Gender Dynamics in Financial Decision-Making: Unveiling the Money Illusion Effect in Brazil*

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Money illusion is a cognitive bias where individuals focus on nominal rather than real values, a concept initially highlighted by Shafir, Diamond, and Tversky (1997). In this study, we replicated four scenarios from their research within the Brazilian context, involving 372 participants making financial decisions impacted by money illusion in contexts of earnings and transactions. Through our analysis, we found that decision-making was significantly influenced by the framing of information, with notable differences in rationality between genders. Our findings highlight that the effects of money illusion may also vary by gender, showcasing distinct patterns of financial behavior between males and females.

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*Code and data supporting this analysis are available at https://github.com/TEJMaster/Replication-For-Money-Illusion.git; Replication on Social Science Reproduction platform available at: https://www.socialsciencereproduction.org/reproductions/1671/published/index

1 Introduction

Money illusion refers to a cognitive bias where individuals tend to assess the valueof money solely based on its nominal value. The real value of money is the nominal value of money plus the inlation rate. thereby overlooking the impact of inflation.This bias can lead to various consequences, such as reluctance to sell assets due to perceived nominal losses, misunderstanding wage increases, and more.

The influential 1997 study by Shafir and colleagues(Shafir, Diamond, and Tversky 1997) has significantly impacted on economic psychology and behavioral economics which introduced the concept of money illusion. The authors argued that money illusion could explain phenomena like inflexible wages and contracts which contrary to traditional economic theories assuming rationality in decision-making.

When shopping, people often ignore information that is clearly distorted by inflation and impulsively raise the psychological price above the actual price, which is the money illusion. Money illusions can lead potential buyers to believe that house prices will always rise, and thus that real estate is a good investment. Robert J. Shiller, a professor of economics at Yale University in the United States, believes that it is the false logic caused by the monetary illusion that led to the real estate bubble, "people mostly only remember the price of a few years ago when they bought a house, but often forget the price of other goods, andmistakenly believe that house prices have risen more than other prices." Thus exaggerating the investment potential of real estate"(Shiller 2014).

For decades, economists have debated whether the money illusion is real or, more generally, whether there are irrational influences in economic transactions.Milton Friedman, the famous monetary theorist, assumed that employers and consumers were rational, paying wages or buying goods with inflation in mind. In other words, they can accurately judge the true value of a commodity(Friedman 2010).

Recognizing the importance of testing theories in different contexts for generalizability, our study aims to investigate the presence of the money illusion effect in a Brazilian cultural setting. Specifically, we aim to replicate four problems proposed by Shafir and colleagues (Shafir, Diamond, and Tversky 1997)and examine if Brazilians exhibit money illusion biases.

In this paper, we focus on the relationship between sex and money illusion in the four problems. According to the references we have found, women is more emotional than men in the aspect of luxury consumptions, despite similar functional value to non-luxury brands, luxury brands command higher prices, especially among female consumers(Stokburger-Sauer and Teichmann 2013).

Our hypothesis are across all four problems: Problem 1, gender and preference in economic decision making; Problem 2, Gender and seller choice; Problem 3, gender and market participation decisions; Problem 4, Gender and financial risk decision making. First of all, we choose the dataset from one replication of "Money Illusion", then we cleaned the dataset and

removed all unnecessary variables in dataset. We plot the graphs of among four problems for male and female respectively. Then we make analysis of it and verify whether we have evidence to against the hypothesis. Then we draw the conclusion and list the limitations of our study.

The findings from experiments investigating gender differences in economic decision-making, highlighting distinct behaviors between men and women acrossvarious contexts, such as job attractiveness, seller selection, buying and selling strategies, and preferences for risky or risk-free contracts. It reveals that both genders show common concerns for economic stability, yet differ in their evaluation of career opportunities, decision-making strategies, and risk preferences. The discussion emphasizes the nuanced role of gender in economic decisions, suggesting further research to explore socio-economic factors, cross-cultural impacts, and psychological dynamics behind these decisions. The study acknowledges limitations due to its experimental design and calls for future research employing more comprehensive and realistic approaches to better understand gender influences in economic behavior.

2 Data

The raw dataset for our study, derived from the replication of the "Money Illusion" effect among Brazilian researchers (Santiago et al. 2023), is archived and accessible through the Open Science Framework (OSF). This dataset encompasses the complete set of responses collected through our online survey, including socio-demographic information, responses to the money illusion problems, and verification question answers. Interested researchers can access the dataset for further analysis or replication studies at the following URL: https://osf.io/48pqu/.

2.1 Dataset Description

The data were collected via an online survey platform of and include a range of variables:

Socio-demographic Information: Participants provided details about their educational background, area of study (if applicable), average monthly family income, and the number of people living off this income.

Economic Decision-Making Scenarios: The core of the dataset revolves around responses to hypothetical scenarios designed to assess susceptibility to the money illusion. These scenarios include decisions about signing contracts under inflation uncertainty, and buying or selling items after an inflation increase, reflecting real-life economic decisions that people might face.

Temporal and Response Details: Each record includes timestamps for the start and end of the survey, the type of response, progress through the survey, duration in seconds, and completion status.

Verification Questions: To ensure participants understood the scenarios accurately, verification questions were included. These serve as a quality control measure, filtering for data quality and comprehension.

2.2 Variable Description

This study serves as a reproduction and further exploration of the seminal work on the money illusion effect, particularly examining the impact of gender on financial decision-making. Utilizing identical datasets as the original paper, our analysis narrows the focus to the variable of gender.

Question 1 Variables:

- ID: Unique identifier for each participant.
- Gender (gênero): The gender of the participant, recorded as 'Mulher' for female and 'Homem' for male.
- Economic Term (economicam): Choice of the individual more likely to leave their job, between 'Carolina' and 'Maria'.
- Happiness (felicidade): The happiness level, which is not filled in the provided data excerpt.
- Job Attractiveness (atratividade_trab): The perceived job attractiveness with choices being 'Carolina' or 'Maria'.

Question 2 Variables:

- ID: Unique identifier for each participant.
- Gender (gênero): The gender of the participant, recorded as 'Mulher' for female and 'Homem' for male.
- Andre (A Casa_1): the actual least seller, recorded as 1, 2, 3 for participant's ranking with 1 represent the best.
- Bento (A casa_2): the actual middle seller, recorded as 1, 2, 3 for participant's ranking with 1 represent the best.
- Marcelo (A casa_3): the actual top seller, recorded as 1, 2, 3 for participant's ranking with 1 represent the best.

Question 3 Variables:

- ID: Unique identifier for each participant.
- Gender (gênero): The gender of the participant, recorded as 'Mulher' for female and 'Homem' for male.
- Selling Chair - Real (poltrona_venda_reais): The likelihood of selling a chair when considering real value changes.
- Buying Chair - Real (poltrona_compra_reai): The likelihood of buying a chair when considering real value changes.

Question 4 Variables:

- ID: Unique identifier for each participant.
- Gender (gênero): The gender of the participant, recorded as 'Mulher' for female and 'Homem' for male.
- Contract Type AB (contrato_AB): The type of contract chosen by the participant, with 'A' indicating a risky contract and 'B' indicating a less risky contract.
- Contract Type CD (contrato_CD): Similar to AB, with 'C' indicating a risky contract and 'D' indicating a less risky contract.
- Contract Type EF (contrato_EF): Similar to the above, with 'E' indicating a risky contract and 'F' indicating a less risky contract.

2.3 Data Analysis Tools

The data analysis was performed using R (R Core Team 2022), a powerful open-source statistical programming language. Key packages from the tidyverse collection (Wickham et al. 2019) were employed to streamline data manipulation, visualization, and analysis processes. These packages include ggplot2 (Wickham 2016) for creating advanced graphics, dplyr (Wickham et al. 2022) for data manipulation, readr (Wickham, Hester, and Bryan 2022) for its robust data reading functionalities, here (Müller 2020) is used to avoid file path issue, and knitr (Xie 2014) for dynamic report generation.

2.4 Measurement and Data Collection

To contextualize the study within the Brazilian socio-economic environment, Brazilian researchers tailored the survey instrument while maintaining the core essence of the original study. A cross-sectional online survey was conducted with the prerequisites that participants be at least 18 years old and give their consent. The study received ethical clearance from the Pontifical Catholic University of São Paulo's Research Ethics Committee in 2021.

Participation was voluntary and uncompensated, and participants had the option to respond to any number of the problems presented. Data were captured using the Qualtrics XM platform over eight months, from December 2021 to July 2022, and were distributed via social media.

The survey gathered socio-demographic information and responses to four problems designed to assess susceptibility to money illusion in contexts such as salary increases, real estate transactions, purchasing/selling decisions, and risk susceptibility. The survey also included verification questions to ensure participant comprehension and to act as a quality control mechanism.

3 Results

3.1 Problem 1: Gender and Preference in Economic Decision-Making

The first analysis, we explored gender perspectives on economic decisions, focusing on preferences for "Carolina" and "Maria" in terms of economic advantage and job attractiveness. The indication of money illusion would be suggested if, for instance, male participants showed a preference for "Carolina" for economic stability and "Maria" for professional opportunities, while female participants exhibited similar or contrasting preferences, thereby revealing gender-specific biases in economic decision-making.

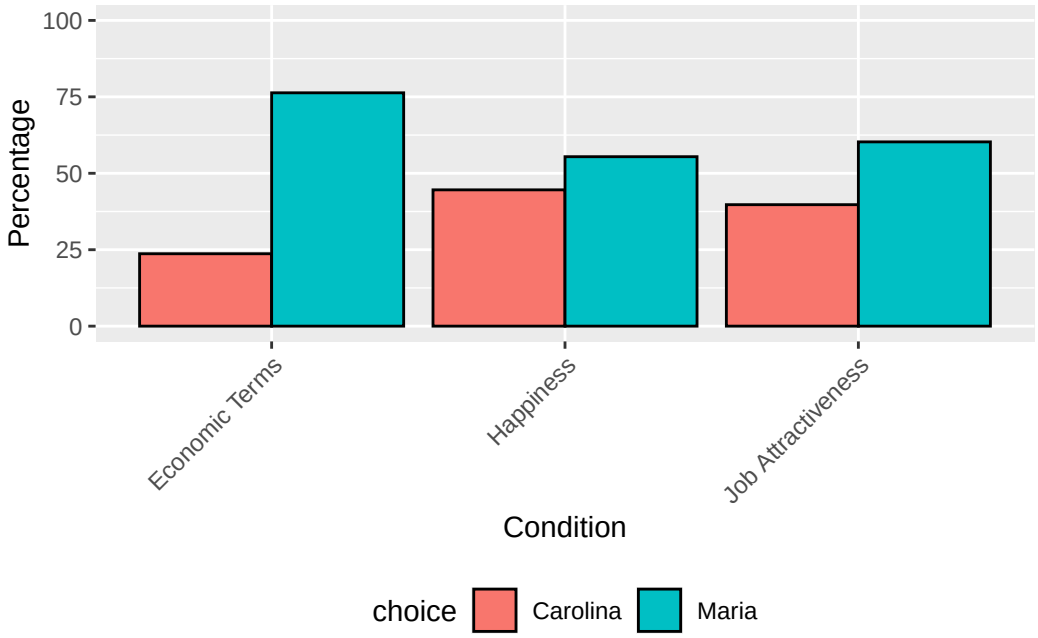

Figure 1: The percentage of female participants' choices within each condition in problem 1.

Observations from Figure 1 for female participants' choices:

For the economic terms, a significant majority of female participants chose "Maria" over "Carolina" in economic terms. This choice distribution is similar to that of the male participants, suggesting a consensus across genders regarding economic choices tied to "Maria". For the happiness, female participants seem evenly split between "Carolina" and "Maria" when it comes to happiness, which differs from male participants, who showed a slight preference for "Carolina" in this condition. This could suggest that women see both "Carolina" and "Maria" as equally viable options for emotional fulfillment or that happiness is not as strongly associated with either choice as it is with economic terms. For the job Attractiveness, the choices for job attractiveness among female participants had a preference for "Maria".

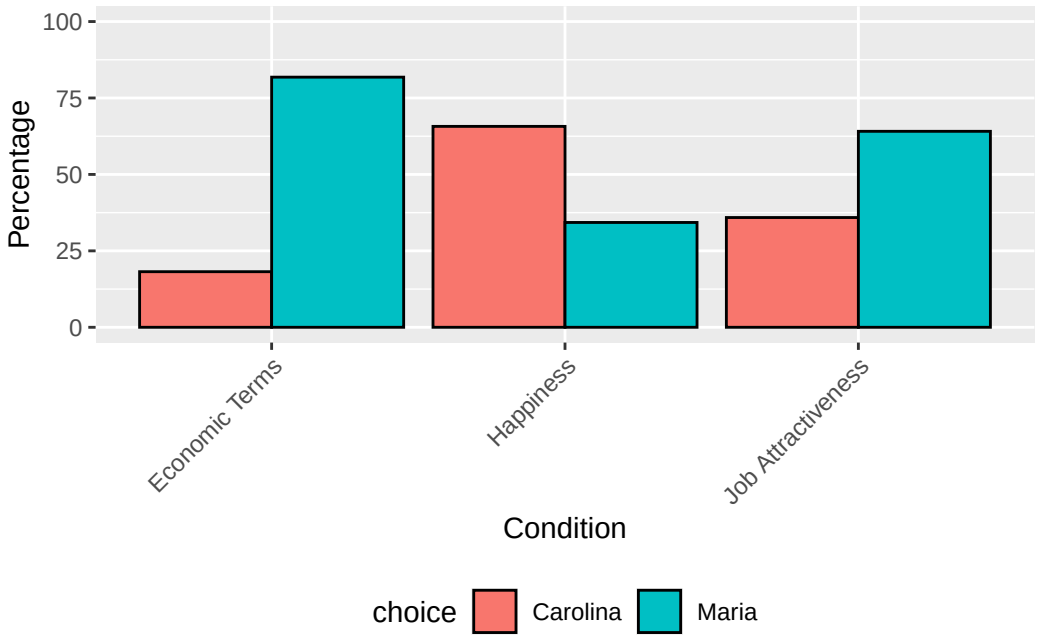

Figure 2: The percentage of male participants' choices within each condition in problem 1.

Observations from Figure 2 for male participants' choices:

For the economic terms, a significant majority of male participants chose "Maria" over "Carolina" in economic terms. This indicates a strong preference for the economic implications associated with "Maria" among male participants, suggesting they may perceive "Maria" as a more stable or profitable economic choice. For the happiness, the male participants' choices for happiness are nearly evenly split, with a slight preference for "Maria." This distribution shows that men do not strongly associate either "Maria" or "Carolina" with happiness or that they see both options as similarly capable of providing emotional satisfaction. For the job Attractiveness, male participants displayed a clear preference for "Maria" in terms of job attractiveness. This could suggest that the attributes or opportunities associated with "Maria" resonate more with men when considering the attractiveness of a job or career path.

Gender Comparison Analysis:

In the problem 1 we examining gender perspectives on economic decisions, specifically preferences between "Carolina" and "Maria" across economic advantage, happiness, and job attractiveness, we found intriguing differences and similarities between genders. Analysis revealed a consensus among both male and female participants, with a strong preference for "Maria" in economic terms, indicating a shared prioritization of financial stability. Interestingly, while men showed a slight preference for "Carolina" in the context of happiness, suggesting a nuanced difference in emotional satisfaction, women were evenly split between "Carolina" and "Maria," implying a more balanced view towards emotional fulfillment. Job attractiveness

presented are the same; males and females both favored "Maria," suggesting a more good valuation of the professional attributes offered by "Maria." This gender comparison underscores the complexity of economic decision-making influenced by gender, with both shared views on economic rationality and distinct approaches to emotional and professional considerations. The results point towards a societal consensus on certain financial principles and happiness while also highlighting nuanced differences in how job attractiveness are perceived, potentially shaped by societal roles, individual experiences, or inherent biases. Such findings stress the importance of understanding gender perspectives in economic decisions, suggesting that while there may be common ground in economic choices and emotional satisfaction, there are significant differences in the valuation of job attractiveness. This analysis, however, is based on the specific context of our study and requires further exploration to understand the broader implications of these gender differences in economic decision-making.

3.2 Problem 2: Gender and Seller Choice

The second analysis, we examined gender perspectives on seller choices, evaluating preferences among "Andre," "Bento," and "Marcelo" based on their appeal and perceived value. The manifestation of the bias would be clear if male and female participants diverged in their rankings, perhaps preferring Marcelo for immediate trustworthiness or value, Andre for immediate appeal, and Bento for balanced appeal, indicating nuanced gender differences in evaluating seller attributes.

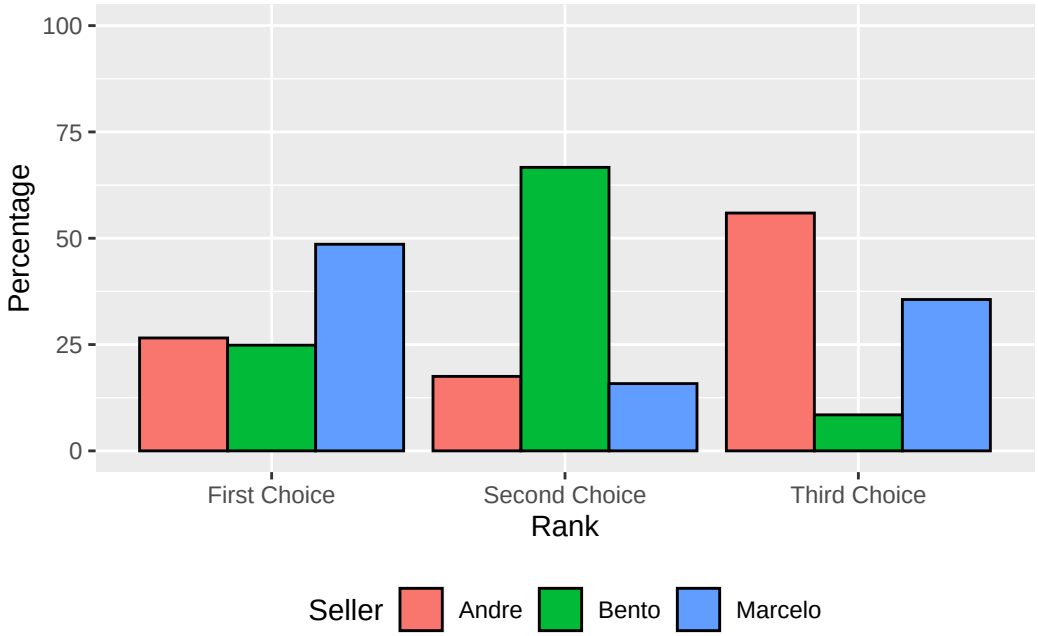

Figure 3: The percentage of female participants' choices ranking each seller in problem 2

Observations from Figure 3 for female participants' choices: First Choice:

For the first Choice, Bento appears to be the least favored as the first choice among female participants. Andre has a moderate preference as the first choice. Marcelo is the most preferred seller for the first choice. For the second Choice, Andre sees a decrease in preference from the first to the second choice. Bento is the most selected as the second choice. Marcelo's preference drops, making him the least favored for the second choice. For the third Choice, Bento is again the least preferred as the third choice. Andre's and Marcelo's preference increases compared to the second choice. Andre became the most favored for the third choice.

Observations from Figure 4 Male Participants' Choices:

For the first Choice, Andre has the highest preference as the first choice among male participants. Bento is the least preferred as the first choice. Marcelo has a moderate preference as the first choice. For the second Choice, Andre's preference decreases significantly from the first

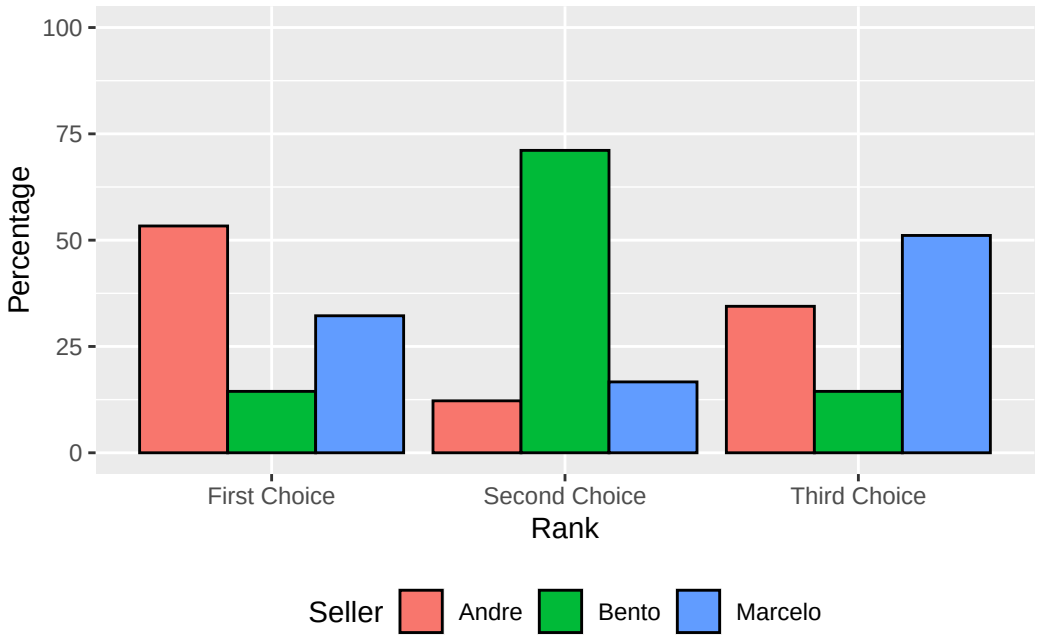

Figure 4: The percentage of male participants' choices ranking each seller in problem 2

to the second choice. Bento is the most preferred as the second choice, showing a substantial increase from the first choice. Marcelo's preference remains relatively stable across the first and second choices. For the third Choice, Andre has a moderate increase in preference as the third choice. Bento's preference drops from the second choice. Marcelo sees a significant increase and is the most favored as the third choice.

Gender Comparison Analysis:

In our problem 2, investigation into gender dynamics within economic decision-making, particularly examining preferences for "Andre," "Bento," and "Marcelo" across first, second, and third choices, a detailed pattern of gender-based differences and evolving preferences emerged. The analysis disclosed a shared yet shifting perspective among male and female participants in their selection sequence. Initially, male participants predominantly favored "Andre" as their first choice, suggesting a distinct preference aligned with specific attributes or perceived benefits associated with "Andre." Conversely, female participants demonstrated a significant preference for "Marcelo," indicating differing priorities or perceived advantages. As participants progressed to their second and third choices, notable shifts in preferences were observed, reflecting a complex evaluative process. "Bento" emerged as a common preference across genders for the second choice, highlighting a reassessment of value or appeal. By the third choice, "Marcelo" gaining favor among males, and "Andre" gains favor among females. This analysis illuminates the nuanced nature of gender influences on economic decisions, revealing both shared and distinct patterns of preference evolution. The initial gender-specific choices evolve through a dynamic process of reevaluation, leading to a shared recognition of value in

the final choice. This highlights the complexity of decision-making processes, influenced by a blend of societal roles, individual experiences, and perhaps inherent biases. These findings underscore the importance of acknowledging gender perspectives in understanding economic decision preferences, suggesting that while there may be commonalities in final choices, the journey to these decisions can significantly differ between genders. This exploration, rooted in the specific context of our study, calls for further investigation into the broader implications of gender differences in economic decision-making processes.

3.3 Problem 3: Gender and Market Participation Decisions

The third analysis delved into gender perspectives on financial decisions, with participants choosing to buy or sell under conditions of varying likelihoods ('More', 'Same', 'Less'). The presence of money illusion would be inferred if there were a gender-based pattern in the willingness to engage in financial transactions, reflecting underlying gender differences in risk tolerance and investment strategy.

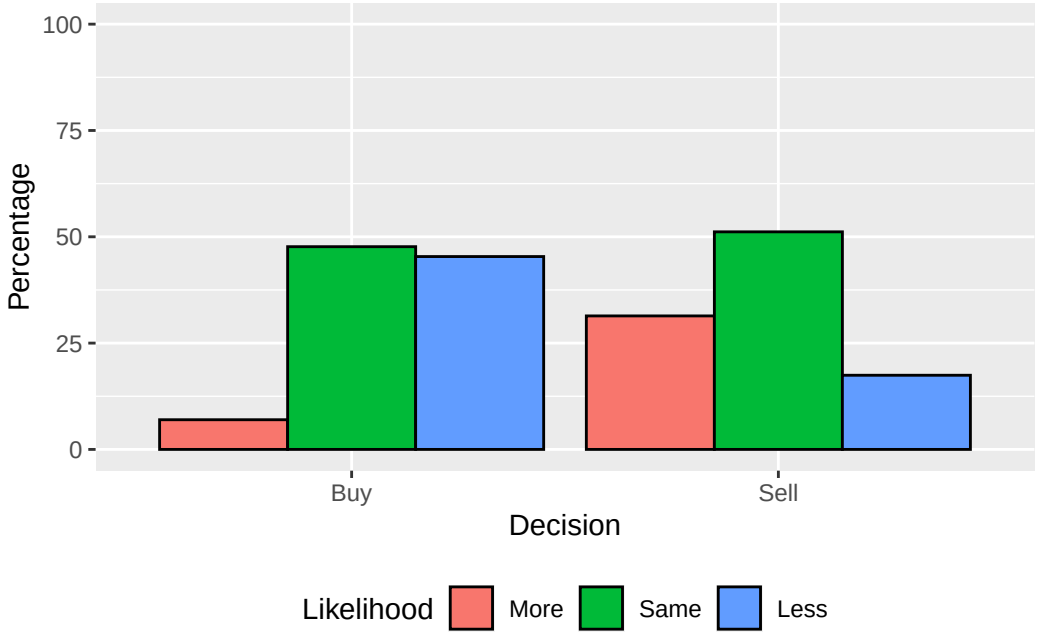

Figure 5: The percentage of female participants' choices (more, same, less) for both 'buy' and 'sell' conditions in problem 3

Observations from Figure 5 for female participants' choices:

For the buy decisions, females show the least likelihood to buy more and a similar inclination to buy less or the same. For the sell decisions, the tendency to sell more is considerably higher than to sell less, with selling the "same" is the first choose.

Observations from Figure 6 for male participants' choices:

For the buy decisions, males show a balanced approach between buying more and the same, with less likelihood to buy less. For the sell decisions, there is a strong preference for selling the same, followed by selling more, and the least for selling less.

Gender Comparison

In our investigation into problem 3, focusing on gender dynamics within buying and selling decisions, we unveiled compelling gender-specific preferences that significantly enrich our

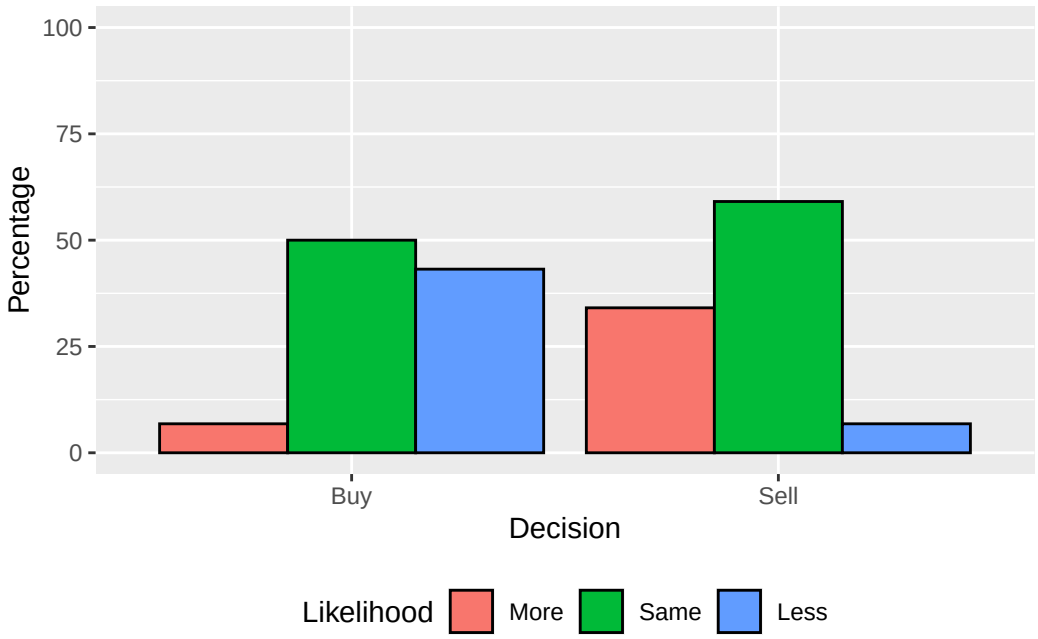

Figure 6: The percentage of male participants' choices (more, same, less) for both 'buy' and 'sell' conditions in problem 3

understanding of economic behavior. The study meticulously examined the differences and similarities in how males and females approach financial transactions, particularly through the lens of risk tolerance and strategic financial planning. Our findings highlighted a shared emphasis on cautious financial management, yet revealed distinct gender-based strategies when delving deeper into the specifics of buying and selling actions. The analysis demonstrated a notable consensus in prioritizing financial prudence, with both genders exhibiting a strategic approach to economic transactions. However, the nuances in behavior became apparent when dissecting the data further. Females displayed a tendency towards conservatism in buying decisions, showing a lesser likelihood to increase their purchasing volume. This cautious approach suggests a higher degree of risk aversion, possibly rooted in a desire for financial stability or influenced by broader societal or individual factors. In contrast, males presented a more balanced buying strategy, showing an openness to both increasing and maintaining their purchase levels, which might indicate a more optimistic outlook on financial growth or a greater confidence in navigating market conditions. When analyzing selling behaviors, the Same choices for men and women. females and males both demonstrated a preference for maintaining their current asset levels, suggesting a long-term investment perspective or a cautious approach to market fluctuations. This gender comparison underscores the complexity of financial decision-making processes, revealing that while there is a shared foundation of financial caution, the methods and motivations driving these decisions diverge significantly between genders. The findings suggest that societal norms, personal experiences, and possibly inherent biases influence these economic behaviors, highlighting the importance of incorporating

gender perspectives in financial decision-making studies. Such insights into buying and selling behaviors not only contribute to our understanding of economic dynamics but also suggest that gender differences in risk tolerance and financial strategy are crucial factors in economic decision-making.

3.4 Problem 4: Gender and Financial Risk Decision-Making

The fourth analysis, we focused on gender perspectives on financial risk decisions, where participants were asked to choose between riskier and less risky contracts in nominal, real, or neutral terms. The evidence of the illusion would be apparent if participants, influenced by gender perspectives, showed distinct preferences for certain contracts, revealing a gendered approach to risk assessment in different economic scenarios.

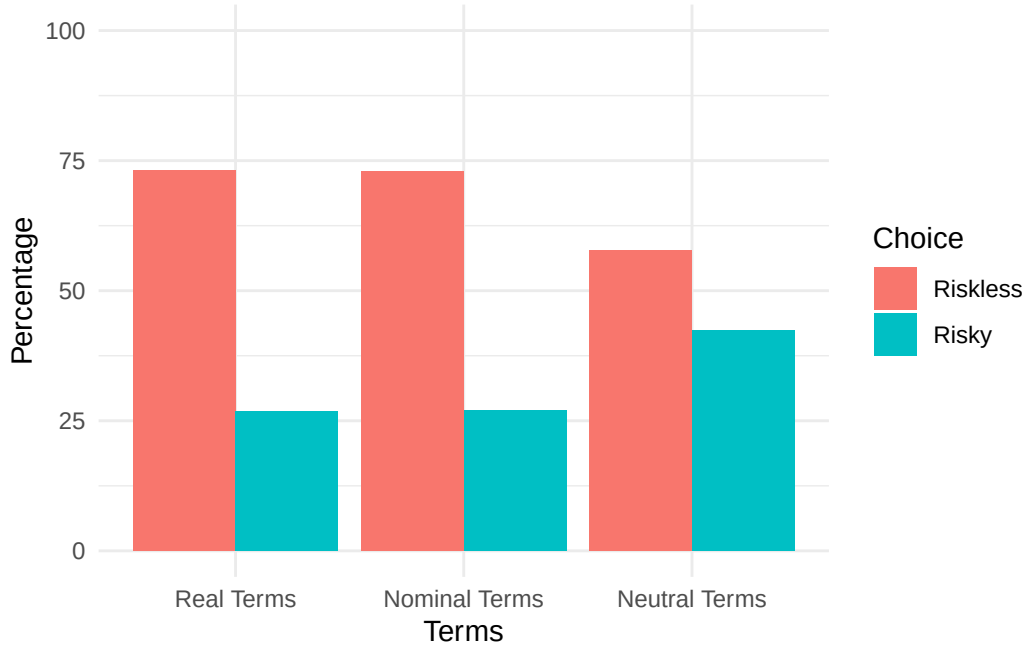

Figure 7: The percentage of female participants' choices of contract types across frames(real, nominal and neutral) in problem 4

Observations from Figure 7 for female participants' choices:

For the real terms, females show a preference for riskless contracts. For the nominal terms, a slight preference for riskless contracts over risky ones. For the neutral terms, the distribution is more balanced, but still, riskless contracts are slightly preferred.

Observations from Figure 8 for male participants' choices:

For the real terms, males show an overwhelming preference for riskless contracts in real terms. For the nominal terms, the preference shifts towards riskless contracts. For the neutral terms, there is a nearly even split, with a slight lean towards risky contracts.

Gender Comparison:

In our study examining gender perspectives on economic decisions, particularly in the context of contract preferences under different terms (real, nominal, and neutral), we observed distinct

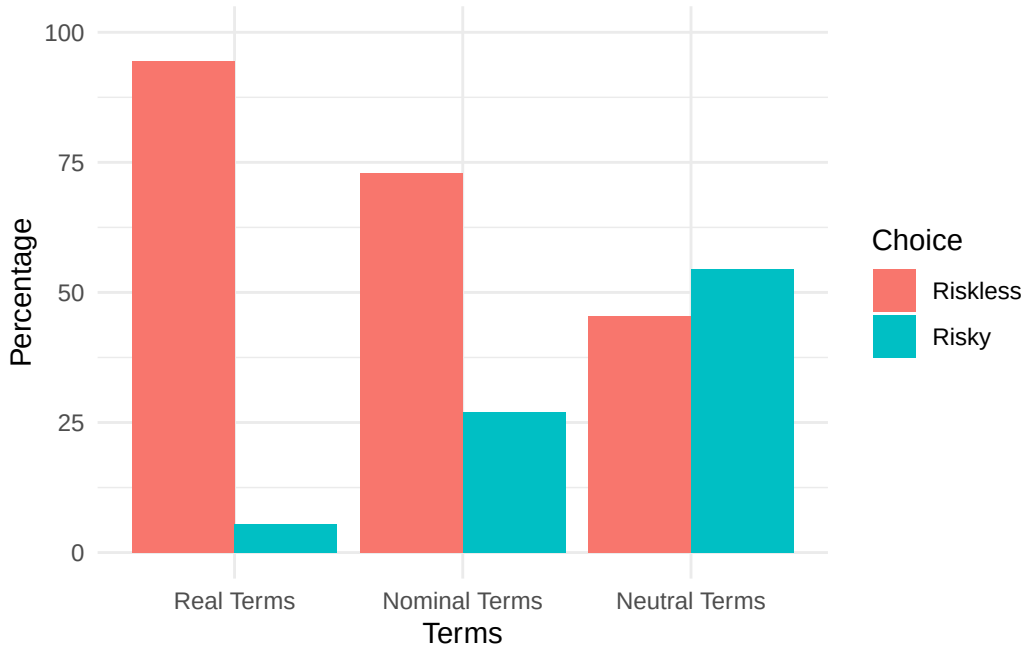

Figure 8: The percentage of male participants' choices of contract types across frames(real, nominal and neutral) in problem 4

patterns between male and female participants. Females consistently demonstrated a preference for riskless contracts across all terms, with their preference being strongest in real terms and slightly less pronounced but still evident in nominal and neutral terms. This indicates a general female inclination towards financial stability and aversion to risk, regardless of the framing of the economic conditions. Males, on the other hand, showed a significant preference for riskless contracts in real terms, mirroring the strong aversion to risk seen in female preferences. However, when considering nominal terms, this preference, while still leaning towards riskless contracts, becomes less overwhelming, suggesting a somewhat greater tolerance for risk under conditions where the economic framing is less directly tied to tangible outcomes. Interestingly, in neutral terms, males displayed a nearly even split in their preferences, with a slight tendency towards risky contracts, indicating a nuanced shift towards risk acceptance when the economic decision-making context is perceived as more abstract or balanced. These findings highlight the complexity of economic decision-making influenced by gender, revealing both shared and divergent attitudes towards risk under varying economic framings. The gender comparison underscores a societal trend towards risk aversion, particularly in contexts closely associated with real-world financial stability, but also points to nuanced differences in how risk is approached under different conceptual framings. This suggests that while there may be common ground in economic choices, especially in scenarios with clear, real-world implications, significant differences emerge in how risk is valued and managed, potentially shaped by societal roles, individual experiences, or inherent biases. This analysis calls for a deeper understanding of gender perspectives in economic decisions, emphasizing the importance of

context in shaping preferences towards risk and stability.

4 Discussion

4.1 Findings

The first experiment focused on exploring how gender affects individuals' decision-making preferences when faced with economic terms and job attractiveness choices. The analysis showed that both men and women agreed on their choices regarding economic terms, generally preferring "Carolina," which may reflect a common concern for economic stability across genders. However, differences between genders became evident in terms of job attractiveness, with men preferring "Maria," suggesting they have different evaluations of career opportunities and potential for development compared to women. The second experiment examined how men and women make choices based on different characteristics of sellers. The results indicated that men and women initially preferred different sellers, with men choosing Andre and women choosing Marcelo. This finding may reflect different strategies and priorities in economic decision-making between genders. As the choices progressed, preferences for sellers converged, especially in the final choice, where Marcelo became the most popular seller. The third experiment focused on how gender affects buying and selling decisions, especially under different probability conditions. It was observed that women showed a lower likelihood in purchasing decisions and a greater tendency to increase sales, possibly indicating a cautious attitude towards buying and an active strategy towards selling. In contrast, men exhibited a more balanced approach to both buying and selling decisions, suggesting a preference for maintaining the status quo rather than making radical adjustments in changing market conditions. The fourth experiment delved into how gender influences individual preferences for different types of contracts (risky and risk-free) and different economic terms (real, nominal, neutral). Results showed that both men and women preferred risk-free contracts when it came to contracts adjusted for real terms, possibly indicating a common preference to protect purchasing power against inflation. However, under nominal terms, men were relatively more inclined to choose risky contracts, revealing a willingness to take risks for higher returns without inflation adjustment.

4.2 Another Understanding of the World

The results from the first experiment further revealed the impact of gender perspectives on preferences for economic stability and career development. Specifically, the even distribution of choices among women regarding job attractiveness may indicate they consider a more diverse set of factors in career choices, including but not limited to economic benefits, perhaps placing more emphasis on job satisfaction and other aspects of career development. The dynamic change in gender decision-making observed in the second experiment suggests significant gender differences in initial choices, which may diminish as more information is processed. This

may illustrate a complex evaluation process individuals undergo before making final economic decisions, where initial impressions may be revised. The third experiment's results further reinforced our understanding of gender differences in economic risk assessment. Women's more conservative buying behavior and more aggressive selling tendency may reflect their strategy of balancing financial security and opportunities. Men's balanced buying and selling behavior may represent a more robust long-term investment perspective. The findings of the fourth experiment further emphasized differences in financial risk tolerance between genders. Particularly under nominal terms, men's higher risk preference may reflect a pursuit of potential high returns, while women's conservative choices may more reflect a focus on capital preservation. These differences are significant for understanding how gender affects investment decisions and financial planning. Overall, these four experiments have taught us that gender plays a complex and multidimensional role in economic decision-making. Gender not only influences individuals' views on economic stability, career opportunities, market behavior, and risk preferences but also affects the processing of information and the formation of final choices during the decision-making process.

4.3 Limitations of the Study:

The first experiment provided insights into gender differences in economic decision-making but also had limitations. For example, it might not have captured all relevant factors influencing economic decisions, such as individuals' economic background, education level, and expectations of future economic conditions. Moreover, the experimental design might have been too simplistic to fully reflect the complexity of real-life decision-making processes. Despite the second experiment offering insights into how gender affects preferences for sellers, it had limitations. For instance, it might not have fully considered other factors influencing decisions, such as individual experience, market conditions, and specific information provided by sellers. Additionally, the artificial setting of the experimental environment might limit the generalizability of the results. The analysis of the third experiment, although revealing potential gender impacts on economic decisions, might not have fully considered other influencing factors, such as individuals' financial knowledge, past experiences, and socio-economic backgrounds. Furthermore, the experimental setup might have been too simplistic, failing to capture all complexities of real-world decision-making. Despite the valuable insights provided by the fourth experiment regarding the relationship between gender and risk preferences, it too had limitations. First, the experimental setting might not have adequately simulated the complex decision-making environment of the real world, especially in financial market investment decisions. Second, the experiment might not have considered individuals' financial knowledge, experience, and other socio-economic factors that could affect risk preferences. Overall, while these experiments provided valuable insights into the role of gender in economic decision-making, they also had limitations, including the possibility that the simplified experimental settings might not fully simulate the complexity of the real world and the lack of consideration for individual experiences, socio-economic backgrounds, and other factors.

4.4 Future Directions and How to Continue:

For Experiment 1, to further understand the role of gender in economic decision-making, future research needs to adopt a more comprehensive approach that considers a broader range of socio-economic factors and individual differences. Additionally, studies can explore how gender affects individuals' perceptions of and strategies for dealing with economic risks, and how these differences impact individuals' long-term economic well-being. Cross-cultural studies could further investigate how gender impacts economic decision-making across different socio-cultural backgrounds. Moreover, qualitative research methods such as in-depth interviews and case studies will help reveal the psychological dynamics and social influences behind decisions, providing richer insights for developing more effective economic policies and educational programs. For Experiment 2, future research should explore more factors influencing the choice of sellers, such as the dynamics between sellers and buyers, the impact of marketing strategies, and how personal characteristics of sellers affect buyers' choices. By using a more diverse sample of participants, increasing the complexity of scenarios, and applying mixed-methods research designs, our understanding of how gender influences economic decisions can be enhanced. Furthermore, considering how cultural and socio-economic factors shape gender roles is also an important direction for future research. For Experiment 3, future research needs to explore other variables beyond gender that affect economic decisions and attempt to replicate these findings under more realistic conditions. Additionally, studies should consider how cultural differences and social structures shape economic behavior and how education and policy interventions can mitigate the adverse effects of gender differences. Through more in-depth quantitative and qualitative research, a more comprehensive understanding of how individuals make decisions in different economic contexts can be achieved. For Experiment 4, future research should investigate gender differences across more dimensions, including how education and policy interventions can balance these differences. Studies could be extended to individuals across different cultural and social backgrounds to explore how cultural factors influence the relationship between gender and economic decisions. Furthermore, using qualitative methods to delve into the motivations and emotional factors behind individual decisions is also an important direction for future research. By combining quantitative data and qualitative insights, a more comprehensive understanding of the role of gender in economic decision-making can be developed, providing a basis for designing more effective financial planning and educational strategies. Overall, future research needs to take a more holistic approach to explore how factors beyond gender affect economic decisions and how these decisions change over time and across contexts. Cross-cultural comparative studies can reveal how gender roles in different socio-cultural backgrounds shape economic behavior. At the same time, in-depth qualitative research will help understand the psychological motivations behind decisions, offering richer insights for designing targeted economic policies and educational plans.

5 Apenndix

5.1 Data Sample

Table 1: Sample of the Cleaned Data for Money Illusion Study - Question 1

ID	Gender	Economic Term	Happiness	Job Attractiveness
1	Mulher	Carolina	NA	NA
2	Mulher	Carolina	NA	NA
3	Homem	NA	Maria	NA
4	Mulher	NA	Maria	NA
5	Mulher	NA	NA	Maria
6	Mulher	NA	NA	Maria

In this Table 1 which reflects responses to a study on money illusion in Brazil, participants were asked to consider scenarios involving two workers, Maria and Carolina. Maria is the worker who received a real salary increase, which is an important detail for interpreting the Economic Term and Job Attractiveness columns. Respondents chose between "Maria" or "Carolina" for the person more likely to leave her job. The column "Happiness" is not filled in this excerpt, and "NA" indicates no choice was made by some respondents for certain questions. The Gender column distinguishes between "Mulher" (female) and "Homem" (male).

Table 2: Sample of the Cleaned Data for Money Illusion Study - Question 2

ID	Gender	Andre	Bento	Marcelo
1	Mulher	3	2	1
2	Mulher	3	2	1
3	Homem	3	1	2
4	Mulher	3	2	1
5	Mulher	3	2	1
6	Mulher	3	2	1

This Table 2 represents a subset of data from a study examining money illusion, specifically focusing on Question 2 where participants ranked three house sellers—André, Bento, and Marcelo—according to the perceived success of their transactions. A response with ranking of "1" signifies the best deal, suggesting the most favorable outcome for the seller, whereas a "3" indicates the least favorable or worst deal. The table lists the participant's gender as "Mulher" for female and "Homem" for male, followed by their rankings for each seller. The actual ranking is: Marcelo as the top seller (1), Bento in the middle (2), and André as the least successful (3).

Table 3: Sample of the Cleaned Data for Money Illusion Study - Question 3

ID	Gender	Selling Chair - Real	Buying Chair - Real
1	Mulher	NA	NA
2	Mulher	NA	NA
3	Homem	Igual	Menos suscetível
4	Mulher	NA	NA
5	Mulher	Menos suscetível	Mais suscetível
6	Mulher	NA	NA

The Table 3 represents data from a study examining the concept of money illusion in decision-making, specifically regarding the perceived value of buying and selling under inflationary conditions. The participants, identified by gender and denoted as 'Mulher' for female and 'Homem' for male, were asked to evaluate their propensity to buy or sell a chair given changes in real value. The terms "Menos suscetível" (Less susceptible), "Igual" (Same), and "Mais suscetível" (More susceptible) indicate the participants' likelihood of buying or selling the chair, with 'NA' representing a lack of response. This part of the study probes whether inflationary illusions affect individuals' willingness to engage in transactions, contrasting their readiness to sell against their inclination to buy.

Table 4: Sample of the Cleaned Data for Money Illusion Study - Question 4

ID	Gender	Contract Type AB	Contract Type CD	Contract Type EF
1	Mulher	NA	D	NA
2	Mulher	NA	NA	E
3	Homem	NA	NA	F
4	Mulher	B	NA	NA
5	Mulher	NA	C	NA
6	Mulher	B	NA	NA

The Table 4 displays a subset of responses from a study exploring the influence of money illusion on contract selection. Participants, differentiated by gender as 'Mulher' for female and 'Homem' for male, had to choose between contracts labeled A, B, C, D, E, and F under varying conditions reflecting different levels of risk. Contract types AB, CD, and EF correspond to different framing conditions: nominal, real, or neutral. Contracts A, C, and E represent riskier options with certain nominal returns but uncertain real returns, capturing the essence of money illusion if chosen. The responses marked 'NA' indicate where participants did not make a selection. This component of the study aimed to determine whether participants' contract choices were swayed by nominal versus real terms, signifying the presence of money illusion.

5.2 Rough Sketch about Brainstorming

For a visual depiction of the brainstorming process and the initial ideas that shaped this study, please refer to the document located at `inputs/misc/Plan-Sketch.pdf`. This sketch includes preliminary thoughts on the data structure and one potential approach to address the research questions.

5.3 Data Simulation

The simulated dataset, designed to mirror the structure of the actual "Money Illusion" dataset, can be found at `scripts/00-simulate-data_data.R`. This script meticulously generates a dataset of 1000 hypothetical survey response instances.

5.4 Data Cleaning Process

Data cleaning is a critical step in ensuring the accuracy and reliability of the analysis.The detailed procedure and the R script used for data cleaning are available in `scripts/01_cleanup_data.R`.The script elucidates the steps taken to refine the dataset by filtering out incomplete records and unnecessary columns for this study. The steps are: 1.Remove the first row in the dataset, since it is used to store the description to the column name.2. Remove unnecessary columns for this study, by only keep the gender and responses columns.3. Remove all gender rows with 'na' since this study is focusing on the behavior for money illusion for male and female participants. The cleaned dataset is conveniently saved at `outputs/data/cleaned_money_data.csv`, ready for in-depth analysis.

5.5 Data Set Validity Testing

To affirm the integrity and consistency of the cleaned dataset, a series of validation tests are performed using the script `scripts/03-test-data-validity.R`. This script performs three crucial checks to ensure the data set's accuracy and consistency:

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