

# TRABAJO DE FIN DE GRADO



Facultad de Ciencias Económicas y Empresariales

Grado en Economía

Curso Académico 2019/2020

## **INEQUITY AVERSION: DEMOGRAPHIC FACTORS, SOCIAL FRAMING AND MOTIVES**

**Autor:** Juan B. González Blanco

**Tutores:** Pablo Brañas y Diego Jorrat

15 de junio de 2020

## Agradecimientos

En primer lugar, quiero darle las gracias a Pablo Brañas y Diego Jorrat por darme la oportunidad de realizar esta investigación, por su paciencia y por todo el tiempo que me han dedicado.

Por supuesto, este trabajo no hubiera sido posible sin la cesión de los bases de datos que aquí se analizan. Debo dar las gracias por esa cesión sobre todo a Pablo y Diego, pero también a Antonio Espín, Filippos Exadaktylos, Pedro Caldentey, Teresa García y Ana Hernández.

A Juanfri, por ser mi mayor apoyo en estos meses. A Lucía, por todo. A mis amigas, por su tiempo y su cariño. A Riccardo y a Alfonso por iniciarme en los caminos de Stata. A Benito M. Ocasio, por estar siempre ahí.

## Nota

Todas las figuras, tanto tablas como gráficas, son de **elaboración propia**. Para evitar repeticiones innecesarias, no se ha incluido la fuente bajo cada una de ellas.

**Resumen:** La economía experimental ha demostrado que muchos seres humanos buscan resultados equitativos cuando toman decisiones, incluso cuando ello les perjudica. La aversión a la desigualdad tiene importantes implicaciones para los mercados y las políticas públicas, por lo que es imprescindible comprender qué factores la causan y cómo se desarrolla. En este trabajo se analiza en qué medida los factores demográficos (género, edad, renta y educación), el marco de interpretación y la combinación de preferencias sociales explican las diferencias individuales en la aversión a la desigualdad. Encontramos que la edad y el género son especialmente relevantes en el proceso de desarrollo de la aversión a la desigualdad y que el marco de interpretación y otras preferencias deben ser tenidas en cuenta a la hora de su estudio. Estos resultados aportan evidencias de por qué las personas cuidamos unas de otras.

**Palabras clave:** preferencias sociales; aversión a la desigualdad; envidia; compasión; *social framing*

**Abstract:** Experimental economics has shown that many human beings search for egalitarian results when they make decisions, even if doing so is detrimental to their interests. Inequity aversion has huge implications for markets and policy, so it is essential to understand which factors cause it and how it develops. In this essay, we analyse to which extent demographic factors —gender, age, income and education—, social framing and the combination of social preferences explain individual heterogeneity in inequity aversion. We find that age and gender are highly relevant during the development process of inequity aversion, and that social framing and other social preferences must be considered when studying it. These findings shed some light on why people take care of each other.

**Keywords:** social preferences; inequity aversion; envy; compassion; social framing

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# 1 Introduction

Economics is usually defined as the science that studies how humans satisfy their necessities. Despite humans are by nature social animals, the economic science modelled humans as self-regarding individuals for quite some time. The *homo economicus* just care for himself and rationally maximize his self-interest. This is called *self-centered preferences* or *rationality*.

This controversial paradigm did not last long. Since the 90s, Behavioural and Experimental Economics (hereafter Behavioural Economics) showed that real humans are not so rational as economic theory considers them. This emergent field also empirically demonstrated that humans do care about others as well. After decades of debate, economic theory finally incorporated the commonsensical fact that people care about each other. This is called *Social preferences*.

Social preferences, that is, the care for the material situation of others beyond oneself, entirely changed the model. Non-selfish individuals constantly deviate from Nash equilibria (see e.g. [Attanasi and Nagel \(2008\)](#); [Battigalli and Dufwenberg \(2009\)](#); [Iriberry and Rey Biel \(2011\)](#) for theoretical implications of social preferences). They also alter predicted outcomes in coordination, bargaining and strategic behaviour in markets (see e.g. [Camerer \(2003\)](#); [Brañas-Garza \(2011\)](#) for a review of economic consequences of social preferences and non-rationality). So, if we want to truly understand how humans make economic decisions, we need to consider social preferences.

Behavioural economics currently identify three main social preferences beyond selfishness: reciprocity, altruism and inequity aversion. In the current essay, we focus on inequity aversion (IA), i.e., the desire for egalitarian outcomes. Based on the most influential inequity aversion model developed by [Fehr and Schmidt \(1999\)](#), we explore three topics on IA: individual heterogeneity, social framing, and mixed motives.

A relevant fraction of the population value egalitarian outcomes, but not everyone values them to the same extent. Some people just do not care about others and some of them are willing to sacrifice some gains to reach a fair outcome. These differences in

inequity aversion are called *individual heterogeneity* regarding IA. Along this essay, we analyse some of the demographic factors that may explain this heterogeneity. We explore the relation of gender, age, income and education to IA preferences, in order to draw some conclusions and better understand social preferences and their implications. We also test how *social framing*, that is, how individuals interpret their environment, can shape inequity aversion. Additionally, we explore how reciprocity, altruism and inequity aversion make up *mixed motives* of human behaviour.

While these topics have been previously covered by the literature, results are not clear. Earlier investigations have mainly employed experimental choices in economic games to study IA. In this essay, we take an alternative approach and use novel self-reported measures rather than experimental choices. Self-reporting is crucial in the investigation of social norms and expectations, so they can shed some light onto unclear topics in IA. In order to do so, we use more than 4,000 unique observations from 6 different experiments belonging to previous research by [Exadaktylos et al. \(2013\)](#); [Brañas-Garza et al. \(2014, 2020a,b\)](#) and [Jorrat \(2020\)](#). The use of self-reported data combined with experimental choices and the large number of observations are key strengths of this study.

The essay is structured as follows. First, in Section 2 we explain how behavioural economics has modelled social preferences, focusing on the Fehr & Schmidt model. The main findings on individual heterogeneity, social framing and mixed motives are also reviewed. We present in Section 3 the novel self-reported measures of envy and compassion, with their strengths and limitations. This explanation is followed in Section 4 by a brief description of the data gathering methodology and the differences between databases. Our results are presented and discussed in Sections 5 and 6. Finally, the main findings are synthesized in Conclusions (Section 7). Annex A.1 includes the specification of extensions and complementary measures, while Annex A.2 displays additional graphs and robustness checks.

## 2 Literature review

### 2.1 Social Preferences & Inequity Aversion

The idea that “people not only care about their own welfare but also for the well-being of others, and that this may have important economic consequences” (Fehr, 2009) is not new in economics. Adam Smith, considered one of the founding fathers of the field, thought morality played a crucial role in economic decision making (Smith, 2010). Smith viewed decisions as a struggle between “passions” and an “impartial spectator” —a “moral hector who, looking over the shoulder of the economic man, scrutinizes every move he makes” (Grampp, 1948, p.317). Also, John M. Keynes stressed the importance of psychological and moral factors in his seminal explorations of economic behaviour (Thaler, 2000; Barnett, 2015).

Nevertheless, after the mathematical revolution of the 1940s moral and others-regarding motives were put aside for some decades. The *homo economicus* paradigm became mainstream. Individuals were modelled as subjects that cared only for their material well-being. The exclusion of the care for others did not last, as evidence against it piled. Even “mainstream” economists, such as Nobel Prize winners Becker (1974), Samuelson (1993), Sen (1995) and Selten (1998), started to realize the need to internalize the care for others in individual utility functions. By the end of the 20<sup>th</sup> century, it was clear that the self-interest model couldn't correctly predict economic behaviour (Fehr and Gächter, 2000; Camerer and Fehr, 2006). Economic theory had to get beyond the *homo economicus* paradigm. Behavioural economics thus undertook the various challenges of empirically developing economic theory. The particular challenge of incorporating the care for others' welfare into individualistic utility functions gave rise to a new research field: Social preferences.

Harsanyi (1955) is usually recognized as coiner of the term *social preferences*: individualistic value judgements about the material situation of other members of the society (Cabralés and Ponti, 2011). Nowadays, it is considered that “a person exhibits social preferences if she does not only care about the material resources allocated to her but

also cares about the material resources allocated to relevant reference agents” (Fehr and Fischbacher, 2002, p.2). This means that people do not only care about their material situation nor only about others’ but that a trade-off between own and others’ gains occurs in economic decisions (Andreoni and Miller, 2002). In this trade-off, some people prefer to just maximize their selfish gains while others are concerned with external agents. Therefore, not everybody exhibits social preferences to the same degree but there is individual heterogeneity (Fehr and Gächter, 2000; Fehr, 2009).

Researchers have developed several theories to explain how a person takes into account others’ welfare and at the same time selfish gains. These theories are widely varied. While each of them sheds light on a particular aspect or motive of social preferences, they can be broadly classified as follows:

- *Reciprocal fairness* theories: social preferences emerge as a consequence of reciprocity. Individuals behave procedurally fairly: they value positively others’ kind intentions and negatively their hostile ones. This means that in a two-player game if player A behaves selfishly, player B will also be selfish or try to punish him. However, in the case player A gets more resources and inequality rises between them, player B will not punish him. The most relevant reciprocal fairness theories have been developed by Rabin (1993); Levine (1998); Charness and Rabin (2002); Dufwenberg and Kirchsteiger (2004) and Falk and Fischbacher (2006).

- *Inequity aversion* theories: the care for others is reflected as dislike for inequality or welfare differences among agents. In this case, individuals do not only value reciprocity but they respond to the difference in outcomes. This means that if inequality is created by chance, for example by random allocation of resources, inequity averse individuals will take action to redistribute resources and reduce inequality. The most influential theories based in inequity aversion are the Bolton and Ockenfels (2000) model and, especially, the one created by Fehr and Schmidt (1999).



· *Unconditional altruism* theories: subjects value positively the gains of others, no matter what. Altruist subjects do not condition their behaviour on the action of others nor punish other people for unfair actions. A review of most relevant altruism-based theories can be found in [Fehr and Fischbacher \(2003\)](#) and [Cox \(2007\)](#).

In addition to them, other theories have focused on the role of social image and reputation ([Bénabou and Tirole, 2006](#)), the inner rewards of altruism ([Andreoni, 1990](#)) and a combination of moral and ethical considerations, social scrutiny and the stakes of the decisions ([Levitt and List, 2007](#)).

Experimental evidence support both groups of theories, generating great debate about the motives and modelling of social preferences (see e.g. [Engelmann and Strobel \(2004\)](#); [Fehr and Fischbacher \(2002\)](#); [Fehr et al. \(2006\)](#) for debates on the topic). But in recent years, the emergence of neuroeconomics has contributed with a distinct insight into the debate. The neural evidence points (as current methodologies cannot yet infer causality) to the broad support of social preferences. It suggests the individualistic valuation of others' welfare, since altruistic and selfish choices seem to be made in the same part of the brain ([Fehr, 2009](#); [Fehr and Krajbich, 2013](#)). More specifically, neuroeconomics has given some evidence supporting inequity aversion models, as people in cooperative contexts value positively the redistribution of previously randomly allocated resources ([Tricomi et al., 2010](#)). Therefore, there is neural evidence in support of inequity aversion models and which contradicts theories based entirely on reciprocal fairness.

In this essay we focus on the most influential inequity aversion model: the [Fehr and Schmidt \(1999\)](#) model. However, that focus does not mean we should disregard other explanations of social preferences. Individuals are strongly motivated by reciprocity even in typical inequity aversion choices ([Falk et al., 2008](#)). The interrelation of these social preferences norms is further analysed in Section [5.3](#).

## 2.2 The Fehr & Schmidt model

The [Fehr and Schmidt \(1999\)](#) model is the most important outcome-based fairness model. It is modelled as a two-player interaction: what matters for player A is her own material payoff and the difference with player B's gains. Unlike reciprocal fairness theories, the path followed to that unequal distribution is not considered. Even if resources had been allocated by chance, an inequity averse person would take action to reduce that inequality. In words of [Fehr and Fischbacher \(2002\)](#):

“Inequity averse persons want to achieve an equitable distribution of material resources. This means that they are altruistic towards other persons, i.e., they want to increase the other persons' material payoff, if the other persons' material payoffs is below an equitable benchmark, but they feel envy, i.e., they want to decrease the other persons' payoffs, when the payoffs of the others exceed the equitable level.” (p.2)

Formalizing that theory, the evaluation function for an individual  $i$  who interacts with another individual  $j$  is given by:

$$U_i = x_i - \alpha_i \max[x_j - x_i, 0] - \beta_i \max[x_i - x_j, 0] \quad (1)$$

In this model, individual  $i$ 's utility  $U_i$  depends on his material gain ( $x_i$ ) and the disutility coming from an unequal outcome.  $\alpha_i$  measures the disutility from being worse off than  $j$ , which we will refer to as envy.  $\beta_i$  measures the disutility of being better off, henceforth referred to as compassion. Therefore, we may say that  $\alpha_i$  measures disadvantageous IA or envy; while  $\beta_i$  advantageous IA or compassion. The combination of both preferences constitutes the overall inequity aversion.

We have seen there is great heterogeneity among individuals regarding social preferences. The variation and combinations of both parameters  $\alpha_i$  and  $\beta_i$  allow for this heterogeneity of inequity aversion. For example, although these parameters are designed to account for inequity *aversion*, they can also reflect the opposite: some people show a

negative  $\alpha_i$ : that is, they positively value that the other person is better off. They may also exhibit a negative  $\beta_i$ , i.e., they positively value being above others. So, positive  $\alpha_i$  and  $\beta_i$  mean a negative valuation of inequality (inequity averse preferences) while negative  $\alpha_i$  and  $\beta_i$  mean a “taste” for inequality.

The Fehr & Schmidt model allows us, summing up, to easily understand and quantitatively measure inequity averse preferences. Its two main parameters, envy ( $\alpha_i$ ) and compassion ( $\beta_i$ ), will be the base for the current study. Since our aim is to shed some light onto the factors behind IA heterogeneity, the following sections review the literature on some of them: gender, age, income, education and social context.

## 2.3 IA & demographic factors

Gender differences in inequality aversion and social preferences have received great attention by behavioural economics since they have huge social, political and economical implications. For example, different attitudes towards competition and compassion condition behaviour in strategic interactions, with important consequences in the labour market (Fehr and Fischbacher, 2002; Cabrales et al., 2010). Although some of these gender differences have biological roots, social norms and structures are the determinant factor for gender differences in preferences (Gneezy et al., 2009).

What do we know about gender heterogeneity in social preferences? Previous research suggests that women are more altruistic and show more IA (Eckel and Grossman, 1998, 2008). Nonetheless, evidence is mixed, as some experiments have found no gender difference (Niederle, 2016). We have also to consider what has been called *publication bias*: experiments yielding concluding and significant differences have a higher probability of being published than inconclusive ones (Engel, 2011). This bias may lead to overrepresentation of gender differences in the literature. Despite the publication bias, we can consider there is some consensus in women being more altruistic and inequality averse (Croson and Gneezy, 2009; Engel, 2011).

What has been consistently found is that women decisions are more context-specific

than those of men (Gilligan, 1982; Croson and Gneezy, 2009). For example, women respond more to variations of the experimental framing (Boschini et al., 2018), the payoffs source (Umer, 2020), or the reference agents (Eckel and Wilson, 2003; Ben-Ner et al., 2004; Houser and Schunk, 2009), among other factors. Also, research has found that, while most people (of both genders) want to be perceived as altruistic and inequity averse, women are more sensitive to their social image and reputation (Bénabou and Tirole, 2006; Andreoni and Bernheim, 2009; Jones and Linardi, 2014; Exley, 2018). This sensitiveness can be explained as the consequence of different social norms. Women are expected to be more inequity averse and altruist (Aguilar et al., 2009; Brañas-Garza et al., 2018) and they are punished more frequently when they deviate the expected response and behave selfishly (Heilman and Okimoto, 2007; Eagly, 2009). Therefore, there are gender differences both in the exigency of social norms and in individual adherence to them. Evidence supports this mechanism of social pressure: Boschini et al. (2018) find no gender difference in Dictator Game giving, but when women are reminded of their gender this changes. When gender is made salient, women acknowledge they bear higher expectations and give significantly more than men. So, women are socially obliged to show more compassion to maintain their social image, which is also more important for them than for men. In consequence, they should tend to self-report more compassion and less envy. We thus develop the following hypothesis:

- $H_1$  : Gender is a significant factor in inequity aversion. Women report more compassion.

In conclusion, evidence suggests that women are more sensitive to social norms and expectations (which are also higher for them). They thus tend to show more inequity aversion. Thus, we expect to find that women in our database report higher levels of inequity aversion, especially compassion. We present results for this hypothesis in Section 5.1 and discuss them in Section 6.1.

Age is also key factor to explain individual heterogeneity in IA. So far, research efforts have focused more on explaining IA development in childhood than through adulthood.

IA development in childhood is usually characterised as a progressive inhibition of innate egoistic impulses as social norms begin to be internalized (Van Lange et al., 1997; Steg and de Groot, 2010).

However, although both envy and compassion are dimensions of overall inequity aversion, their development through life may be different. Evidence suggests separate evolutionary paths for each of them. Envy seems to be an innate response and some variety of animals show it even from a young age. Compassion, on the other hand, is more complex and strategic, as it implies reducing your payoff for non-evident reasons (van den Bos et al., 2006). This complex thinking has been just observed beyond humans in adult chimpanzees (Brosnan and de Waal, 2014). Furthermore, neural evidence hints at the existence of distinct processing mechanisms for each of them. Envy is associated with brain structures linked to the triggering of negative emotions (anterior Insula and amygdala), while compassion generates activity in regions associated with complex processes (DMPFC and DLPFC) (Gao et al., 2018).

These different neural and development paths may explain that despite envy being observed in very young children, compassion has only been noted in children from 8 years old who already have more mature cognitive and social abilities (Fehr et al., 2008; Blake and McAuliffe, 2011; McAuliffe et al., 2017). This age seems to be especially relevant for the internalization of the social norm of compassion: Brañas-Garza et al. (2020a) find that exposure to income inequality being 8 years old enhances Dictator Game giving in adulthood. This behaviour is associated with advantageous inequity aversion (Brañas-Garza et al., 2020b).

Beyond childhood and early adolescence, age influence in IA preferences has not received much direct attention. In his meta-analysis of more than 120 publications employing the Dictator Game, Engel (2011) finds that age had a significant effect eliciting advantageous inequity aversion (compassion). Additionally, Van Lange et al. (1997) and Matsumoto et al. (2016) find that age increases prosocial behaviour all through adulthood. Nevertheless, even if we expect age to enhance overall inequity aversion, we may expect different effects of age on each envy and compassion, following the evolutionary and

neural evidence presented above.

-  $H_2$  : Age is a significant factor in inequity aversion. Age increases compassion and diminishes envy.

Income and education are closely linked, as higher formation levels often lead to higher wages. To simplify the following explanation, socio-economic status (SES) will comprise both income and education level. The literature on social preferences has suggested two different directions in the relation between SES and inequity aversion. First, some authors suggest that SES leads to prosocial preferences, as high SES individuals may have more social capital, which in turn leads to prosocial preferences (Brañas-Garza et al., 2011). Others have suggested that low SES individuals have to face harsh and unpredictable social environments, creating incentives for adapting towards more egoistic preferences and expectations (Del Giudice et al., 2016). Following this framework, we should expect income and education to prompt IA preferences, especially compassion.

In contrast with that framework, other researchers posit a different account. They also consider the harshness and uncertainty that lower SES individuals face. In those conditions, developing more resilient social networks can be a useful mechanism to manage uncertainty and reduce the impact of future negative shocks (Amir et al., 2018). Also, dependency on those social bonds increases awareness of others' needs, increasing thus prosocial preferences (Goetz et al., 2010; Piff et al., 2010). Among others, Brañas-Garza et al. (2020a) find evidence supporting this framework, as exposure to inequality and harsher conditions in childhood enhances inequity aversion in adulthood.

Nevertheless, our data is cross-sectional. This means we cannot be sure that individuals have faced over their lives the same SES they currently report, since there may be some degree of social mobility. Considering both frameworks and this limitation, we cannot expect whether income and education prompt inequity aversion or the opposite. To answer these research questions, we operationalize the following hypotheses:

-  $H_3$  : Education is a significant factor in inequity aversion. The direction of this relation is unclear.

-  $H_4$  : Income is a significant factor in inequity aversion. The direction of this relation is unclear.

Results for these hypotheses are displayed in Section 5.1 and further discussed in Section 6.1.

## 2.4 IA & social framing

Framing is a crucial feature of economic experiments. Already in the 1950s, [Deutsch \(1958\)](#) demonstrated that framing experiments as cooperative or competitive is key in the decision process. Since then, a great number of studies have concluded that framing affects human behaviour and, more specifically, social preferences (see (e.g. ([Kahneman et al., 1982](#); [Tversky and Kahneman, 1986](#); [Camerer, 2003](#); [Levitt and List, 2007](#)))) for further insight on the topic). For example, [Brañas-Garza \(2007\)](#) showed that DG giving can be promoted just by including an additional sentence on the game's instructions.

There is even neural evidence of how important can be framing for inequity aversion. [Tricomi et al. \(2010\)](#) find that individuals value positively the gains of others (own losses) when the game is framed as cooperative. On the other hand, fMRI shows neural rewards for selfish gains (others' losses) when the game is framed as competitive ([Fliessbach et al., 2007](#); [Bault et al., 2011](#)). Therefore, it seems that even at the neural level there are strong competitive/cooperative framing effects. To distinguish this particular framing effect, we henceforth refer to it as *social framing effect*.

However, our self-reported measures are neutrally framed, that is, they include no signals neither for cooperation nor for competition. Does this mean there is no social framing effect in our data? Previous research suggests this may not be the case. Following [Engel and Rand \(2014\)](#)[p. 388]: "when no context is given in experiments, participants are forced to supply their own frame". This way, individuals implicitly project their own social frame onto neutrally framed decisions ([Rand et al., 2014](#)). Self-supplied social framing is thus generated from beliefs and values about society ([Cornelissen et al., 2011](#); [Ellingsen et al., 2012](#)).

These findings lead us to an additional research question: does interpretation of society as cooperative or competitive condition self-reported inequity aversion? in line with available neural evidence and previous research on self-supplied social framing, we make the following hypothesis:

- $H_5$  : The belief in a cooperative society enhances compassion.

Results for this hypothesis are presented in Section 5.2 and further discussed in Section 6.2.

## 2.5 IA & mixed motives

We saw in Section 2.1 that behavioural models have usually focused on three main social preferences: inequity aversion, reciprocity and altruism. Each of them is defined differently, since they are designed to account for different motives of human behaviour. Despite these theoretical differences, these three motives are often interrelated and mixed in behaviour (Charness and Rabin, 2002; Fehr and Fischbacher, 2002, 2003, 2005). Mixed motives pose a serious challenge to the interpretation of economic games and experiments (List, 2007; Yang et al., 2016). For that reason, mixed motives in economic games have received much attention from experimental research. However, the topic is mainly unexplored for self-reported measures. Although our alpha and beta are by definition measures of inequity aversion, do altruism and reciprocity play a role? Are these motives interrelated, as has been claimed?

There may also be a fundamental difference between experiments and self-reported measures. In a DG or another one-shot game, the individual (usually) had no previous interaction with the other player, which is the reference agent for IA valuation. In other words, a one-shot game is a static and novel situation. This is not the case in our self-reported measures. Here the reference agent is defined as “other people”, a collective agent whom everyone has interacted with. This means that self-reporting could be understood as a snapshot in a sequence, a single round of a life-long game. The subject has so



accumulated past interactions with the reference agent by the moment of self-reporting. This could lead to mixing IA with reciprocity motives. For envy, where the reference agents are those who have more than the individual, past inaction can be interpreted as hostile (they haven't helped). This way, envy (disutility from being in disadvantage) may be linked with negative reciprocity (vengeance) for those hostile actions. For compassion, the reference agents are those people with fewer resources. Therefore, we expect altruism to play the leading role rather than reciprocity. Positive reciprocity could also affect compassion but in a lesser degree than altruism.

So, we decide to test whether inequity aversion preferences are mixed with other motives in self-reported measures. We operationalize the following hypotheses, in line with the previous explanation:

- $H_6$  : Negative reciprocity is directly related to envy.
- $H_7$  : Positive reciprocity is directly related to compassion.
- $H_8$  : Altruism is directly related to compassion.

Results for these hypotheses are shown in Section 5.3 and further discussed in Section 6.3.

### 3 Measuring IA

As we have seen, IA social preferences can be best analysed using the F&S model, based on its utility function:

$$U_i = x_i - \alpha_i \max[x_j - x_i, 0] - \beta_i \max[x_i - x_j, 0] \quad (2)$$

In the model, inequity aversion is explained by  $\alpha_i$  and  $\beta_i$ . The question is, how can we measure  $\alpha_i$  and  $\beta_i$ ? Usually, they are inferred from actual individual behaviour, estimating them from decisions in the Dictator Game (Fehr, 2009; Cabrales et al., 2010; Cabrales and Ponti, 2011). The standard Dictator Game (DG for short) was developed by Kahneman

et al. (1986) and Forsythe et al. (1994). It consists in a simple allocation of resources. Player A is given a fixed payoff and decides how much to give to Player B and how much to keep for himself. As Player B cannot reject the offer as in an Ultimatum Game, she has no power. Thus, Player A's decision reflects her altruism or selfishness in a one-shot non-strategic situation.

However, the interpretation of DG giving is controversial (List, 2007), as they may be mixed motives beyond altruism or selfishness involved. To offer a different perspective and avoid that controversy, Espín et al. (2018) have developed a novel approach to IA estimation. In this case,  $\alpha_i$  and  $\beta_i$  are not inferred from experimental games, but they are directly self-reported by individuals. In their survey, Espín et al. (2018) employ two questions to measure them:

- For alpha (envy): "I do not care about how much money I have; what concerns me is that there are people that have more money than I have."
- For beta (compassion): "I do not care about how much money I have; what concerns me is that there are people that have less money than I have."

Individuals answered to these questions using a 1-to-7 Likert scale, where 1 means "totally disagree", and 7 "totally agree". The higher a person scores in them, the higher her self-reported inequality aversion is. It is important to highlight how useful the starting sentence for both questions is. It allows us to measure the self-reported "disutility" the individual gives to disadvantageous (envy) and advantageous (compassion) inequality beyond his income. Besides, the framing makes oneself the reference point. These questions measure thus how much does the individual value inequality in comparison with her payoff. This way, they may capture better the essence of the F&S parameters than behavioural inference.

The framing of the questions offers another advantage. We saw before that social preferences meant the care about "material resources allocated to relevant reference agents" (Fehr and Fischbacher, 2002, p.2). In this case, relevant reference agents are not explicit but chosen by the individual. It is the individual who decides which agents "other people"

includes. This is especially useful in the case of women, whose IA varies more depending on the other player's profile. This way, each individual considers and compares her own material situation to that of others relevant to her.

Despite offering these advantages, self-reported measures also have limitations that must be considered. First, the stakes of the decision, that is, the amount of resources to be allocated, are an important factor in IA ([List, 2007](#)). However, our self-reported measures do not control them. In addition to that, the questions' design makes it impossible to know the meaning of low alpha and beta. Disagreeing with the concern for inequality may mean both indifference and "taste" for it. The subject may value positively inequity, or maybe he just does not care. Nevertheless, we can still accurately assume that individuals scoring higher in these measures are more inequity averse than those scoring low, who can be either selfish or inequality seeking.

More importantly, self-reporting eliminates material incentives from economic decisions, in contrast with most behavioural experiments. This leaves individuals with just two possible gains from responding: the self-reward of being sincere and the reward of having a positive social image ([Andreoni and Bernheim, 2009](#)). Which of them is generally higher? Recent accounts conclude that motivated Bayesian reasoning makes self-image very plastic, whereas social image is much more constraining and fixed ([Carlson et al., 2020](#); [Gino et al., 2016](#)). Therefore, we can assume social image to play a bigger role in self-reporting.

This way, self-reported preferences may tend to the optimal social response, i.e., what is thought to be socially expected. So, self-reporting may represent more accurately personal beliefs about social norms and expectations than actual preferences as observed in an economic experiment. This explains why the average value of envy in our data (-1.68) is much lower than that of compassion (-0.14), while most empirical studies find the opposite. High compassion levels in our dataset may reflect social norms and expectations rather than personal preferences, as compassion and altruism is socially expected ([Brañas-Garza et al., 2017](#)).

This limitation can, however, be an opportunity. Self-reported measures can give us

a different approach to inequity aversion, showing the effect social norms and expectations can have on social preferences. While self-reporting imposes some constraints to research, it gives us quite valuable information about personal perception of social norms. This perception is highly relevant to the study of social preferences since norms are a constitutive dimension of them ([List, 2009](#)).

In conclusion: this novel approach can offer useful insight into IA and social norms. But as every measure, it also has some limitations. In [Section 5.3](#) we will briefly explore one of them and analyse the interrelated motives behind IA.

In addition to measuring envy and compassion, we use analytical extensions based on alpha and beta. Other variables are also employed to explore social framing and mixed motives. The specification of those extensions and additional variables are included in [Annex A.1](#).

## 4 Data

Six different databases were used to construct the dataset analysed in the current essay. Each database has a different number of observations coming from different subject types in distinct research designs. We must address the strengths and limitations coming from this heterogeneity to correctly interpret the results. In this section, the methodology and subjects of the data gathering process are specified for each database, as well as the variables included in each one of them.

The first database is called “Granada City”. The original data come from research made by [Exadaktylos et al. \(2013\)](#). Surveys and experiments were made by interviewers throughout the city of Granada (southern Spain) in 2010. Interviewers presented themselves at the subjects’ door, so it was a field research design. The sample was (locally) geographically representative since the sampling process was done through a stratified random method. As [Table 1](#) shows, subjects were 15 to 91 years old and from all education and income levels. Alpha and beta were measured with a 1-to-7 Likert scale.

The base also includes attitudes to immigrants, reciprocity and altruism preferences, and understanding of the society as cooperative or competitive. A total of 834 complete observations were included in this database.

**Table 1:** Database 1 - Granada City

VARIABLES	(1) min	(2) max	(3) mean	(4) sd
Alpha	-3	3	-1.574	1.787
Beta	-3	3	0.0707	2.062
Female	0	1	0.539	0.499
Education level	0	8	5.068	2.273
Age	15	91	38.47	17.55
Income level	0	9	3.828	2.420

N=834

The second database is called “Granada Lab”. The original data come from research made by [Brañas-Garza et al. \(2014\)](#). Again, surveys and experiments were made in Granada in 2010. In this case it was a lab research, with volunteer subjects hosted by the University of Granada.

**Table 2:** Database 2 - Granada Lab

VARIABLES	(1) min	(2) max	(3) mean	(4) sd
Alpha	-3	3	-1.817	1.487
Beta	-3	3	-0.479	1.765
Female	0	1	0.577	0.494
Education level	0	8	4.083	0.813
Age	17	61	19.59	5.157
Income level	0	9	4.220	2.264

N=655

The volunteers, as can be seen in [Table 2](#), were in this case less representative, as most of them were college students (hence the low mean age and standard deviations of

education level and age). Nevertheless, subjects reported belonged to every education and income level, and they were 17 to 61 years old. Additional self-reported measures of cooperation, altruism, reciprocity and attitudes to immigrants were included. The database is comprised of 665 observations.

Database 3 comes from surveys and experiments made in 2017 in Reina Isabel Formation Centre (Granada), belonging to research by [Brañas-Garza et al. \(2020b\)](#). Subjects were students from vocational training cycles who were 17 to 49 years old in the time of the survey. Table 3 illustrates that all subjects had, at least, completed secondary studies, but no income level data was reported. In this case, no more self-reported information (altruism, reciprocity...) was gathered but subjects played the Dictator Game. This lab design was applied to 170 subjects.

**Table 3:** Database 3 - Vocational Training

VARIABLES	(1) min	(2) max	(3) mean	(4) sd
Alpha	-3	3	-1.976	1.463
Beta	-3	3	-0.006	1.895
Female	0	1	0.552	0.499
Education level	4	8	4.212	0.898
Age	17	49	22.65	6.197

N=170

The fourth database included in our dataset is the online experiment made by [Brañas-Garza et al. \(2020a\)](#) from December 2017 to January 2018. Subjects were all college students from 37 different Spanish universities, so all 892 of them had the same education level. This also explains the high concentration of observations at young ages shown in Table 4. Income level was also reported. Surveys and experiments were made online and included a Dictator Game but no additional self-reported measures. As in previous databases, alpha and beta were measured by a 1-to-7 Likert scale.

**Table 4:** Database 4 - Online

VARIABLES	(1) min	(2) max	(3) mean	(4) sd
Alpha	-3	3	-1.594	1.522
Beta	-3	3	-0.111	1.784
Female	0	1	0.527	0.500
Education level	7	7	7	0
Age	17	45	19.25	2.802
Income level	0	9	4.600	2.286

N=892

Our “Zaragoza” database belongs to research by [Brañas-Garza et al. \(2020b\)](#). The research design was similar to that from Granada City database. In this case data comes from field surveys and experiments made in 2014 to a geographically representative sample from Zaragoza, in north eastern Spain. “Zaragoza” is a locally representative database with subjects ranging from 9 to 97 years old, from all income and education levels. As presented in [Table 5](#), all demographic variables were more dispersed than in online and lab experiments. Additional self-reported measures were included as well as a Dictator Game. This base makes up 727 observations.

**Table 5:** Database 5 - Zaragoza

VARIABLES	(1) min	(2) max	(3) mean	(4) sd
Alpha	-3	3	-1.700	1.415
Beta	-3	3	-0.150	1.690
Female	0	1	0.267	0.443
Education level	0	8	6.518	1.808
Age	9	97	39.88	11.76
Income level	0	9	4.984	2.335

N=727

Finally, our last database is “Students”, which belongs to [Jorrat \(2020\)](#). Jorrat applied

an innovative recruiting process for this database: WhatsApp. He asked some Economics students to reach out to their WhatsApp contacts and invite them to participate in the on-line experiments. He gathered 1,172 complete observations. Envy and compassion were measured from 1 to 10 instead of the usual 1-to-7 Likert scale. Also, this database does not include age or income, which limits the demographic factors in it to gender and education level. Table 6 illustrates the high concentration of subjects around current college education, which may introduce an age bias that is not controlled. Because of these reasons, analysis of this base is made separately to the others. However, a joint regression is presented in Table 9

**Table 6:** Database 6 - Students

VARIABLES	(1) min	(2) max	(3) mean	(4) sd
Alpha	1	10	3.079	2.314
Beta	1	10	5.009	2.590
Female	0	1	0.477	0.500
Education level	3	8	6.786	0.836

N=1,172

In conclusion, our dataset is comprised of 6 different databases totalling more than 4,000 observations from surveys and experiments carried out in Spain. This is an important feature of the current study, as it allows for a certain cultural homogeneity. On the other hand, the diversity of subjects contributes to the robustness and representativeness of this study. Nevertheless, the combination of 6 databases with 3 research settings and with different measures (in some cases) can be a limitation in our research. To control for these problems, each regression includes fixed effects for databases, henceforth referred as “Base FE”. Also, different regressions are made for each measure of envy and compassion.



## 5 Results

### 5.1 Demographic factors

In Section 2.3 we reviewed how demographic factors could condition individual heterogeneity of inequity aversion. Starting with gender, we saw that different socialization processes could lead to the internalization of differing social norms, leading to more IAP in women than in men. Does this apply also to self-reported IA measures?

The first thing we may notice is that envy and compassion are not equally distributed for men and women. Figure 6 (Annex) shows women tend to report more frequently the minimum value for envy, but there are not important differences. Indeed, a Kruskal-Wallis rank test reports that there are not differences for alpha ( $p=0.4781$ ). The gender difference in distributions is higher for compassion, as can be appreciated in Figure 7 (Annex). In this case, men report more frequently the minimum value, while women show higher compassion levels. For beta, a Kruskal-Wallis test gives a significant difference in distributions ( $p<0.01^{***}$ ).

We observe the same for age, education level and income level. There are no significant distribution differences for alpha. Beta, on the other hand, is unequally distributed across those variables. In Annex Figure 8 we can appreciate that older individuals tend to report higher levels of compassion. The opposite is true for education (Annex Figure 9) and income level (Annex Figure 10), where individuals of higher education and income levels report lower compassion.

The differences in distributions points to a significant effect from demographic factors on individual heterogeneity, at least for compassion. Now, we test the significance of this effect using Tobit regressions. Tobit are used for truncated dependent variables, as is the case. The Likert scale may have not comprised all the domain of responses, as can be inferred seeing the normal distributions from Figures 6 and 7. Results from these Tobit regressions are shown below.

In Table 7, we can see two specifications for each dependent variable. Odd-numbered

models include just the shown variables. Even-numbered models also include fixed effects for each database. Fixed effects can account for the approximately homogeneous effects of common local social norms, methodology and subject type for each database. Starting with gender, we can conclude that women significantly report higher beta levels, i.e., more compassion for those worse-off. However, we don't find any significant gender effect on envy, just a minor negative relation. We find significant but opposite age effects: self-reported envy decreases with age while compassion increases. Income level does not seem to have any significant effect neither on advantageous nor disadvantageous IA. On the other hand, education has a positive effect on envy, but it disappears when controlling for database effects. It also has a negative effect on compassion, but only when controlling for base effects.

**Table 7:** Demographic factors on envy and compassion

VARIABLES	(1) Alpha	(2) Alpha	(3) Beta	(4) Beta
Female	-0.095 (0.108)	-0.062 (0.109)	0.682*** (0.093)	0.661*** (0.094)
Age	-0.007* (0.004)	-0.014*** (0.005)	0.033*** (0.003)	0.038*** (0.004)
Income	-0.037 (0.023)	-0.027 (0.024)	-0.014 (0.020)	-0.009 (0.020)
Education	0.081*** (0.029)	0.031 (0.038)	-0.020 (0.025)	-0.071** (0.033)
Constant	-2.489*** (0.229)	-1.902*** (0.321)	-1.412*** (0.194)	-1.330*** (0.266)
Observations	2,765	2,765	2,765	2,765
Base FE	N	Y	N	Y

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Alpha and beta in our "Students" database are not measured by a 1-to-7 Likert scale, but by a 1-to-10 one. To see if that led to different results, we made the same Tobit regressions above but only for this database. It also has less demographic information, just gender and education level. Table 8 presents the results from those regressions. It includes

just a specification for each dependent variable because Base FE are not available in this case. The results are consistent with our 1-to-7 data. Gender has no significant effect on envy, but women significantly report higher levels of compassion. Similarly, education level has no significant effect on envy but it does have a negative effect on compassion.

**Table 8:** Gender and education in Students base

VARIABLES	(1) Alpha	(2) Beta
Female	-0.095 (0.221)	0.792*** (0.188)
Education	-0.007 (0.135)	-0.397*** (0.114)
Constant	2.308** (0.921)	7.112*** (0.778)
Observations	1,139	1,139

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Finally, we pooled all data, combining the two different scales. We normalized alpha and beta, which now range from 0 to 1 in all databases. We tested gender and education effects on them, since they are the only demographic variables included in all databases. We find the same results as in previous models, displayed in Table 9. Gender does not have a significant effect on envy but a positive one on compassion. Education level, on the other hand, seems to prompt envy and to decrease compassion.

We also included a dummy variable to account for the difference in scales. Using a 1-to-10 scale is linked to a slight reduction in self-reported compassion. However, we cannot conclude a significant scale impact because the reduction on compassion can be attributed to uncontrolled subjects' youth in the "Students" database. While our 1-to-7 data is representative, 97% of 1-to-10 subjects are students currently in high school or college, so results may be biased.

**Table 9:** Gender and education in pooled data

VARIABLES	(1) Alpha	(2) Beta
Female	-0.011 (0.014)	0.089*** (0.012)
Education	0.012*** (0.004)	-0.009** (0.004)
1-10 Scale	0.019 (0.016)	-0.028** (0.014)
Constant	0.032 (0.029)	0.463*** (0.025)
Observations	4,047	4,047
Base FE	N	N

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

We just covered the demographic effects on individual heterogeneity of inequity aversion parameters (alpha and beta). Remain these effects consistent when tested on the analytical extensions of alpha and beta explained in Annex A.1? In the following lines, we present the results of the demographic effects on those extensions.

First, we check this consistency with the variables developed by [Espín et al. \(2018\)](#), Inequality Aversion (IA) and Level of Competitiveness (LC). We use Tobit regressions, in this case, bounded at -6 and 6. Two different models are presented for each variable: one without base FE and a second with them. Table 10 exhibits the results. Gender maintains its significance: women report higher overall levels of inequality aversion and lower levels of competitiveness. Age is again found to have a prosocial effect, as IA rises and competitiveness decreases with it. No significant effects are found for income level. Education has only a marginally significant effect on competitiveness.

As can be appreciated, these results are consistent with those found for alpha and beta. Age and gender seem to play the biggest role on individual heterogeneity in IA. Education follows with a slight but not consistent effect and income turns out to be in-

significant.

**Table 10:** Inequity Aversion and Level of Competitiveness

VARIABLES	(1) IA	(2) IA	(3) LC	(4) LC
Female	0.560*** (0.109)	0.559*** (0.110)	-0.581*** (0.095)	-0.548*** (0.097)
Age	0.024*** (0.004)	0.022*** (0.005)	-0.032*** (0.003)	-0.040*** (0.005)
Income	-0.033 (0.023)	-0.022 (0.024)	-0.009 (0.021)	-0.006 (0.021)
Education	0.018 (0.030)	-0.053 (0.038)	0.049* (0.026)	0.061* (0.033)
Constant	-2.918*** (0.229)	-2.451*** (0.314)	-0.565*** (0.197)	-0.230 (0.280)
Observations	2,765	2,765	2,765	2,765
Base FE	N	Y	N	Y

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Results for the Students database are presented separately in Table 11. In this base, IA ranges from 2 to 20 and LC from -9 to 9, as is explained in Annex A.1. These results are consistent with the rest of the dataset: women report significantly more inequality aversion and less competitiveness. However, education is significant in the Students database: it prompts less overall IA and more competitiveness.

We continue with the classification made based on Cabrales et al. (2010), as explained in Annex A.1. Since preferences groups are binary variables constructed as belonging to the group (1) or not (0), Tobit regression is not adequate. The usual methodology with binary dependent variables are the logit or probit regression models. However, in some cases, standard OLS regression can give the same results and it has an easier interpretation. We test it and find that logit regression gives us the same marginal effects as OLS coefficients (see Annex Table 19). Therefore, OLS regression is implemented with the preferences' classification using all our databases simultaneously.

**Table 11: IA and LC in Students base**

VARIABLES	(1)	(2)
	Inequality Aversion	Competitiveness
Female	0.700*** (0.246)	-0.781*** (0.200)
Education	-0.364*** (0.139)	0.344*** (0.133)
Constant	9.995*** (0.945)	-3.888*** (0.910)
Observations	1,139	1,139

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

In addition to the regression results, figures for the distribution of observations among the Preferences Groups depending on gender, age, education and income level are presented.

**Figure 1: Preferences Groups by gender**

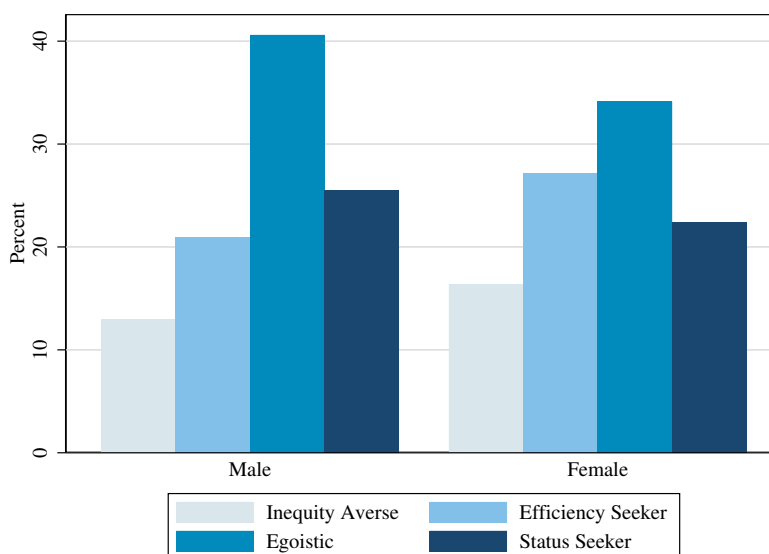


Figure 1 illustrates there is a non-trivial gender bias in IA preferences. Women show

more frequently Inequity Averse (IAP) and Efficiency Seeker Preferences (ESP) than men. However, both genders mainly exhibit Egoistic Preferences (low alpha and beta).

These differences are confirmed by the OLS results presented in Tables 12 and 13. Women are, everything else being equal, around 3.3% more likely to show IAP than men (depending on the specification) and 6.3% to show Efficiency Seeker Preferences. This gender effect reverses for anti-social preferences groups, Egoistic (EP) and Status Seeker (SSP). Women are 6.9% less likely than men to exhibit Egoistic Preferences. They are also less likely to belong to the SSP group, but this effect is not consistent among specifications. Therefore, similarly as in previous models, gender significantly elicits pro-social self-reported preferences.

**Figure 2: Preferences Groups by age**

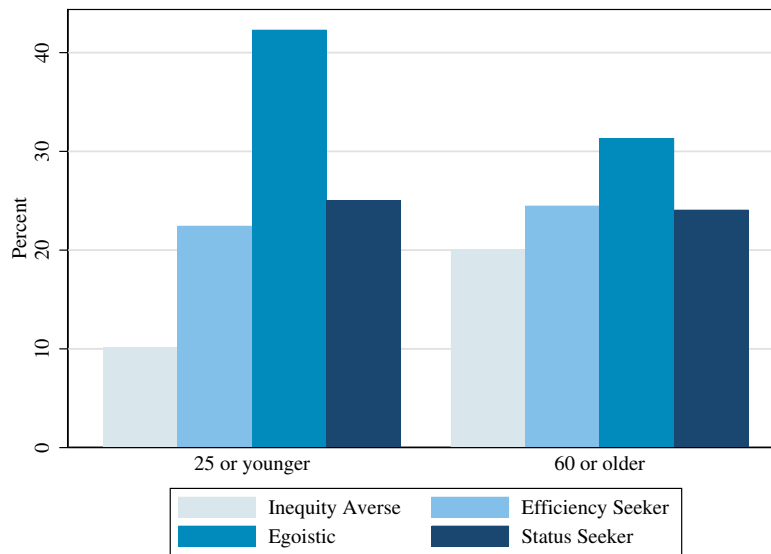
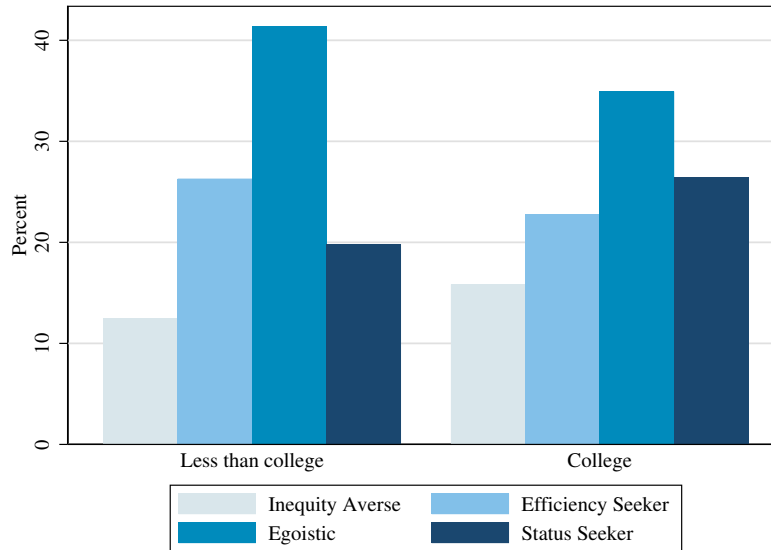


Figure 2 displays appreciable differences in the distribution among groups of preferences depending on age. Younger individuals (25 years or younger, N=1,647) show much more frequently Egoistic Preferences than older ones (60 years old or older, N=1,710) and slightly more SSP. Older people show, in contrast, much more IAP and slightly more ESP.

Results from the OLS regressions prove some of the relations guessed from Figure 2. Table 12 shows a positive effect of age on the probability of belonging to the Efficiency

Seeker group, but surprisingly no effect at all for IAP. The lack of relation between age and IAP can be explained as individuals exhibiting IAP show high levels of both envy and compassion, and age had inverse effects on each of them. As expected, we find negative effects of age for anti-social preferences (Egoistic and Status Seeker) in Table 13.

**Figure 3:** Preferences Groups by education



For Figure 3, individuals have been classified into two groups depending on their education level: less than college (N=1,714) and college (students or alumni, N=2,702). Some differences can be inferred from it. College students show more IAP and SSP but less ESP and EP than those with lower education level. In this case, a clear effect on prosocial or antisocial preferences is not appreciated graphing.

Nevertheless, this difference is found in OLS regression, though not consistently. Education seems reduce prosocial preferences (Table 12), but the relation becomes insignificant when age and income are included. No effect is found regarding Egoistic Preferences but a positive and significant one is found for Status Seeker Preferences (Table 13).



**Table 12:** Inequity Averse and Efficiency Seeker Preferences

OLS	(1) IAP	(2) IAP	(3) ESP	(4) ESP
Female	0.037*** (0.011)	0.027** (0.013)	0.065*** (0.014)	0.062*** (0.017)
Education	-0.007* (0.004)	-0.003 (0.004)	-0.016*** (0.005)	-0.008 (0.006)
Age		0.000 (0.001)		0.006*** (0.001)
Income		-0.006*** (0.002)		0.002 (0.004)
Constant	0.151*** (0.024)	0.143*** (0.034)	0.331*** (0.031)	0.048 (0.045)
Observations	4,047	2,765	4,047	2,765
Base FE	Y	Y	Y	Y

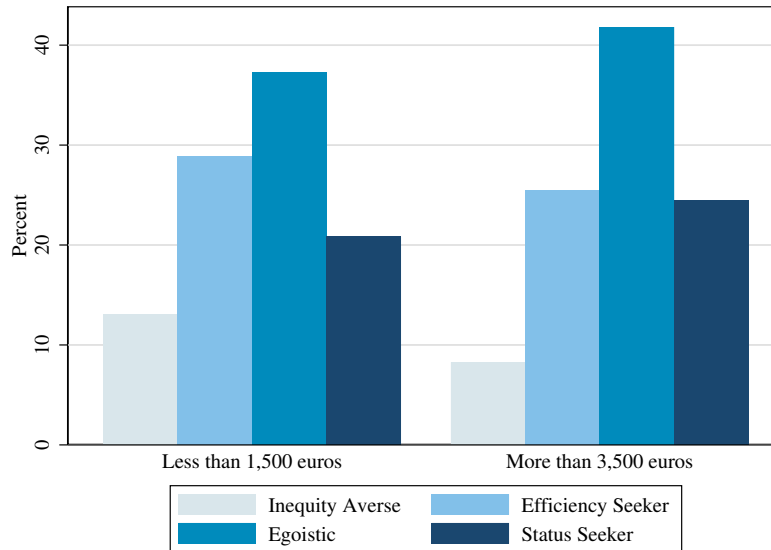
Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Therefore, in conclusion, we find mixed and non-concluding evidence for the education effect on individual heterogeneity in this classification. Evidence just points to a vague effect on antisocial behaviour.

Concluding with income as an individual factor of heterogeneity in social preferences, two groups are extracted from the income data. We display those whose household monthly income is less than 1,500 euros (N=706) and those whose income is higher than 3,500 euros (N=617). Again, some clues can be extracted from Figure 4. Low-income individuals in our dataset show slightly more frequently IAP and ESP (prosocial), while high-income ones show more EP and SSP (antisocial).

**Figure 4: Preferences Groups by income**



However, results from OLS regression (Tables 12 and 13) reject those clues. Income is found to have no significant effect on the probability of belonging to any of the groups excepting a negative effect on IAP. Therefore, no conclusive results are found for income level and preferences groups, the same as in previous models.

**Table 13: Egoistic and Status Seeker Preferences**

OLS	(1) EP	(2) EP	(3) SSP	(4) SSP
Female	-0.067*** (0.015)	-0.071*** (0.019)	-0.035** (0.014)	-0.018 (0.017)
Education	0.008 (0.005)	-0.001 (0.006)	0.015*** (0.004)	0.012** (0.005)
Age		-0.004*** (0.001)		-0.003*** (0.001)
Income		0.003 (0.004)		0.002 (0.004)
Constant	0.364*** (0.033)	0.540*** (0.051)	0.154*** (0.026)	0.269*** (0.043)
Observations	4,047	2,765	4,047	2,765
Base FE	Y	Y	Y	Y

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 5.2 Social framing

In Section 2.4 we highlighted the relevance of context interpretation for IA. Evidence points out that framing the interaction with other agents as cooperative leads to neural rewards for compassion. On the other hand, competitive interpretation triggers rewards for being above others. We adapted that framework to our self-reported measures and elaborated this hypothesis: the belief in a cooperative society enhances compassion.

The hypothesis is tested using the *cooperation<sub>i</sub>* variable whose construction is detailed in Annex A.1. We employed Tobit regressions to test it in envy and compassion. Results are presented in Table 14. Two specifications are used for each dependent variable: even-numbered models include all demographic factors as controls while odd-numbered ones do not. Supporting the social framing hypothesis, a cooperative interpretation is found to be significantly related to compassion (in both specifications) but not to envy.

**Table 14:** Cooperation beliefs, envy and compassion

VARIABLES	(1) Alpha	(2) Alpha	(3) Beta	(4) Beta
Cooperation	-0.345* (0.196)	-0.271 (0.197)	0.609*** (0.175)	0.498*** (0.173)
Constant	-2.320*** (0.124)	-1.913*** (0.330)	-0.136 (0.110)	-1.392*** (0.271)
Observations	2,201	2,182	2,201	2,182
Base FE	Y	Y	Y	Y
Controls	N	Y	N	Y

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

We replicate the context hypothesis test with our extensions constructed based on alpha and beta as a robustness check. These replications also support our hypothesis. For the sake of brevity, the results from Tobit and OLS regressions are displayed in Annex Tables 20 and 21.

### 5.3 Motives

We saw in Section 2.5 that the three main social preferences are often entangled and interrelated. Although our alpha and beta are by definition measures of inequity aversion, do altruism and reciprocity play a role? We presented three hypotheses accounting for these mixed motives.

We check this possible relation between self-reported social preferences using two Tobit regressions. The results, shown in Table 15, support the interrelation hypothesis. We can see that, as expected, negative reciprocity is directly related to envy, which points to our hypothesis of a sequential game interpretation of self-reported measures. Neither altruism nor positive reciprocity are significantly related to envy. As expected, altruism appears as a better predictor of compassion, but we also find a significant relationship with positive reciprocity.

**Table 15:** Reciprocity and altruism

VARIABLES	(1) Alpha	(2) Beta
Positive reciprocity	-0.112 (0.084)	0.227*** (0.071)
Negative reciprocity	0.426*** (0.053)	-0.046 (0.045)
Altruism	-0.027 (0.054)	0.408*** (0.045)
Constant	-2.115*** (0.325)	-1.407*** (0.268)
Observations	2,194	2,194
Base FE	Y	Y
Controls	Y	Y

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

We make an additional test for this hypothesis. We explore the motives behind another self-reported attitude towards a quasi-natural experiment of resource allocation: immigration. Immigrants tend to have fewer resources at destination than national residents. So, in

a context of limited resources, immigration can be understood as a resource redistribution from better-off residents to worse-off immigrants ([Emmenegger and Klemmensen, 2013](#)). Since it is a distributional dilemma, inequity aversion should be the main motive. However, if we consider the mixed motives hypotheses, that may not be the case. In Spain, many people think that immigrants abuse the welfare state, taking too much of a limited pie ([Careja and Emmenegger, 2013](#)). This leaves the subject with fewer resources and may trigger “revenge”. In consequence, reciprocity can also be an important motive behind the rejection of immigration.

Altruism, on the other hand, should not be an important motive. The usual but incorrect interpretation of immigration and welfare is a zero-sum game (see (e.g. [Lalonde and Topel \(1997\)](#))). This way, resources going to migrants mean losses for others. So, altruism should not be significant in this dilemma.

We make two Tobit regressions to test the mixing of motives in this distributional dilemma. In Table 16, we find that reciprocity is highly related to having negative views towards immigration. Inequity aversion is a significant motive behind attitudes to immigration. Envy is related to a higher rejection of immigrants, whereas compassion has the opposite effect. Results also illustrate that altruism does not play a significant role in this quasi-experiment.

**Table 16:** Are there too many immigrants in Spain?

VARIABLES	(1) Immigration	(2) Immigration
Envy	0.099** (0.045)	0.120*** (0.045)
Compassion	-0.099** (0.039)	-0.162*** (0.039)
Positive reciprocity	0.193** (0.089)	0.172** (0.087)
Negative reciprocity	0.325*** (0.060)	0.326*** (0.059)
Altruism	-0.011 (0.057)	-0.045 (0.056)
Constant	1.111*** (0.151)	1.348*** (0.350)
Observations	2,214	2,194
Base FE	Y	Y
Controls	N	Y

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

This evidence supports our hypotheses of mixed motives in social preferences. Alpha and beta are related to altruism and reciprocity, and the last appears as a powerful motive also in the case of attitudes towards immigration. Further exploration of this issue is out of the scope of this essay. It should be an interesting path for future research on social preferences and human decision-making.

## 6 Discussion

### 6.1 Demographic factors

Are these findings what we expected from past research on inequity aversion? We begin with age, which is the most important factor on our dataset. Age seems to be a consistent factor explaining individual heterogeneity in IA. Envy and competitiveness decrease with age, while compassion and inequality aversion increase with it. Elders' preferences are more frequently classified as Efficiency Seeker and less frequently as Egoistic or Status Seeker than youngsters. Considering these results, it can be said that age enhances prosocial preferences beyond childhood and adolescence.

Two main conclusions can be extracted from these results. First, our evidence supports that overall inequality aversion increases throughout life. Second, and more importantly, age has opposite relations with each envy and compassion. This hints to different development paths for each social preference, as recent accounts defend (see Section 2.3).

In self-reported measures, this consolidation of social norms along life is even more salient than in experiments. Most experimental economic games have material payoffs. In contrast, in self-reporting, the only gain is social or self-reward for complying with norms. So, subjects may tend more frequently to not deviate from social optimal responses. It's also possible that elders are expected to be more compassionate and less envious than younger people and they adapt to those social expectations.

In conclusion, age is a highly significant factor for explaining individual heterogeneity in inequity aversion. It has opposite effects for envy (-) and compassion (+). This difference may be explained by a variety of factors, especially by different mental processing and development between both preferences. These findings should orient future research on IA and discourage treating equally both types of inequity aversion.

This difference can be understood from various perspectives. While envy has been associated with lower life-satisfaction, compassion has positive effects over it. This creates opposite incentives for adapting IA preferences throughout life (Espín et al., 2018). Also,

**Table 17:** Significant ( $p < 0.05$ ) factors of individual heterogeneity on social preferences

	Alpha	Beta	Inequality Aversion	Competitiveness	IAP	ESP	EP	SSP
Gender (female)	+		+	-	+	+	-	(-)
Age	-	+	+	-		+	-	-
Education	(+)	(-)	- *	+ *		(-)		+
Income					-			
Cooperation		+		-				-
Positive recip.		+						
Negative recip.		+						
Altruism		+						

( )=Not significant in all specifications

\*=Just for Students base



since individuals accumulate knowledge from social interactions with age, ageing can be framed as a social learning process. While both compassion and envy deviate from pure egoism, only compassion is socially considered desirable. As interactions are repeated, individuals learn to anticipate the negative social response from envy and the positive rewards from compassion. Age may consolidate thus social norms and change subjects' valuation of others' situation (Van Lange et al., 1997; Steg and de Groot, 2010). This would apply even if the individuals only cared for themselves because future rewards would be hindered for deviating from social optimal responses (Spitzer et al., 2007).

Gender has also significant effects on IA. We have found that women in our data pool consistently report more prosocial preferences. As shown in Table 17, women report more compassion, more overall inequality aversion and less competitiveness. These results are consistent with previous literature on social preferences, reviewed in Section 2.3. Nevertheless, we have also found an unexpected result. Women have been sometimes represented as less motivated by efficiency than men in social preferences (Andreoni and Vesterlund, 2001; Niederle, 2016). However, in our dataset women are more frequently classified as Efficiency Seekers (defined by Cabrales and Ponti (2011)). This inconsistency may be due to different definitions of efficiency. While in this study efficiency-seeking is defined as high compassion and low envy ("inequality should be reduced but incentives maintained"), other authors have characterised it as price-elasticity of social preferences. Future research should address this issue to reach homogeneous criteria.

Previous literature has found that women's IA seem to be more context-specific than men's (Gilligan, 1982). They are more sensitive to the reference agent when deciding how fairly to allocate resources (Ben-Ner et al., 2004). However, this concern is eliminated in self-reported measures because individuals decide their reference agents. Then, how can these results be interpreted?

We have suggested that self-reported measures do not only reflect behaviour. They rather capture what the subject interprets as the socially optimal response. We should consider that women are socially expected to be more advantageous-inequity averse than men (Aguiar et al., 2009; Brañas-Garza et al., 2018). So, the socially optimal response

for compassion is thus higher for women than for men. Besides, women are more image-concerned ([Jones and Linardi, 2014](#); [Exley, 2018](#)). Therefore, they have greater incentives to adhere to social norms, which are more exigent for them ([Eagly, 2009](#)). Thus, women face higher expectations and greater incentives to comply with them. This may lead to different social preferences learning processes depending on gender, especially for compassion. This pathway of gender difference in learning processes through life is supported by our own data. Coefficients on compassion are significantly higher for the interaction *female\*age* than *male\*age* ( $p < 0.000^{***}$ ).

Summing up gender effects, women do not only adhere differently to social norms as [Croson and Gneezy \(2009\)](#) concluded but they face stricter social norms and expectations. These differences generate separate incentives and learning processes depending on gender, which lead women to report more disadvantageous inequity aversion. More research on gender IA differences would be welcome to explain socially generated gender inequalities.

Following with income and education, we see distinct results for them. While income is just found to be significant and negatively related to IA Preferences, education seems to have more effect. Higher levels of education prompt envy, competitiveness and status-seeking. Education also reduces compassion, overall inequality aversion and efficiency-seeking. However, these results are not consistent across all specifications and databases.

These results show some support for the hypothesis that explains how low socio-economic status leads to more prosocial behaviour, as suggested by [Goetz et al. \(2010\)](#); [Amir et al. \(2018\)](#); [Brañas-Garza et al. \(2020a\)](#) (see Section 2.3). Nevertheless, this is cross-sectional data, so we cannot correctly address how individuals adapt their social preferences as they are exposed to uncertainty and hardships through life. Expanding this line of research with panel data is a worthwhile endeavour for future investigation.

## 6.2 Social framing

Fehr and Krajbich (2013) suggested different neural mechanisms to advantageous inequity depending on the social context of the experiment. We applied this framework to self-reported measures and suggested that interpretation of social context as competitive or cooperative can affect self-reported compassion. Our results support this hypothesis (Section 5.2). Interpreting society as a cooperative context significantly enhances compassion but it does not have a significant relation with envy.

Decision framing and its effect on decision making can have huge policy implications. As an example, we may expect higher revenues from taxation when framed as a cooperative context, emphasizing its benefits for those worse off. A similar framework has been employed by the Spanish government in the Covid-19 crisis, using slogans as “We stop the virus together”. This framing makes cooperation more salient to elicit prosocial behaviour even from those better off and not highly threatened by the virus (young people). Future research could follow these leads to better understand how social context and cooperative framing shapes individual decisions.

## 6.3 Motives

In Section 5.3, we tested the interrelation between different types of social preferences. Evidence from our self-reported data shows that envy or disadvantageous inequity aversion is highly related to negative reciprocity. Compassion or advantageous inequity aversion, on the other hand, is linked to altruism and positive reciprocity. We also observe this interrelation in a quasi-natural experiment of resource allocation: immigration. Immigration can be understood as redistribution (through wages and welfare) from those better off to those worse off. So, immigration is a mechanism for reducing advantageous inequity from the viewpoint of natives. Even in this setting of resources distribution, we have found that advantageous inequity aversion is not the main motive behind attitudes to immigration, but reciprocity.

How can we interpret these results? We think there are two main explanations. First,

we may consider that our self-reported measures were not designed to isolate IA from other motives. The design of our variables may have driven subjects to a sequential interpretation of the questions. This could mean that the mixing of motives is a unique feature of self-reporting, but not of economic experiments. Nonetheless, evidence suggests the interrelation of social preferences is not exclusive of self-reported measures. An alternative but not incompatible explanation is needed.

Inequity aversion has been usually given an evolutionary explanation. Caring for others and cooperating have non-evident future rewards for the individual. Social norms have evolved through generations to make prosocial behaviour endemic and almost automatic, so as to reduce the computational effort of prosocial valuation. This way, inequity aversion preferences and altruism have evolved as the internalized and implicit anticipation of future rewards. This means that at the evolutionary level, inequity aversion, altruism are interrelated to reciprocal fairness.

In consequence, these social preferences are internalized through a process where they combine naturally. Once internalized, these motives trigger intuitive responses to strategic interactions and everyday decisions. This has been called “social heuristics” and does not only apply to the conditions of our self-reported measures but to all sorts of economic games ([Rand et al., 2014](#)).

In conclusion, social preferences are mixed and combined to form intuitive responses to complex decisions. To correctly understand how social preferences shape human behaviour, future research should address in which way and to which extent social motives are mixed. Until preferences are disentangled, heterogeneous motives should be considered even in one-shot games.

## 7 Conclusions

For decades, economic science disregarded ethics and morality in human behaviour, which was explained by self-regarding utility functions. Experimental and behavioural economics put an end to this omission and incorporated the care for others' welfare into the field as *social preferences*.

This study focuses on the preference for equal outcomes: inequity aversion (IA), based on the Fehr and Schmidt Model. Using innovative self-reported data, this research is intended to shed some light onto three main aspects of inequity aversion: the relation between demographic factors and individual heterogeneity of IA, the effects of social framing on IA, and the mixed motives behind IA.

We conclude that demographic factors have a significant influence over self-reported inequity aversion. Women care more for those worse off, age enhances prosociality and IA whereas education and income seem to inhibit them. Overall, we can conclude that individuals from different ages, gender and socio-economic status face distinct social contexts and social interactions and internalize different social norms.

Humans adapt their behaviour and expectations to the conditions they face. Social preferences and inequity aversion are adapted through a life-long learning process. This development is different for each type of preferences, even for advantageous and disadvantageous IA. These findings, supported by neural evidence, encourage future research about the development of social expectations, norms and preferences throughout life.

We also find that social framing has a significant effect on IA. Individuals who interpret their environment as cooperative tend to report more compassion for others. The importance of social framing had been previously highlighted by the literature on IA, but it had not yet been proved with self-reported measures. This finding has real policy implications, as it shows how to elicit compassion and selflessness simply through framing.

Finally, we demonstrated humans show plural and mixed motives for the same behaviour. Even if theoretically separated, inequity aversion is deeply related to reciprocal fairness and even to altruism. These social preferences are deeply interrelated in human

cognition, through what has been defined as social heuristics. Both moral and strategic motives intuitively shape one-shot non-strategic decisions. Further research is needed to accurately bound these preferences and better understand the complexity of human behaviour and decision-making.

Understanding human social behaviour and decision-making is crucial if we want to comprehend how markets and institutions work and overcome the great challenges we face as a society. Economics will not be able to offer solutions if economists do not recognize humans beyond the individual: we are social animals. The study of inequity aversion and social preferences is a huge step in this direction, in the endeavour to find what do we owe one another, as Michael Sandel would put it. We started this essay by saying that economics is the science which studies how humans satisfy their necessities. In light of our findings, it is just fair to end making a suggestion: what if we defined the economy as the way we take care of one another?

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# A Annex

## A.1 Complementary extensions and variables

Further characterization of social preferences based on combinations of self-reported envy and compassion can be useful for our analysis. In this essay, we use some extensions to alpha and beta: Inequality Aversion and Competitiveness Level, as defined by [Espín et al. \(2018\)](#), and the classification made by [Cabrales et al. \(2010\)](#).

[Espín et al. \(2018\)](#) developed two additional concepts using lineal combinations of alpha and beta. Inequality Aversion (note the distinction between *inequity* aversion as defined by [Fehr and Schmidt \(1999\)](#) and this *inequality* aversion) is the sum of both advantageous and disadvantageous inequity aversion. A person with a high level of Inequality Aversion is concerned with any unequal outcome, beneficial for her or not. So, Inequality Aversion (IA) is defined as follows:

$$IA_i = \alpha_i + \beta_i \quad (3)$$

In contrast, competitive people dislike when they are in disadvantage but value positively being above others. As more difference someone reports between her envy and her compassion, higher is her preference for competition. Therefore, Level of Competitiveness (LC) for any individual  $i$  can be defined as:

$$LC_i = \alpha_i - \beta_i \quad (4)$$

Following those definitions, IA (LC) was constructed summing (deducting) beta to (from) from alpha. As alpha and beta had been centred around their middle value (4) and range from -3 to 3, IA and LC range from -6 to 6 in most databases. In the Students database IA ranges from 2 to 20 and LC from -9 to 9 because alpha and beta were scaled from 1 to 10.

In addition to the creation of IA and LC variables, further classification of individual

preferences can be made following [Cabrales et al. \(2010\)](#). They characterize four types of IA preferences:

- Egoistic Preferences (EP):  $\alpha_i = \beta_i = 0$ . People with egoistic preferences just care for their material payoff, behaving as classical individualistic theories predict.
- Inequity Averse Preferences (IAP):  $\alpha_i > 0; \beta_i > 0$ . People with IAP dislike inequality in any direction, showing both envy for those better off and compassion for those worse off.
- Status Seeker Preferences (SSP):  $\alpha_i > 0; \beta_i < 0$ . In this case, a SSP individual dislikes disadvantageous inequality (envy) but likes or does not care about advantageous inequity. Is the equivalent of competitive preferences in the frame of [Espín et al. \(2018\)](#).
- Efficiency Seeker Preferences (ESP):  $\alpha_i < 0; \beta_i > 0$ . An individual who exhibits ESP positively value or ignores that others are better off than him (inequality understood as an incentive). However, he would reduce self-advantageous inequality, showing compassion for those worse off.

But [Cabrales et al. \(2010\)](#) inferred alpha and beta directly from a DG, and this study uses self-reported measures. This means that the lowest score in alpha and beta could be both indifference and taste for inequality. Therefore, as absolute measures can lead to error, groups were redefined to represent a relative classification. We used the median value of alpha ( $M_\alpha$ ) and beta ( $M_\beta$ ) as reference point instead of 0. After those changes, the groups are defined as follows:

$$IAP : \alpha_i > M_\alpha; \beta_i > M_\beta \tag{5}$$

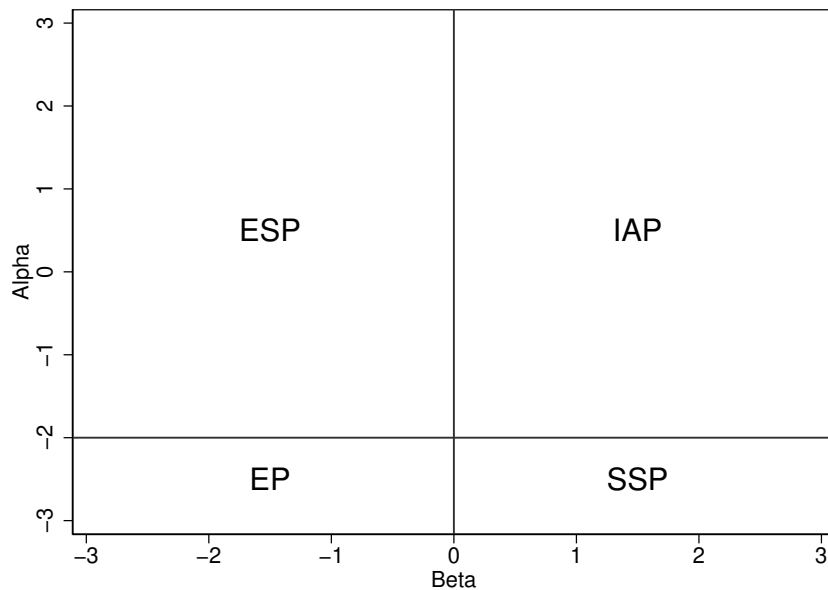
$$ESP : \alpha_i \leq M_\alpha; \beta_i > M_\beta \tag{6}$$

$$EP : \alpha_i > M_\alpha; \beta_i \leq M_\beta \quad (7)$$

$$SSP : \alpha_i \leq M_\alpha; \beta_i \leq M_\beta \quad (8)$$

The range middle value and the mean were also considered for the reference point of this classification. We compared the Akaike Information Criterion and the Bayesian Information Criterion of three Tobit regressions using each value. Table 18 (Annex) illustrates that using the median as reference point offers the best model for predicting actual behaviour. In conclusion, we classified [Cabrales et al. \(2010\)](#) groups as shown in Figure 5.

**Figure 5:** Preferences classification



Since we are using the median value, the classification criteria vary for the Students database, where alpha and beta are measured from 1 to 10 instead. Therefore, for that database median values change: 2 for alpha and 5 for beta.

Apart from those extensions, some of our databases include complementary self-reported measures. We constructed six variables from a selection of them: cooperative



social context, altruism, positive and negative reciprocity and attitudes towards immigration. The process of construction of these variables is detailed in this section.

The importance of social framing for social preferences was highlighted in Section 2.4. We developed a hypothesis based on self-supplied social framing: the belief in a cooperative society enhances compassion. To test it, we used two questions made in some of the surveys (Granada City, Granada Lab and Zaragoza):

1. Do you believe that most people would try to take advantage of you if given the opportunity or would they try to be fair?
  - a. Most people would try to take advantage of you.
  - b. Most people would try to be fair.
2. Would you say that people try to be useful to society most of the time or that they look mainly for their own interest?
  - a. People try to be useful.
  - b. People look mainly for their own interest.

If a person marks option 1.b and 2.a, she understands society as a cooperative context. According to our hypothesis, a cooperative framing would mean higher compassion. With the mean response to these questions, the variable  $cooperation_i$  is created, where higher values mean greater belief of cooperative context. Results for this topic are presented in Section 5.2.

Motives behind the care for others' are mainly altruism, reciprocity, and inequity aversion. They are often intermingled (see Section 2.5). Three additional variables were created to account for those motives. It must be considered that these measures were only included in three of our databases: Granada City, Granada Lab and Zaragoza.

$Altruism_i$ , defined as "unconditional kindness" (Fehr and Fischbacher, 2002)[p. 3], was created as the mean response to these 1-to-7 Likert scale questions:

1. I use to give money to those who beg on the street if they need it.
2. I would help an acquaintance that would not help me.

Positive reciprocity is understood as the willingness to repay a positive action with a positive response. *Positive reciprocity<sub>i</sub>* was defined as the mean 1-to-7 Likert scale response to the following questions:

1. I am willing to do a boring job to repay a previous favour.
2. I am friendly only when others treat me well, in another case: an eye for an eye.
3. If someone is friendly with me at work, I help her with pleasure.
4. If someone makes me the favour of lending me money, I feel I should return her something more than owed.
5. When I compliment someone, I expect to be corresponded [not included in Zaragoza base].

Negative reciprocity is known as the willingness to repay a negative action with retaliation. We operationalized *Negative reciprocity<sub>i</sub>* as the mean response to these questions:

1. I am willing to dedicate time and effort to repay an injustice made to me.
2. I am friendly only when others treat me well, in another case: an eye for an eye.
3. If I suffer an injustice, I will take revenge as soon as possible, no matter what.

It must be noted that question 2 is used in both negative and positive reciprocity variables because it includes both motives. Results showing the interrelation between altruism, reciprocity and inequality aversion are presented in Section 5.3.

Finally, in addition to those variables, some databases (Granada City, Granada Lab and Zaragoza) include a measure about individual's attitudes to immigration. It is a 1-to-7 Likert scale response to the statement "There are too many immigrants in Spain". We centred these responses around the middle value, so they range from -3 to 3. This is the variable *immigration*, analysed in Section 5.3.

## A.2 Additional tables and graphs

**Table 18:** BIC and AIC for Preferences Groups

	(1)	(2)	(3)
DV: DG Offer	Median	Rank	Mean
BIC	<b>22364</b>	22369	22372
AIC	<b>22335</b>	22339	22343
Observations	2,722	2,722	2,722
Base FE	N	N	N
Controls	N	N	N

**Table 19:** Marginal Effects (at means) from logit regression

	(1)	(2)	(3)	(4)
Marginal Effects	IAP	ESP	EP	SSP
Female	0.036*** (0.011)	0.065*** (0.014)	-0.068*** (0.016)	-0.035** (0.014)
Education	-0.007* (0.004)	-0.015*** (0.005)	0.008 (0.005)	0.017*** (0.005)
Observations	4,047	4,047	4,047	4,047
Base FE	Y	Y	Y	Y

Standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table 20:** Cooperation beliefs, IA and competitiveness

VARIABLES	(1) IA	(2) IA	(3) LC	(4) LC
coop	0.327 (0.199)	0.281 (0.203)	-0.671*** (0.174)	-0.523*** (0.169)
Constant	-1.743*** (0.124)	-2.475*** (0.318)	-1.544*** (0.111)	-0.172 (0.285)
Observations	2,201	2,182	2,201	2,182
Base FE	Y	Y	Y	Y
Controls	N	Y	N	Y

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

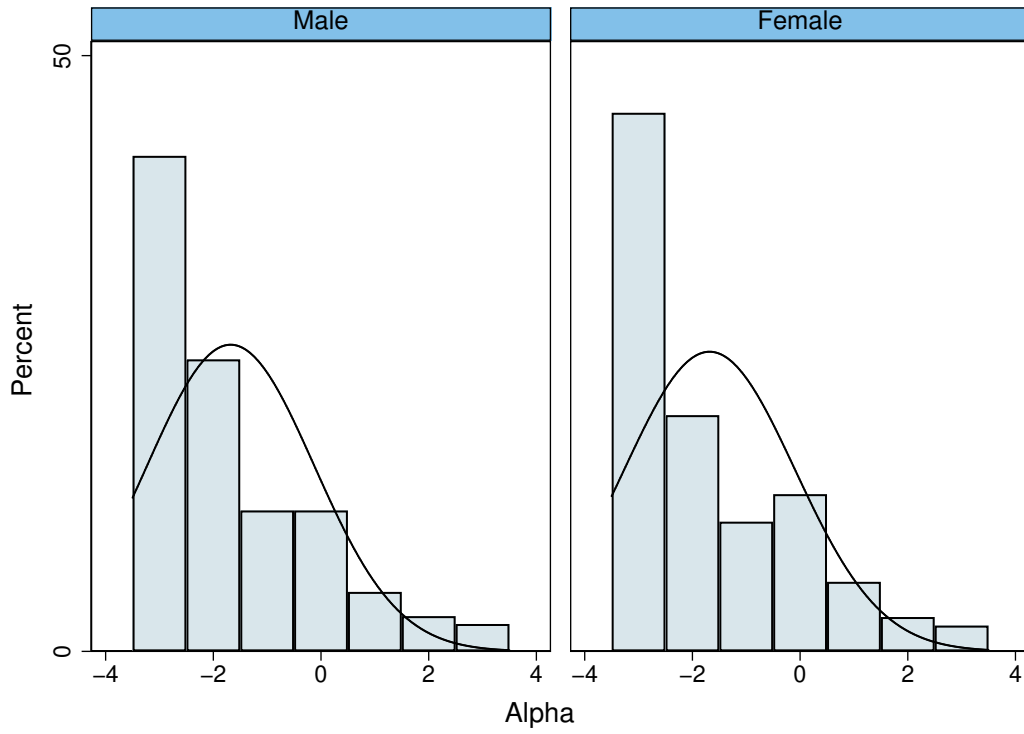
**Table 21:** Cooperation beliefs and Preferences Groups

OLS	(1) IAP	(2) ESP	(3) EP	(4) SSP
coop	0.037* (0.022)	0.055* (0.029)	-0.037 (0.033)	-0.056** (0.026)
Constant	0.143*** (0.035)	0.038 (0.045)	0.542*** (0.051)	0.276*** (0.044)
Observations	2,182	2,182	2,182	2,182
Base FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y

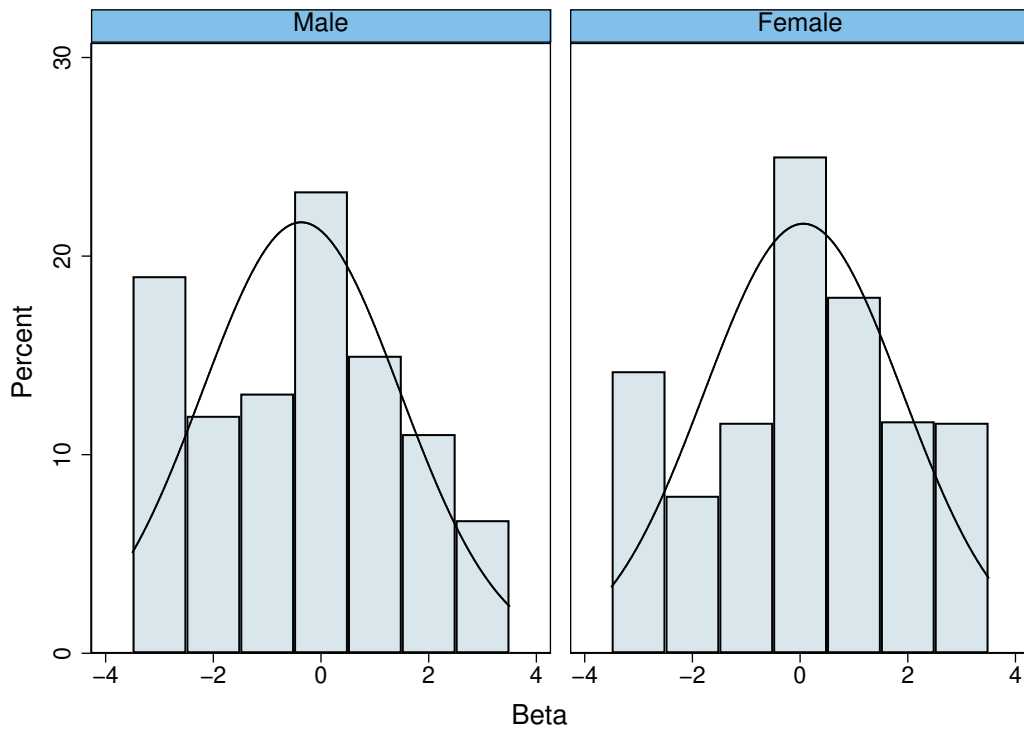
Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

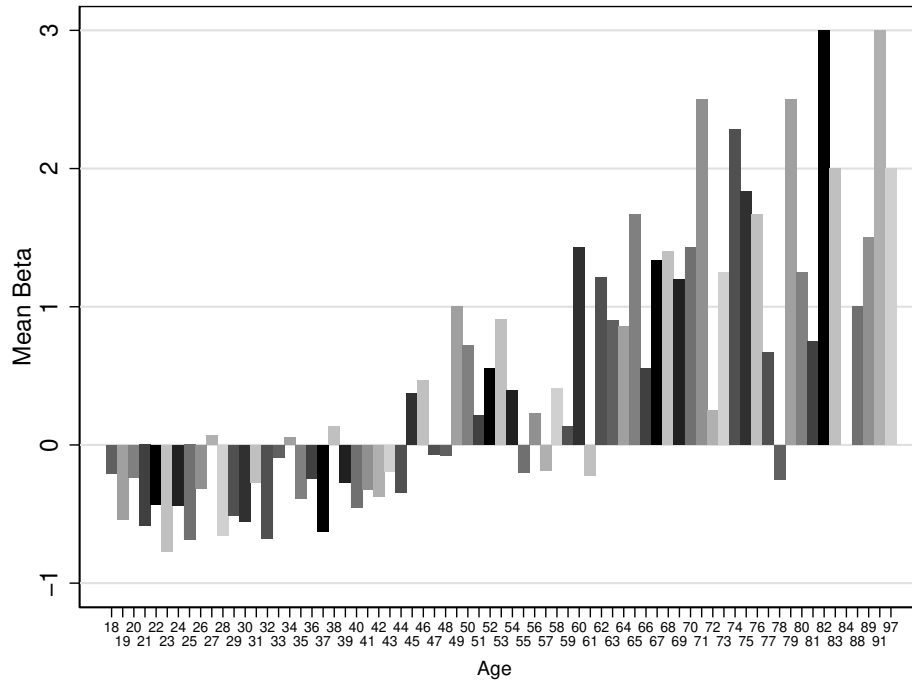
**Figure 6: Alpha (envy) by gender (N=3,278)**



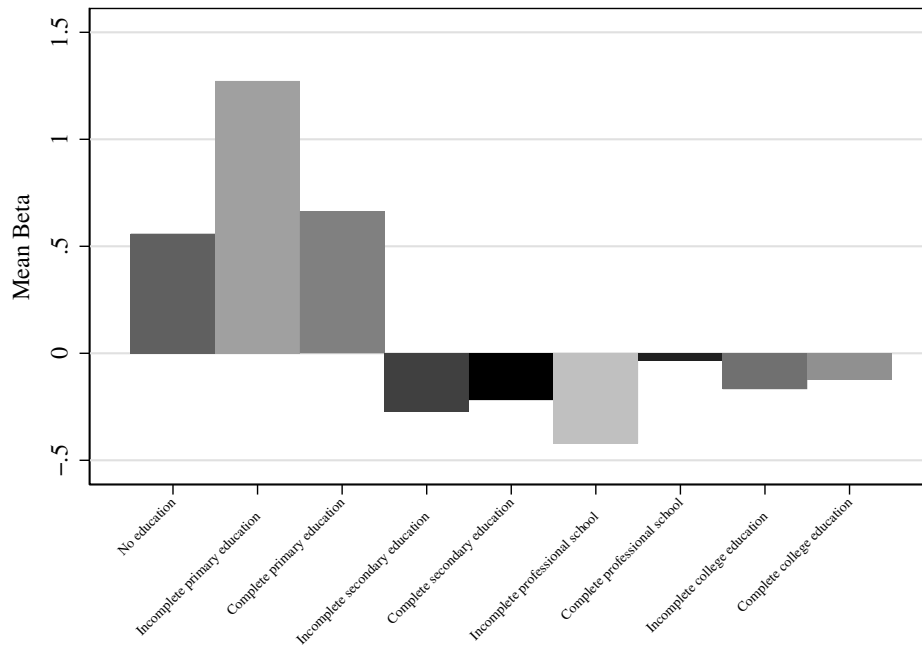
**Figure 7: Beta (compassion) by gender (N=3,279)**



**Figure 8: Beta (compassion) by age (N=2,904)**



**Figure 9: Beta (compassion) by education level (N=3,278)**



**Figure 10:** Beta (compassion) by income level (N=3,095)

