

UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA

Sede Amministrativa Università degli Studi di Padova  
Dipartimento di Scienze Economiche ed Aziendali "Marco Fanno"

SCUOLA SUPERIORE IN ECONOMIA E MANAGEMENT  
INDIRIZZO: ECONOMIA E MANAGEMENT  
CICLO XXVIII

**Terroir Wines, Mafia's Externalities and Death Awareness:  
Three Essays in Experimental Economics and Accounting**

**Direttore della Scuola:** Ch.mo Prof. Giorgio Brunello

**Supervisore:** Ch.mo Prof. Luca Nunziata

**Dottoranda:** Patrizia Malaspina

# Contents

Acknowledgments	v
Introduction	vii
Introduzione	ix
<b>Chapter 1</b>	<b>1</b>
<i>Terroir and Perceived Quality of Wine: Evidence from Tasting Experiments.</i> with Luca Nunziata	
<b>Chapter 2</b>	<b>47</b>
<i>Criminal firms: Exploring Negative Externalities on Non-criminal Competitors.</i> with Antonio Parbonetti and Michele Fabrizi	
<b>Chapter 3</b>	<b>79</b>
<i>Does Thinking about Death Make Us More Generous? Evidence from a Field Experiment in Cooperation with UNICEF.</i>	



## Acknowledgments

My experience as PhD student would have not been possible without the support of many people, to whom I am grateful.

First and foremost I would like to thank my advisor Luca Nunziata, for being a mentor and having guided me during this PhD.

My profound gratitude goes also to Antonio Parbonetti, for his constant presence, tireless dedication, and for sharing with me his invaluable knowledge and expertise.

Special mention goes also to Luca Corazzini, for his inestimable help in moving the first steps towards the realization of the third chapter of this thesis, and for giving me the opportunity to spend a worthy visiting period, from which I have benefitted enormously.

Rupert Sausgruber deserves my sincere appreciation and thanks, for hosting me at the Institute for Public Sector Economics at the Vienna University of Economics and Business, and our numerous talks that provided me with his very precious comments and enthusiasm for this work.

I am also indebted to Maria Vittoria Levati, for her brilliant suggestions and for being so generous in going beyond the call of duty.

I express my immense acknowledgment to Sheldon Solomon, for hosting me at Skidmore College, being a tremendous example as successful professor and for the profound passion he expresses in his work, and, even more importantly, for being a good friend.

I would like to thank Michele Fabrizi, for the long hours we have dedicated to our research.

I am grateful also to other professors with whom I had the possibility to discuss my projects, Ralph Bayer and Andreas Lange, who offered me interesting insights.

I acknowledge Thomas Bassetti, Giorgio Brunello, Giovanni Caggiano, Martino Grasselli, Luca Grosset and Bruno Viscolani for having hosted me during their classes and allowed me to conduct the experiment presented in the third chapter of this thesis. In this respect, I acknowledge the chiefs, Prof. Rinalda Montani and Dr. Alfredo Zannini, and all the volunteer staff of the local Unicef Committee for their collaboration in the implementation of the above-cited experiment.

I wish to thank the directors of the shopping malls, who have authorized the use of the spaces of their premises to conduct the wine tasting experiments presented in the first chapter. I am grateful also to Dr. Nicola Berti, who has given access to data of the Padova Chamber of Commerce used in the second paper.

All my gratitude goes to my PhD fellows and friends in Padova, especially Francesca, Barbara and Juan, for the exhausting and endless nights we have worked together before deadlines, the

stimulating discussions and for having made this experience special. I thank also PhD students in Vienna, Nadine, Simone, Florian, Thomas<sup>2</sup>, who have enriched immensely my academic experience and for all the fun we have had together.

I am grateful to my friend, Carlo Zenzale, for its technical support in designing the graphic material used in the experiments treatments.

Finally, my Family, for their infinite love, for having always believed in me and taught to do my best and never give up.

Last but not the least, my life partner, my husband Simone. Thank you for your enormous and constant trust in me, and for helping me believe in my projects and keep an open mind. This thesis is dedicated to you for being always there to show me the bright spots during the hardest moments of this path.

## Introduction

This doctoral thesis is composed by three research papers.

The first chapter, titled "*Terroir* and Perceived Quality of Wine: Evidence from Tasting Experiments", is co-authored with Luca Nunziata.

In this study we use experimental data in order to verify whether information about the *terroir* of a wine has a causal effect on the perceived wine quality and whether these pieces of information are more effective than the quality signal used for *terroir* products in the wine market: appellation (label) of origin. In order to address these issues we have carried out two wine-tasting experiments in three different shopping malls in Italy, using a random sample of 790 individuals. We used a Palizzi IGT red wine as it was awarded for its *terroir* expressiveness and it is an appellation not well known to consumers. Wine consumers in our samples are found to be able to use technical and detailed information about *terroir* to infer the quality of the wine and they exhibit a higher appreciation when receiving information about *terroir* rather than about the appellation of origin Palizzi IGT.

The second chapter is titled "Criminal Firms: Exploring Negative Externalities on Non-Criminal Competitors" and it is co-authored with Antonio Parbonetti and Michele Fabrizi.

The aim of this paper is to provide empirical evidence of the economic consequences due to the presence of firms connected with mafia-type criminal organizations located in developed areas. In particular, we verify for the first time how these criminal firms affect non-criminal competitors' performance and we investigate the negative externalities that they inflict by using firm-level data. Our empirical analysis exploits exogenous shocks imposed by operations against Mafia (from 2008 to 2011) at municipality level to implement a difference-in-difference strategy that compares the change in performance of non-criminal firms with the change in performance of a control group of (non-criminal) firms that operate in either an industry or a municipality that have not been affected by these police operations. The underlying idea is that these operations 'clean' the industries and the municipalities where the targeted criminal firms operate, with a consequent beneficial effect on non-criminal competitors located in the geographical proximity. Results suggest that treated competitors experience a statistically significant and sizeable increase in EBITDA/Total Assets and ROA after the operation, with respect to comparison groups that have not been exposed to this shock. Further explorations permit us to verify that this positive effect is not merely due to a decrease in the industry size after the operations. Organized crime and criminal firms bring inefficiencies in the institutional and business environment that

cause many distortions, such as in the access to procurement markets, especially for smaller firms.

The third chapter, "Does Thinking About Death Make Us More Generous? Evidence from a Field Experiment in Cooperation with UNICEF", is a solo paper.

In this study I draw on Social Identity Theory (SIT) and Terror Management Theory (TMT) to expand our understanding of the phenomenon of ingroup bias in charitable giving. I aim at investigating the effect of the use of death priming in emotive charity advertisement on potential donors' decisions and ingroup bias. In particular I compare implicit and explicit priming of death thoughts against priming of thoughts related to disease and I explore the role of various dimensions of subjects' self-esteem in moderating their responses to implicit stimuli. To this purpose I conduct a field experiment in cooperation with UNICEF, which has involved 547 subjects. Main findings of this study show that in the control group we observe that on average ingroup bias is in favor of ingroup (white-skinned - Caucasian) recipients, rather than outgroup (black-skinned - African) ones. When thoughts of death are activated, both implicitly and explicitly, discriminatory behavior emerges at the expense of donors' ingroup and favorable towards the outgroup. Furthermore, implicit death effects arise independently from the level of general self-esteem and self-esteem's relevant domains. This study produces interesting findings not only for the direct field of application. The integration of SIT and TMT offers valuable sparks for forthcoming economic analyses of ingroup bias in different settings.

## Introduzione

Questa tesi di dottorato è composta da tre saggi.

Il primo capitolo, intitolato "*Terroir* and Perceived Quality of Wine: Evidence from Tasting Experiments", è coautorato con Luca Nunziata.

In questo studio utilizziamo dati sperimentali per verificare se le informazioni sul *terroir* di un vino hanno un effetto causale sulla qualità percepita e se queste informazioni sono più efficaci del segnale di qualità utilizzato per i prodotti da *terroir* nel mercato vinicolo: la denominazione (marchio) di origine. Al fine di affrontare queste questioni abbiamo condotto due esperimenti di degustazione in tre diversi centri commerciali in Italia, coinvolgendo un campione casuale di 790 individui. Abbiamo utilizzato un vino rosso Palizzi IGT in quanto è stato premiato per l'espressività del *terroir* di provenienza ed è una denominazione non molto conosciuta dai consumatori. I consumatori di vino nei nostri campioni sono stati in grado di utilizzare informazioni tecniche e dettagliate sul *terroir* per inferire la qualità del vino e hanno mostrato un maggiore apprezzamento quando hanno ricevuto le informazioni sul *terroir* piuttosto che sulla denominazione di origine Palizzi IGT.

Il secondo capitolo è intitolato "Criminal Firms: Exploring Negative Externalities on Non-Criminal Competitors" ed è coautorato con Antonio Parbonetti e Michele Fabrizi.

L'obiettivo di questo articolo è di fornire evidenza empirica delle conseguenze economiche dovute alla presenza di aziende connesse con organizzazioni criminali di tipo mafioso localizzate in aree sviluppate. In particolare, verifichiamo per la prima volta come le imprese criminali influenzano la performance dei concorrenti non criminali ed investighiamo le esternalità negative che infliggono ai concorrenti utilizzando dati a livello di impresa. La nostra analisi empirica sfrutta gli shock esogeni imposti da operazioni contro la Mafia (dal 2008 al 2011) a livello comunale per implementare una strategia difference-in-difference che compara il cambiamento nella performance delle aziende non criminali con quello di un gruppo di controllo composto da aziende (non criminali) che operano in settori o aree che non sono stati interessati dalle operazioni di polizia considerate. L'idea sottostante è che queste operazioni 'puliscano' i settori e i comuni dove le aziende criminali colpite operano, con un conseguente effetto benefico sui concorrenti non criminali localizzati in prossimità geografica. I risultati suggeriscono che i concorrenti trattati presentano un considerevole e statisticamente significativo aumento dell'EBITDA/Totale Attivo e del ROA dopo l'operazione rispetto ai gruppi di controllo che non sono stati esposti a tale shock. Ulteriori esplorazioni ci permettono di verificare che questo



effetto positivo non è semplicemente dovuto ad una diminuzione della dimensione dei settori dopo le operazioni. Il crimine organizzato e le imprese criminali portano inefficienze nell'ambiente istituzionale in cui operano le imprese che causano numerose distorsioni, come nell'accesso al mercato degli approvvigionamenti, soprattutto per le aziende più piccole.

Il terzo capitolo, "Does Thinking About Death Make Us More Generous? Evidence from a Field Experiment in Cooperation with UNICEF", è a firma unica.

In questo studio mi baso sulla Social Identity Theory e Terror Management Theory per espandere la conoscenza del fenomeno dell'*ingroup bias* nel comportamento altruistico. Il mio obiettivo è investigare l'effetto dell'induzione di pensieri di morte (*death priming*) nelle campagne caritatevoli 'emotive' sulle decisioni dei donatori e l'*ingroup bias*. In particolare, esploro l'effetto di *priming* di pensieri di morte relativi ai beneficiari di una campagna per le vaccinazioni contro l'attivazione di pensieri legati alla malattia ed esploro il ruolo di diverse dimensioni dell'autostima dei soggetti nel moderare le loro risposte agli stimoli impliciti. A tal fine, ho condotto un esperimento *field* in cooperazione con UNICEF che ha coinvolto 547 soggetti. I principali risultati di questo studio mostrano che in media nel gruppo di controllo osserviamo la presenza di *ingroup bias* a favore di beneficiari appartenenti all'*ingroup* (di pelle bianca - caucasici), piuttosto che all'*outgroup* (pelle nera - africani). Quando vengono indotti pensieri di morte osserviamo un comportamento discriminatorio nei confronti dell'*ingroup* e favorevole nei confronti dell'*outgroup*. Inoltre, gli effetti del *priming* implicito emergono indipendentemente dal livello e dai domini rilevanti dell'autostima dei soggetti. Questo studio produce interessanti risultati non solamente per i diretti ambiti di applicazione. L'integrazione della SIT con la TMT offre degli spunti per future analisi di interesse economico dell'*ingroup bias* in diversi contesti.

# Chapter 1

---

## ***Terroir* and Perceived Quality of Wine: Evidence from Tasting Experiments**

**Patrizia Malaspina\***

*(University of Padua)*

**Luca Nunziata**

*(University of Padua, IZA)*

### **Abstract**

Wine is one of the most interesting product to study within the field of consumer behavior. In the last years, the question "does *terroir* really matter?" has been dominating the debate on wine quality. In this study we use experimental data in order to verify whether information about the *terroir* of a wine has a causal effect on the perceived wine quality and whether these pieces of information are more effective than the quality signal used for *terroir* products in the wine market: appellation (label) of origin. In order to address these issues we have carried out two wine-tasting experiments in three different shopping centers in Italy, using a random sample of 790 individuals. We used a Palizzi IGT red wine as it was awarded for its *terroir* expressiveness and it is an appellation not well known to consumers. Wine consumers in our samples are found to be able to use technical and detailed information about *terroir* to infer the quality of the wine and they exhibit a higher appreciation when receiving information about *terroir* rather than about the appellation of origin "Palizzi IGT".

\* Authors are listed alphabetically

# 1. Introduction

In this study we explore the effect of *terroir*, as marketing tool, on consumers' perceived wine quality.

Nowadays, perceived quality of wine is arising a growing curiosity in the academic field. The rapid changes in the wine sector<sup>1</sup> together with the complexity that characterizes the wine quality concept and the air of mysticism surrounding its quality perception<sup>2</sup> have increased over time the interest of producers and scholars in the analysis of the wine quality dimensions.

In the last 40 years, we have been witnessing a number of controversies about what wine is, how it should be understood and, in particular, about which are the strategic attributes that ultimately determine the quality of wine. This debate has its roots mainly in the following dilemma: does *terroir* really matter?

*Terroir* is a construct regularly used to justify and endorse the wine quality, mostly in European countries. The OIV (Organisation Internationale de la Vigne et du Vin) defines the viticultural *terroir* as "a concept that refers to an area for which there is collective knowledge of the interaction between the physical and the biological environment and applied specific practices, which provide unique characteristics for goods originating from this specific area [that cannot be reproducible in wines produced in any other area]. *Terroir* includes specific characteristics of the soil, topography, climate, landscape and biodiversity". Other definitions exist and are divided into: "restricted" - environmental factors<sup>3</sup> - and "expanded" - environmental factors + human factors (Vadour, 2005). In this work we refer to the expanded definition, in accordance with the OIV. We make this choice as the focus of our study is on consumers' quality perception and the 'expanded' definition is the one that was found to fit more to the way consumers perceive *terroir* products in their mind (Aurier, Fort, Siriex, 2005).

Extant literature remarks that the use of 'relationship to place' has a long history in the wine trade and it is seen as a core brand attribute, that can provide the winery with the opportunity to pursue a more niche-oriented strategy based on product differentiation (Beverland, 2006; Thode and Maskulka, 1998). *Terroir* is intended as a powerful marketing device that satisfies consumers' demand for authenticity and uniqueness, conveying a symbolic idea of "genuine" rather than "industrial" product, and it is tightly linked to the success of wine tourism (Spielmann and Charters, 2013; Moulard et al., 2015).

---

<sup>1</sup> The progressive increase and diversification of the offer and consumption motivations, the decline of consumption in traditional countries and the appearance of new producer and consumer countries.

<sup>2</sup> Consumers find evaluation of wine quality more difficult with respect to similar products (D'Alessandro and Pecotich, 2013).

<sup>3</sup> Soil, subsolil, topography, climate, etc, that represent the 'technical' *terroir* (Ballantyne, 2011).

Nevertheless, its definition and actual relevance are surrounded by ambiguity and are at the centre of several international debates and controversies that involve Old World (mainly European countries) and New World countries<sup>4</sup> (Charters, 2010), outlining the so-called “War on Terroir” (Joslin, 2006). Old World countries traditionally adopt a *terroir-based* strategy and resort to the appellation (label of origin) system<sup>5</sup> based on geographical areas to signal quality to the market. Differently, New World countries mainly adopt a *brand-based* strategy<sup>6</sup>, embracing the idea that the producer is the agent that ultimately determines the quality of a wine in a bottle and that *terroir* is an expedient to maintain the *status quo* and protect the European productions.

In the last years, the trend of the international wine trade has been showed that New World countries’ productions are gaining upon Old World countries’ ones (OIV, 2013).

Data appear to endorse the claim of those who do not support the appellation system arguments, suggesting that appellations alone cannot guarantee success on international wine markets and fail to generate the idea of uniqueness, which may derive from the *terroir* reality, in consumers' minds (e.g. Agnoli et al., 2009). However, the implementation of a place-based strategy can be effective only in presence of a perceptible link between the presumed quality, mystique, of the wine and its place of origin. This is particularly true if it is not well promoted and thereby popular among consumers.

Therefore, some questions naturally arise in our mind: what about consumers’ experience and evaluation of the attribute *terroir* in its *very essence*? Does consumers value *terroir*, when they are provided with detailed and technical information about and/or experience it? *It is for customers to judge!*

In this exploratory study, we conduct two wine tasting experiments to address these issues.

Little attention has been given to *terroir* as quality cue in the academic literature so far. The vast majority of the existing studies have focused more on appellation of origin and region/country of origin (e.g. Al-Sulaiti and Baker, 1998; Thode and Maskulka, 1998; Koschate-Fischer *et al.*, 2013; Johnson and Bruwer, 2007; Schamel and Anderson, 2003; Melnyk *et al.* 2012; Agnoli et al., 2009). The few investigations on *terroir* have mainly used surveys and interviews to identify the dimensions characterizing *terroir* and *terroir* authenticity (Aurier et al., 2005; Spielmann and

---

<sup>4</sup> USA, Australia, New Zealand, South Africa, China, Argentina, Chile, etc.

<sup>5</sup> Appellations are signals associated to *terroir* products (such as wine), so they are conceptualizations, representations of *terroir*. They are used to legally identify and certificate products that are typical from an area and possess certain characteristics that cannot be reproduced elsewhere (Barahm, 2003). In virtue of its appellation, a product is supposed to benefit from a certain reputation, as appellations are a guarantee of a product’s ‘institutional authenticity’ (Spielmann and Charters, 2013). The main three categories of the Italian appellation system are: DOCG, DOC and IGT.

<sup>6</sup> In the last years, some of them have attempted to mimic the *terroir* approach with different results (Thode and Maskulka, 2005).

Charters, 2013), verified which variables describing *terroir* (technologies and natural endowments) affect more consumers' quality evaluation (Gergaud and Ginsburgh, 2008) or focused on the value of *terroir* in terms of value of the vineyards (Cross et al., 2011).

In this study, the first experiment aims at verifying whether *terroir* does really matter from the consumers' point of view. More specifically, our experimental design seeks to identify and infer the causal effect of *terroir* on perceived quality of wine, by investigating whether technical information about *terroir* can positively influence the value consumers recognize to the wine and their overall judgment about it. We return to the objective 'reality' of *terroir* construct in its "expanded" definition, without referring solely to its conceptualization (e.g. appellation of origin)<sup>7</sup>, and we attempt to explore whether technical information about *terroir* affect not only the wine expected quality but also the experienced one, when consumers taste it.

Wine represents an interesting subject for such an investigation, as it is considered to be a product difficult to evaluate (that implies a more complex purchase choice) and its pleasantness is largely influenced by what consumers think to know about it (Lockshin and Hall, 2003, D'Alessandro and Pecotich, 2013).

The second experiment tests the effect of *terroir* against appellation (label of origin). The idea is to investigate whether appellation is a signal informative of the quality of a *terroir* wine; in other words, we would like to test if it is a valuable and effective quality signal of a *terroir* wine to the market, independently of its popularity and reputation. This research question gains more relevance if we consider that, currently, label of origin is one of the few signals reported on the wine labels and used by *non-connoisseurs* in formulating their purchasing decisions. Indeed the larger the wine-related knowledge that consumers have, the lower the importance of appellations in *terroir* wine quality evaluations (e.g. Agnoli et al., 2009).

The decision to collect data using tasting experiments is based on the following considerations. First, sensory examination of wine is of paramount importance for the evaluation/assessment of the quality of a wine. A number of studies has showed that wine taste is the main factor that drives consumers' assessment and decisions (e.g. Keown and Casey, 1995; Charters and Pettigrew, 2007; Dotson *et al.* 2012); indeed, wine is a hedonic product and pleasure is an important dimension of wine consumption experience. Second, *terroir* is supposed to find expression in the organoleptic properties of the wine (e.g. Vaudour, 2002; Barham, 2003; Trubek, 2008); hence the experience of tasting is important when we explore the effect of *terroir* on perceived quality. Lastly, several

---

<sup>7</sup> In the past, scholars have given little attention to consumers' experience and evaluation of information, also technical and detail, about *terroir*; the literature is rich of studies about appellation of origin, region/country of origin (e.g. Deselnicu et al., 2011; Gergaud and Livat, 2007; Al-Sulaiti and Baker, 1998; Thode and Maskulka, 1998; Koschate-Fischer et al., 2013; Johnson and Bruwer, 2007; Schamel and Anderson, 2003; Melnyk et al. 2012).

researches have demonstrated that extrinsic cues can affect the actual efficacy, the perceived quality and even the sensory perception of a product, (e.g. Allison and Uhl, 1964; McClure *et al.* 2004; Litt and Shiv, 2012; Okamoto and Dan, 2013). In this work, the tasting experience allows us to test whether the availability of technical information about the *terroir* can affect the *actual* (experienced) quality of the wine, when the consumer tastes it.

The two experiments were carried out within Italian shopping malls (in the province of Padua and Reggio Calabria), which involved 790 subjects of 18 and over, who spontaneously took part in the experiment. The wine we used was a prize-winning red wine (Palizzi IGT) awarded for its *terroir* expressiveness by the native wines guide “Vinibuoni d’Italia”. The appellation Palizzi IGT is not well known to consumers. The choice of an appellation that is not popular allows us to take the effect of its reputation apart. In both experiments, the treated group received technical and detailed information about the *terroir* of the wine, while the control group took part in a *blind tasting* in the first experiment and it was informed about the appellation of origin of the wine in the second one.

Perceived quality was measured by participants’ willingness to pay for one bottle of the tasted wine in restaurants/specialized shops and hyper- or supermarkets, and by the rating that they assigned to it. We analyze data by running a regression analysis using a linear model and robust standard errors. The robustness of the estimates was checked by using different set of controls, possible confounding factors into the relationship between the regressands and the main regressor: demographical and socio-economic factors and other information concerning participants’ knowledge of wine and consumption habits (involvement level). These data were gathered by means of an anonymous questionnaire, administered during the experiment. Main results of this study show that consumers appreciate and value more the wine they taste when they are provided with information about *terroir* (experiment 1). *Terroir* is found to affect quality perception even against appellation of origin (experiment 2). The analysis of a dataset that combine data gathered through the two experiments confirm that the *terroir* effect is statistically similar across the two studies. So *terroir* comes out to matter irrespectively of whether the control group receive or not any information and to be more effective as marketing tool than appellation of origin.

The value of this paper is to academic readers, wine industries practitioners and *terroir* wine and tourism associations alike, as it explores the importance of wine’s *terroir* in the consumer wine-evaluation and the relevance of *terroir* in wine marketing strategies.

To our knowledge, our study represents a first attempt to investigate experimentally whether the consumers value ‘technical’ *terroir* as quality cue and to test the effectiveness of the appellation system to signal it.

This paper is structured as follows. In section 2, we briefly provide the theoretical background of our study. In section 3, we illustrate and discuss the methodology and the experiments' designs. In section 4 we present the regression analysis and the main results we obtained. Finally, section 5 concludes.

## **2. Theoretical Background**

Markets may die out if consumers cannot assess the quality of the goods supplied (Arkelof, 1970). This sentence suggests the importance of one of the most relevant issues in consumer and marketing research: exploring and understanding the way consumers infer and learn quality. In the academic literature different and field-specific perspectives on quality emerged and customers' perception of quality are of paramount interest within marketing and consumer research.

Zeithaml (1988) defines it as the consumers' judgments about a product's overall superiority or excellence and provides a conceptual model that represents the different components (attributes) of the consumers' quality perception. These attributes are usually distinguished between two types: intrinsic and extrinsic (Olson and Jacoby; 1972). Intrinsic attributes concern the physical composition of the product and they cannot be changed without altering the nature of the product (e.g. in the case of wine, the organoleptic properties), while the extrinsic ones are related to the product, but are not physically part of it (such as price, brand name, advertisement, appellation of origin and other information reported on wine labels).

In order to signal the quality of their products and persuade consumers to buy them, firms deliver these attributes, signals (cues), to the market and consumers use them to infer quality (Steenkamp, 1989). Unfortunately what firms deliver to consumers may not correspond to what consumers perceive, through the lens of their measurement knowledge and motivation, expectations and emotion (Golder et al., 2012). Thus gaining insights on customers' perceptions of those attributes (that firms consider strategic) and understanding which attributes count for consumers are necessary requirements for firms to formulate effective communication strategies of their products' quality, and to gain and maintain a sustainable competitive advantage. According to Poulsen *et al.* (1996), the consumers' overall quality evaluation depends both on the expected and experienced quality of the product, which affect the quality formation process. The expected quality is based both on intrinsic and extrinsic quality cues, while the experienced quality derives from the actual consumption and sensorial experience of the product; expectations influence perceived experiences and experiences influence expectations in the future. Previous studies teach

us that consumption experiences are affected by consumers' expectations about the product. In this respect, an experiment by Almberg and Dreber (2011) demonstrate that consumers rate better more expensive wines, which are found to really taste better, while Shiv et al. (2005) show even that marketing actions can influence the actual efficacy of a product.

Perceived quality of wine requires a special attention, as it has been shown that the choice for wine is more difficult for consumers than for any other product, as there are several cues that can affect their decision (Lockshin and Hall, 2003) and that cannot be easily available to consumers. Indeed they quite resort to the judgment of experts in order to evaluate a wine (Verdú Jover *et al.*, 2004). In this study, we are interested in the effect of the extrinsic cue *terroir* on wine quality perception. In the existing literature, direct references to the *terroir* construct are seldom. We find researches on its conceptualizations or generalizations, such as appellation of origin and region/country of origin (e.g. Al-Sulaiti and Baker, 1998; Thode and Maskulka, 1998; Koschate-Fischer *et al.*, 2013; Johnson and Bruwer, 2007; Schamel and Anderson, 2003; Melnyk *et al.* 2012).

It was found that wine region (regional brand image) is one of the most important information that consumers use to predict the quality of wine and that the addition of regional information makes the product more reliable and increase the confidence in its quality (Johnson and Bruwer, 2007).

Indeed, 'relationship to place' is found to be one of the attributes of authenticity, a positioning device, which is resonating with consumers (Beverland, 2006 p.251). A number of studies show that consumers are willing to pay more for a favorable place/region/country of origin image in all those markets in which the link between the product place of origin and its presumed quality is perceptible (e.g. Koschate-Fischer *et al.*, 2013).

In addition, GI<sup>8</sup>-labeled wines received some attention in the existing literature. Demographical and social characteristics are found to influence the willingness to pay for them: the WTP of inferior wine consumers depends on their education and ties to the area of origin of the wine (Skuras and Vakrou, 2002).

In general Deselnicu *et al.* (2013) demonstrate that price *premia* are lower for completely transformed products, with a longer offer chain and characterized by the possibility of being a *branded* company, like wine.

From the study of Agnoli *et al.* (2009) we learn that there are some variables that influence the way consumers behave towards wine and food: intangible factors that regard environment, history of the area, local traditions, cultivation and elaboration techniques, all of which define *terroir*. It has emerged that the reputation of a wine brand is one of the main factors influencing consumers'

---

<sup>8</sup> Geographical Indication.



choice and that the better the knowledge customers have, the less they are influenced by the reputation of the brand.

As pointed out above, specific studies on *terroir* are seldom and developed in different directions. Aurier *et al.* (2005) explore the factor *terroir* from the consumer point of view, by carrying out a study based on interviews, focus groups and questionnaire surveys. They show that *terroir* product is a cognitive category characterized with three intrinsic dimensions: “trade-skill” (know-how, recipe and tradition), “time and culture” (history and ritual) and “origin” (territory, region and land). They find that among all these categories, the most important is “time and culture”. Gergaud and Ginsburgh (2008) use a "restricted" definition of *terroir* and verify whether the evaluation of quality on behalf of the experts (Parker, Bettane and Desseauve, and Broadbent) and the consumers (Christie’s auction prices) depends on the variables that describe *natural endowments* (land characteristics, exposure of vineyards) and *technologies* (all of the elements that are different from *natural endowments*). They show that technologies have an influence on the quality and the taste of wine, while natural endowments have a negligible effect. Cross *et al.* (2011) make a reference to a "restricted" definition of *terroir* and concentrate their attention on the value of *terroir* and, in particular, they explore whether the characteristics of the *terroir*’s area (soil types, altitude, slope, etc.), or designated appellation, confer an higher value to the vineyard, by increasing the sales price. The results of this analysis show that site attributes (*reality of terroir*) do not have a significant effect on the value of the vineyard, while the AVA appellation (*concept of terroir*) does, despite a series of robust tests and the use of precise measures for the site attributes. Rebelo and Caldas (2013) use an "expanded" definition of *terroir* and deal with the threat that Old World producers (whose products are based on the *terroir model*) face from the New World producers. They use a cluster approach and focus the attention on the case of the Portuguese wine *Demarcated Douro Region*, where two categories of wine are produced (Port and still wine). They propose a strategic solution to increase the competitiveness at an international level, passing from an *organized* cluster (the present condition in the region) to an *innovative* one.

Several studies have showed that *terroir* factors are used mainly by professional, expert wine consumers (*connoisseur*) to represent complexity and infer quality of wine, while non-expert consumers (*non-connoisseur*) tend to give more importance to intrinsic dimensions, such as smell and taste (Parr *et al.*, 2011; Dotson *et al.*, 2012; Sáenz-Navajas *et al.*, 2013), other information reported on wine labels and their own experience. Two recent studies have focused on perceived authenticity of *terroir* wines (Spielmann and Charters, 2013; Moulard *et al.*, 2015). Spielmann and Charters (2013) find three dimensions of *terroir* concept that relate to authenticity (product, internalized and institutional authenticities) and they are positively correlated. Each of them can

be related to quality perceptions, purchase intent and satisfaction. Moulard et al. (2015) explore how technical *terroir* and country of origin (New World v. Old World countries) affect consumers' authenticity perception and their willingness to pay for it. Their results suggest that Old World wines are perceived as more authentic and they are valued better with respect to New World countries and that the effect of *terroir* on perceived authenticity and willingness to pay is moderated by country of origin.

### 3. Wine-Tasting Experiments

To infer the causal effect of *terroir* on perceived quality of wine, we carried out two wine-tasting experiments in three shopping malls where there are hypermarkets in Italy (one of the largest wine producer and exporter country). Both the experiments took place in an area near the cash registers of the hypermarkets (outside the hypermarkets), where the experimenter positioned a tasting table. Participants were customers of the shopping mall who had spontaneously decided to participate in the experiment. They were asked to fill an anonymous questionnaire, to taste a glass of a Palizzi IGT red wine, to rate it on a 10-point scale and to declare their willingness to pay (in euro) for a bottle of the tasted wine in a restaurant/specialized shop and in an hyper- supermarket.

We chose a Palizzi IGT red wine for two main reasons:

- The expert guide *Vinibuoni d'Italia* had awarded it for its quality, agreeableness, drinkability and the union of wine, grape and territory – *terroir expressiveness*.
- The geographical indication Palizzi IGT is almost unknown to the consumer public; even though it is a reality with a 100-year-long history, it is not popular and it is still in a phase of rediscovery. We decide to refer to an appellation that does not benefit from any particular fame in order to take the effect of appellation of origin reputation on perceived quality apart.

*Sampling Design.* Our target population is represented by consumers living in the provinces of Padua and Reggio Calabria, two areas at the opposite ends of Italy: the first is situated in the heart of a region suited to wine making, characterized by a strong tie between culture and wine-making traditions; the second is the area where the tasted wine is produced. Considering these two provinces allows us to control for the *hyper-regionalism* that characterizes Italian preferences and consumption habits. Indeed we should take into account that a *wine prototype*<sup>9</sup> exists in consumers'

---

<sup>9</sup> It affects the ideal expectations of wine drinkers and, consequently, their experience and evaluation processes.

mind and it is built and structured according to cultural references, typical preferences, based on place and connection to local productions (Vaudour 2002), that represents a subjective dimension of *terroir*. In Italy this dimension exhibits a precise heterogeneity across different (wine) regions. Hence in this study we observe the influence of *terroir* on perceived quality in the region where the considered *terroir* is, as well as one which is characterized by a definite wine culture, different organoleptic memory and preferences. Furthermore these two areas exhibit different levels of well-being and living standards.

The choice of carrying out the experiments in shopping malls with hypermarkets was based on the idea of they being the ideal places where to find a random sample of individuals, potentially interested in the purchase of wine, that would be representative of the entire population. On the basis of this first choice, a list of strategically-positioned shopping malls with hypermarkets was drawn up. The experiment was carried out in those shopping malls that gave us the permission to use their premises:

- “Le Brentelle”, SR11, Sarmedola di Rubano – Padua, Veneto (experiments 1 and 2);
- “Centergross”, SS106, Bovalino Marina – Reggio di Calabria, Calabria (experiment 1);
- “La Gru”, SS106, Siderno Marina – Reggio di Calabria, Calabria (experiments 1 and 2).

To be qualified, participants had to be of legal drinking age (18 years). Overall the sample was composed of 881 individuals, but only 790 observations (389 from the second experiment and 401 from the first one) were used (see Appendix B).

*Perceived Quality Measures.* We use two dimensions to measure participants' perceived quality: overall rating of the wine (on a 10-point scale) and the willingness to pay (WTP) in euro for a bottle in a restaurant/specialized shop and hyper-supermarket.

By doing so we want to capture not only the global quality judgment about the product, but also the premium that customers recognize to it and the utility they get from the consumption of *terroir* wines. In previous studies, willingness to pay was found to correspond to the real price that individuals actually pay for a product and to be correlated to quality perception and intention to purchase (e.g. Veale and Quester, 2008; Sáenz-Navajas et al., 2013). We decide to distinguish between WTP in restaurant/specialized and in hyper- supermarkets because it is crucial to precise the purchase/consumption place, otherwise all those factors that are not specified are elicited by the respondents<sup>10</sup>, that may have different perceptions of the quality of the same wine in different contexts (Martínez et al., 2006).

---

<sup>10</sup> They would have imagined themselves in the habitual place where they purchase wine.

### 3.1. Experiment 1

The aim of this experiment is to verify whether *terroir* information do matter for wine consumers and positively affect their quality assessment.

The experiment has been conducted during six days (both weekdays and weekends) in December 2011, from 10 a.m. to 8 p.m.. Data on 470 individuals have been collected, but only 401 observations have been used in our analysis (see Appendix B for further details).

The experimental design is between-subjects mono-factorial on two levels. Each individual was randomly assigned to two groups (treated and control): the control group took part in a blind tasting (“NT” condition); the treated received technical and detailed information about the *terroir* (“T” condition), reported on a card, before to taste the wine. The card provided information about the main elements of Palizzi *terroir*: grape varieties, soil, climate, production practices utilized, images of the vineyards and the landscape, and the appellation Palizzi IGT, as appellations of origin are the ‘concept of *terroir*’ (Cross et al., 2011). These information were provided in a written form to guarantee the homogeneity of their administration (see Appendix A).

Table 1 - Summary of experimental design (experiment 1)

Description	
<i>TREATED (T)</i>	Information about <i>terroir</i> (including appellation of origin)/Wine Tasting
<i>CONTROL (NT)</i>	Blind Tasting

We choose a between-subjects design in order to avoid *carry-over* and *demand effects* (Charnessa, Gneezy, Kuhn, 2012). We use a large sample and random assignment to minimize problems associated to this design (assignment bias and high variability within the treatment); further, we opt for a single-blind design to address other common threats to the internal validity of a between subject design.

Randomness was guaranteed by throwing a die. The “T” condition corresponded to an even outcome, while “NT” corresponded to an odd one. The die was thrown at the beginning of every hour. The experimenter took note of the outcomes of this process on an appropriate form.

#### 3.1.1. Questionnaire and Experiment Phases

Our experiment was divided into three phases. At the beginning the participants were provided with an anonymous questionnaire, that contained also the instructions and the guidelines for the experiment (see Appendix A). The anonymous questionnaire was made up of 28 questions and it

was divided into three parts (see Appendix A), corresponding to the experiments' phases. The division into phases is meant to give each subject a homogeneous guide and to guarantee a correct execution of the experiment.

The front page provided some information and instructions regarding the experiment<sup>11</sup>. First of all, participants were asked to read the instructions and to report date and time, so that it was possible to keep track of where and when they carried out the experiment and to understand the condition to which they had been assigned.

**Table 2 - Experiment phases (experiment 1)**

<b>Experiment phases</b>	<b>Control Group</b>	<b>Treatment Group</b>
<b>1</b> Questionnaire Part 1	<ul style="list-style-type: none"> <li>• Demographic and socio-economic variables</li> <li>• Consumers habits and wine knowledge/level of involvement</li> </ul>	<ul style="list-style-type: none"> <li>• Demographic and socio-economic variables</li> <li>• Consumers habits and wine knowledge/level of involvement</li> </ul>
<b>2</b>	<ul style="list-style-type: none"> <li>• <b>No information</b></li> <li>• Wine Tasting</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Information about <i>terroir</i> (and Appellation)</b></li> <li>• Wine Tasting</li> </ul>
<b>3</b> Questionnaire Part 2	<ul style="list-style-type: none"> <li>• Perceived Quality</li> <li>• WTP (in euro) for a bottle of the wine in a restaurants and super-hypermarkets</li> <li>• Knowledge and previous tastings of Palizzi IGT</li> </ul>	<ul style="list-style-type: none"> <li>• Perceived Quality</li> <li>• WTP (in euro) for a bottle of the wine in a restaurants and super-hypermarkets</li> <li>• Knowledge and previous tastings of Palizzi IGT</li> </ul>

The first part of the experiment was meant to collect individual data on the participants. In this phase they were asked to respond to the questionnaire, which, in turn, was divided into two parts. The first regarded demographic and socio-economic information (such as sex, age, education, household income, occupational condition). The second concerned consumption habits (consumption frequency, type of wine consumed, habitual place for purchase of wine<sup>12</sup>, etc.) and wine knowledge, in order to gather information about their involvement level<sup>13</sup>.

<sup>11</sup> Participants were not informed of the exact aim of the experiment, but they could read that it was about the perceived quality of the wine, without any reference to *terroir*.

<sup>12</sup> Purchase place and consumption frequency were found to influence wine preferences (Martínez et al., 2006).

<sup>13</sup> Controlling for these factors is necessary because the wine drinkers' perception and consumption behavior are substantially dependent on their involvement level: e.g., high-involved consumers (*connoisseurs*) place emphasis on *terroir* attribute more than low-involved ones – novices (Charters and Pettigrew, 2006 – 2007; Parr et al., 2011; D'Alessandro

In the second phase those who had been assigned to the treatment group received the information about the *terroir*, while those in the control group received no information at all. We decide to provide *terroir* information before the tasting because information about the product are found to have a significant effect on consumers' experience before the consumption (Hoch and Ha, 1986; Levin and Gaeth, 1988; Lee et al., 2006). At this point all the participants were required to taste the wine.

In the third phase, the subjects were asked to rate the wine on a scale from 1 to 10, and to declare their willingness to pay (in euro) for one bottle of the wine that had been tasted in both restaurant/specialized shop and hype-supermarkets. At the end of this phase, participants were asked to answer to two questions concerning their knowledge of Palizzi IGT and any previous tasting experiences of it, in order to control for their level of involvement and organoleptic memory connected to this appellation. We asked this information at the end of this phase so that no indications about the nature of the wine and its origin could be provided to the respondents who participated in the blind tasting.

All of the participants we required to fill the questionnaire out autonomously<sup>14</sup>.

For the entire duration of the experiment the bottles stayed wrapped in foil so that participants were not exposed to other signals, that were found in previous studies to influence consumer's quality evaluation and decisions, such as: label design, brand name, vintage, alcohol grade, etc. (e.g. Mueller et al., 2010; Litt and Shiv 2012; Okamoto and Dan, 2013; Sáenz-Navajas *et al.*, 2013). Participants could not even hold the bottle in their hands, as the bottle weight may potentially suggest information about the quality of the wine (Piqueras-Fiszman and Spence, 2012).

### **3.2. Experiment 2**

The aim of the second experiment is twofold. First, it is meant to verify whether the appellation of origin is able to capture the essence of *terroir* in consumers' minds. Second, we would like to demonstrate that the causal effect we estimated in the first experiment is actually a pure '*terroir* effect' and not a priming effect.

The experiment has been carried out on June 2015. We replicated the same conditions of the first one in the same locations, and using the same facilities. The unique difference is represented by

---

and Pocotich, 2013; Torri *et al.*, 2013). Further, technical knowledge allows expert to hold multiple judgments of evaluated aggregate quality, whereas novices may form one summary judgment (Golder et al., 2012, p.10).

<sup>14</sup> The experimenter helped subjects to fill in the questionnaire if she was asked by elderly and foreign participants.

the treatment administered to the control group in stage 2. Data on 411 subjects have been gathered, but we use only 389 observations (see Appendix B).

As mentioned above, the experimental design is similar to the first one. The main difference consists in the treatment administered to the control group at stage 2. In this case control subjects received some neutral information about the wine plus appellation of origin. Information were reported on a card identical to the one handed out to the treated subjects and the quantity of the information provided to the two groups (both text and pictures) was equal (see Appendix 2).

**Table 3 - Summary of the experimental design (experiment 2)**

<b>Description</b>	
<i>TREATED (T)</i>	Information about <i>terroir</i> (including appellation of origin)/Wine Tasting
<i>CONTROL (NT)</i>	Appellation of origin and other ‘neutral’ information /Wine Tasting

### 3.2.1. Questionnaire and Experiment Phases

We use the same questionnaire of the experiment 1. In the figure below a synthetic description of the experiment phases is portrayed.

**Table 4 - Experiment phases (experiment 2)**

<b>Experiment phases</b>	<b>Control Group</b>	<b>Treatment Group</b>
<b>1</b> Questionnaire Part 1	<ul style="list-style-type: none"> <li>• Demographic and socio-economic variables</li> <li>• Consumers habits and wine knowledge/level of involvement</li> </ul>	<ul style="list-style-type: none"> <li>• Demographic and socio-economic variables</li> <li>• Consumers habits and wine knowledge/level of involvement</li> </ul>
<b>2</b>	<ul style="list-style-type: none"> <li>• <b>Neutral information about the wine and Appellation</b></li> <li>• Wine Tasting</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Information about wine <i>terroir</i> (and Appellation)</b></li> <li>• Wine Tasting</li> </ul>
<b>3</b> Questionnaire Part 2	<ul style="list-style-type: none"> <li>• Perceived Quality</li> <li>• WTP (in euro) for a bottle of the wine in a restaurants and super-hypermarkets</li> <li>• Knowledge and previous tasting of Palizzi IGT</li> </ul>	<ul style="list-style-type: none"> <li>• Perceived Quality</li> <li>• WTP (in euro) for a bottle of the wine in a restaurants and super-hypermarkets</li> <li>• Knowledge and previous tasting of Palizzi IGT</li> </ul>

## 4. Data Analysis

For our regression analysis we use a linear estimator (OLS) and robust standard errors. The choice of this estimator is based on the following considerations: we use experimental data, the treatment was administrated randomly and we can assume that there is no correlation between the independent variable and the error term.

Although we use ordinal variables, we do not choose an ordered probit estimator since the OLS estimator produces consistent estimates that are easier to interpret. Furthermore ordered probit estimator requires assumptions of normality on the entire error distribution.

Our dependent variable is perceived quality: overall rating and the willingness to pay in euro for one bottle of the tasted wine in a restaurant/specialized shop or hyper-supermarket. The independent variable of interest is the treatment dummy *Terroir*, which is equal to 1 if the respondents have received information about the wine *terroir*, 0 otherwise.

For both the two experiments, we estimate the regressions of the three outcome variables on the regressor of interest (*Terroir*), with robust standard errors. Then we control for possible confounding factors in the relationship between perceived quality of wine and *terroir*: demographic controls (age, gender, nationality, Italian region of origin, education, household size, religiosity, smoker, number of cigarettes smoked per day), socio-economic controls (net monthly household income and occupation) and “wine-related” controls (levels of knowledge of wine and interest in it: type of consumer, knowledge of acronyms, technical terms connected to this study and Palizzi IGT; consumption habits, etc.). Furthermore we create a binary variable, *Padua*, which captures the effect related to the place where the experiments were held.

The equation can be written as follows:

$$Y = \alpha + \beta * T + \delta * X + \varepsilon$$

Where the outcome Y is perceived quality, the regressor of interest (T) is *Terroir* and X is the vector of controls.

We include the various control blocks in the following order (see Tables 10, 11, 12, 13, 14, 15): initially only *Padua* variable and demographic controls are included, except for the variables that control for the area (region) of origin, because of multicollinearity with the variable *Padua* (column 2); subsequently, we add the socio-economic controls (column 3) and the "wine-related" controls (column 4), that capture the effect of the level of involvement. In column 5 *Padua* dummy is excluded, to control for the region of origin.



After having treated the two experiments separately, we combine the two datasets and we perform the same analysis controlling for a wave dummy (*Wave2*) in columns 6 and 7 (see Tables 16, 17, 18).

## 5. Results

### 5.1. Experiment 1

Even though 470 questionnaires were collected, we exclude 69 observations by following four criteria reported on Appendix B.

The coefficients of the *terroir* variable are positive and statistically significant ( $p < 0.01$ ) in all of the estimated regressions (column 1 of the Tables 10, 11 and 12).

In particular we observe that, with respect to those who took part in the blind tasting, participants assigned to the treated group are willing to pay around €3,193 more for a bottle of tasted wine in restaurants/specialized shops (Table 10) and €2.24 in hypermarkets (Table 11) and they assign 0.833 points more to the pleasantness/quality of the wine (Table 12). These results are robust to the inclusion of all the considered controls, as we can observe in columns (2), (3), (4), (5), (6) of Tables 10, 11 and 12.

### 5.2. Experiment 2

Even though 411 questionnaires were collected, we exclude 22 observations by following the same criteria mentioned above.

Again, *terroir* has a statistically significant effect on the measures of wine quality perception in all the alternative specifications. More specifically, we find that receiving information about the *terroir* of the wine, against the appellation of origin, increases the willingness to pay of 3.578€ at restaurants (column 1, Table 13) and 2.229€ in hyper-supermarkets (column 1, Table 14) and the overall rating of 0.895 points (column 1, Table 15). These results suggest that appellation of origin is not able to capture the idea of *terroir* in consumers' mind. Furthermore, coefficients are very similar to ones obtained from the first experiment, suggesting that our previous estimates were not driven by a priming effect. Before making this conclusion, we propose an additional analysis to verify directly whether the *terroir* effect is similar across the two experiments.

### 5.3. Experiments 1 and 2

First, we combine the two datasets and we control for the wave dummy.

Overall we estimate that people receiving *terroir* information are willing to pay 3.401€ (column 1 of Table 16) and 2.259€ (column 1, Table 17) more, in restaurants and hyper-supermarkets respectively, than those in the control group. They expressed a higher overall evaluation (0.864 points) of the quality perceived (column 1 of Table 18). As we expected, results are robust to the inclusion of controls and of the wave dummy, which has not a statistical significant effect.

We can argue that independently of the treatment administered to the control group, information about the *terroir* of a wine affected consumers' wine experience and evaluation. Furthermore, appellation of origin appears to not succeed in conveying to consumers information about quality concerning *terroir*.

## 6. Discussion and Conclusions

In this study we investigate the causal effect of *terroir* on perceived quality of wine using experimental data.

Within the consumer behavior and marketing fields, perceived quality concept arises a particular interest. Wine perceived quality needs a special attention, as consumers find its quality more difficult to evaluate (D'Alessandro and Pecotich, 2013) because of the large number of quality cues that characterize it (Lockshin and Hall, 2003), which are not easily usable from *non-connoisseurs*, creating an air of mysticism around the wine quality assessment process. Indeed, it is quite common in this market that consumers resort to the experts' opinion for their purchase decisions (Verdú Jover *et al.*, 2004). Probably this situation is favored also by the little informative wine labels, which report few information that consumers can use to infer the quality of a wine.

From times immemorial, in Old World (European) countries wine quality is justified and endorsed by the concept of *terroir*, a reality that is at the base of the appellation of origin system, that can be briefly defined as specific environmental and human factors of an area that confer to wine unique characteristics. Now, when Old World producers are suffering from competition at global level, exploring the *terroir* issue from the consumers' point of view acquires a special relevance. The most interesting questions are: is *terroir* valued by consumers, when they are provided with technical information about it? Wine's *terroir* is 'communicated' to the market using appellation of origin reported on wine labels. But do appellations capture the idea of *terroir* in consumers'

mind? Are they an effective quality signal? In this study, we conduct two wine tasting experiments to investigate these issues.

Our results bring good news to Old World producers. We show that the consumers in our samples are able to use technical and detailed information about *terroir* to infer the quality of the wine. Indeed we observe that consumers provided with *terroir* information value the wine more than others and express a better overall assessment (experiment 1). Once again we demonstrate that expectations about a product (linked to the information about its origin, in this case) have an impact on quality perception and experience. In particular we learned that eliciting the information about *terroir* (without referring solely to its appellation) can make a place-based strategy effective, as *terroir* is able to recall the idea of uniqueness, authenticity and tradition in consumers' minds, by making the link between the quality of the wine and its origin clearer. This conclusion is particularly true when the appellation does not benefit from any particular popularity.

The second experiment confirms that appellation of origin fails in creating an idea of uniqueness in consumers' mind. Indeed appellation of origin could be effective as quality signal only if there is a clear and recognized relation between the presumed quality of a wine and its place of origin (i.e. if it is well-promoted). A large proportion of wine consumers are not wine *connoisseurs* and even when an appellation is well-known, it is required a minimum knowledge of the relative *terroir* to use it as a quality cue useful in wine evaluation process and purchasing choices. These findings are in line with the work of Agnoli et al. (2009), who suggest that labels of origin are not always successful in conveying the idea of uniqueness of wine in consumers' mind, even if they are protected by law and have a good 'brand reputation'.

On the other side, the main problem that producers face is the general belief that quality of wine is inscrutable for the "non-experts" (the expression "I'm not a wine expert" is quite common). This 'lay of the land' reduces the leverages that they may exploit to differentiate their products and attract (new) consumers.

To conclude we suggest the importance for *terroir* wine producers of "educating" (*non-connoisseur*) consumers to link wine sensorial characteristics (the most important quality attributes for non-expert consumers) to specific characteristics of wine *terroir*, by investing more on *terroir* communication.

## References

- Agnoli, L., Begalli, D., Codurri, S. (2009). Consumer Emotions and Preferences: an empirical analysis in two Italian appellation of origin wines, NBER, *Working Paper No. 16762*
- Akerlof, G.A. (1970). The Market for Lemons: Quality, Uncertainty, and the Market Mechanism. *The Quarterly Journal of Economics*, 84, 488-500.
- Allison, R. I., Uhl, K. P. (1964). Influence of Beer Brand Identification on Taste Perception. *Journal of Marketing Research (JMR)*, 1(3).
- Almenberg, J., Dreber, A. (2011). When does the price affect the taste? Results from a wine experiment. *Journal of Wine Economics*, 6(01), 111-121.
- Al-Sulaiti, K. I., Baker, M.J. (1998). Country of origin effects: a literature review. *Marketing Intelligence & Planning*. 16(3), 150-199.
- Amine, L.S., Chao, M.C.H., Arnolf, M.J. (2005). Exploring the Practical Effects of Country of Origin, Animosity, and Price-Quality Issues: Two Case Studies of Taiwan and Acer in China. *Journal of International Marketing*, 13(2), 114-150.
- Aurier, P., Fort, F., Sirieix, L. (2005). Exploring terroir product meanings for the consumer. *Anthropology of Food*, (4).
- Balabanis, G., Diamantopoulos, A. (2011). Gains and Losses from the Misperception of Brand Origin: The Role of Brand Strength and Country-of-Origin Image. *Journal of International Marketing*, 19(2), 95.
- Ballantyne, D. (2011), "Sustaining the promise of terroir: the case of Central Otago wine region", paper presented at the Academy of Wine Business Research International Conference (AWBR), Bordeaux, 9-10 June.
- Barham, E. (2003). Translating terroir: the global challenge of French AOC labeling. *Journal of Rural Studies*, 19(1), 127-138.
- Beverland, M. (2006). The 'real thing': Branding authenticity in the luxury wine trade. *Journal of Business Research*, 59, 251-258.
- Charness, G., Gneezy, U., Kuhn, M. A. (2012). Experimental methods: Between-subject and within-subject design. *Journal of Economic Behavior & Organization*, 81(1), 1-8.
- Charters, S. (2010). *Marketing terroir: a conceptual approach*. 5th International Academy of Wine Business Research Conference, Auckland.

- Charters, S., Pettigrew, S. (2006). Product involvement and the evaluation of wine quality. *Qualitative Market Research: An International Journal*, 9(2), 181-193.
- Charters, S., Pettigrew, S. (2007). The dimension of wine quality. *Food Quality and Preference*, 18(2007), 997-1007.
- Cross, R., Plantinga, A., Stavins, R. (2011), "The value of terroir: hedonic estimation of vineyard sale prices", *Journal of Wine Economics* 6(1), 1-14.
- D'Alessandro, S., Pecotich, A. (2013). Evaluation of wine by expert and novice consumers in the presence of variations in quality, brand and country of origin cues. *Food Quality and Preference*, 28(1), 287-303.
- Deselnicu, O.C., M. Costanigro, Souza-Monteiro D. M., D. Thilmany, D. (2013). A Meta-Analysis of Geographical Indication Food Valuation Studies: What Drives the Premium for Origin-Based Labels? *Journal of Agricultural and Resource Economics*, 38(2), 1-16.
- Dotson, M., Clark, J. D., Davé, D. S., Morris, K. J. (2012). Effects of the Framing of Product Information on Consumer Preferences: An Experimental Comparison of Wines from Different Regions in the United States. *International Journal of Management*, 29.
- Garvin, D. A. (1984). What does 'product quality' really mean? *The Sloan Management Review(Autumn)*, 25-43.
- Gergaud, O., Livat, F. (2007). How do consumers use signals to assess quality?. *American Association of Wine Economists Working Paper*, 3, 1-22.
- Gergaud, O., Ginsburgh, V. (2008). Natural Endowments, Production Technologies and the Quality of Wines in Bordeaux. Does Terroir Matter?\*. *The Economic Journal*, 118(529), F142-F157.
- Golder, P.N., Mitra, D., Moorman, C. (2012). What is Quality? An Integrative Framework of Processes and States. *Journal of Marketing*, 76(July 2012), 1-23.
- Goldstein, R., Almenberg, J., Dreber, A., Emerson, J. W., Herschkowitsch, A., Katz, J. (2008). Do more expensive wines taste better? Evidence from a large sample of blind tastings. *Journal of Wine Economics*, 3(01), 1-9.
- Hoch, S.J., Ha, Y.-W. (1986). Consumer learning: Advertising and the ambiguity of product experience. *Journal of Consumer Research*, 13, 221-233.
- Johnson, R., Bruwer, J. (2007). Regional brand image and perceived wine quality: the consumer perspective. *International Journal of Wine Business Research*, 19(4), 276-297.

- Joslin, T., (2006). The War on Terroir: Geographical Indications as a Transatlantic Trade Conflict, *Journal of Agricultural Economics*, 57(3), 337–363.
- Keown, C., Casey, M. (1995). Purchasing behaviour in the Northern Ireland wine market. *British Food Journal*, 97(1), 17-20.
- Koschate-Fischer, N., Diamantopoulos, A., Oldenkotte, K. (2013). Are Consumers Really Willing to Pay More for a Favorable Country Image? A Study of Country-of-Origin Effects on Willingness to pay. *Journal of International Marketing*, 20(1), 19.
- Lee, L., Frederick, S., Ariely, D. (2006). Try it, you'll like it – The influence of expectation, consumption, and revelation on preferences for beer. *Psychological Science*, 17, 1054–1058.
- Levin, I.P., Gaeth, G.J. (1988). How consumers are affected by the framing of attribute information before and after consuming the product. *Journal of Consumer Research*, 15, 374–378.
- Lockshin, L. Hall, J. (2003). *Consumer purchasing behaviour for wine: what we know and where we are going*, paper presented at International Colloquium in Wine Marketing, University of South Australia, Adelaide
- Litt, A., Shiv, B. (2012). Manipulating basic taste perception to explore how product information affects experience. *Journal of Consumer Psychology*, 22(1), 55-66.
- Martínez-Carrasco Martínez, L., Brugarolas Mollá-Bauzá, M., Del Campo Gomis, F. J., Martínez Poveda, Á. (2006). Influence of purchase place and consumption frequency over quality wine preferences. *Food Quality and Preference*, 17(5), 315-327.
- McClure, S. M., Li, J., Tomlin, D., Cypert, K. S., Montague, L. M., Montague, P. R. (2004). Neural correlates of behavioral preference for culturally familiar drinks. *Neuron*, 44(2), 379-387.
- Melnyk, V., Klein, K., Voelckner, F. (2012). The Double-Edged Sword of Foreign Brand Names for Companies from Emerging Countries. *Journal of Marketing*, 76, 21-37.
- Moulard, J., Babin, B. J., Griffin, M. (2015). How aspects of a wine's place affect consumers' authenticity perceptions and purchase intentions: the role of country of origin and technical terroir. *International Journal of Wine Business Research*, 27(1), 61-78.
- Mueller, S., Lockshin, L., Saltman, Y., Blanford, J. (2010). Message on a bottle: the relative influence of wine back label information on wine choice. *Food Quality and Preference*, 21(1), 22-32.
- OIV (2013). *Statistical Report on world vitiviniculture – 2013*

- Okamoto, M., Dan, I. (2013, March). Extrinsic information influences taste and flavor perception: A review from psychological and neuroimaging perspectives. *Seminars in cell & developmental biology* (Vol. 24, No. 3, pp. 247-255). Academic Press.
- Olson, J. C., Jacoby, J. (1972). Cue utilization in the quality perception process. In M. Venkatesan (Ed.), *Proceedings of the third annual conference of the association for consumer research* (pp. 167-179). Chicago: Association for Consumer Research.
- Parr, W. V., Mouret, M., Blackmore, S., Pelquest-Hunt, T., Urdapilleta, I. (2011). Representation of complexity in wine: Influence of expertise. *Food Quality and Preference*, 22(7), 647-660.
- Piqueras-Fiszman, B., Spence, C. (2012). The weight of the bottle as a possible extrinsic cue with which to estimate the price (and quality) of the wine? Observed correlations. *Food Quality and Preference*, 25(1), 41-45.
- Poulsen, C. S., Juhl, H. J., Kristensen, K., Bech, A. C., Englund, E. (1996). Quality guidance and quality formation. *Food Quality and Preference*, 7(2), 127-135.
- Rebelo, J., Caldas, J. (2013). The Douro Wine Region: a cluster approach, *Journal of Wine Research*, 24(1), 19-37.
- Resolution OIV/Viti 333/2010
- Sáenz-Navajas, M. P., Campo, E., Sutan, A., Ballester, J., Valentin, D. (2013). Perception of wine quality according to extrinsic cues: The case of Burgundy wine consumers. *Food Quality and Preference*, 27(1), 44-53.
- Schamel, G., Anderson, K. (2003). Wine Quality and Varietal, Regional and Winery Reputations: Hedonic Prices of Australia and New Zealand. *The Economic Record*, 79(246), 357-369.
- Shiv, B., Carmon, Z., Ariely, D. (2005). Placebo effects of marketing actions: Consumers may get what they pay for. *Journal of marketing Research*, 42(4), 383-393.
- Skuras, D., Vakrou, A. (2002). Consumer's Willingness to Pay for Origin Labeled Wine; A Greek Case Study. *British Food Journal*, 104(11), 898-912.
- Spielmann, N., Charters, S. (2013). The dimensions of authenticity in terroir products. *International Journal of Wine Business Research*, 25(4), 310-324.
- Steenkamp, J.B.E.M. (1989). *Product quality: an investigation into the concept and how it is perceived by consumers*. Assen/Maastricht, The Netherlands: Van Gorcum

- Thode, S.F., Maskulka, J.M. (1998). Place-based marketing strategies, brand equity and vineyard valuation. *Journal of Product & Brand Management*, 7(5), 379-399.
- Torri, L., Dinnella, C., Recchia, A., Naes, T., Tuorila, H., Monteleone, E. (2013). Projective Mapping for interpreting wine aroma differences as perceived by naïve and experienced assessors. *Food Quality and Preference*, 29(1), 6-15.
- Trubek, A. B. (2008). *The taste of place: A cultural journey into terroir* (Vol. 20). University of California Press.
- Vadour, E. (2002). The Quality of Grapes and Wine in Relation to Geography: Notions of Terroir at Various Scale. *Journal of Wine Research*. 13(2), 117-141.
- Vadour, E. (2005). *I terroir: definizioni, caratterizzazione e protezione*, Bologna, Edagricole.
- Van Leeuwen, C., Seguin, G. (2006). The concept of terroir in viticulture. *Journal of Wine Research*. 17(1), 1-10.
- Veale, R., Quester, P. (2008). Consumer sensory evaluations of wine quality: the respective influence of price and country of origin. *Journal of Wine Economics*, 3(01), 10-29.
- Verdú Jover, A. J., Lloréns Montes, F. J., Fuentes Fuentes, M. D. M. (2004). Measuring perceptions of quality in food products: the case of red wine. *Food Quality and Preference*, 15(5), 453-469.
- Zeithaml, V.A. (1988). Consumer Perceptions of Price, Quality, and Value: A Means-End Model and Synthesis of Evidence. *Journal of Marketing*, vol. 52, July, 2-22.



**Table 5 - Variables**

<b>Variables</b>	<b>Type</b>	<b>Description</b>
Terroir	dummy	equal to 1 if information on <i>terroir</i> communicated; 0 otherwise
Padua	dummy	place of experiment: equal to 1 if Padua; 0 otherwise
Wave2	dummy	equal to 1 if experiment 2; 0 otherwise
Female	dummy	equal to 1 if female; 0 otherwise
Age	age	variable age
Age2	continuous	
Foregneir	dummy	equal to one if foreign; 0 otherwise
Region of origin	dummy	italian region of origin: dummyfied in North*, Centre and South
Education	dummy	dummyfied in Elementary *, Middle School, High School, Degree diplomas
Household size	dummy	number of family members: dummyfied in 1; 2*; 3; 4; 5; more than 5
Married	dummy	equal to one if married; 0 otherwise
Religious	dummy	equal to 1 if religious; 0 otherwise
Smoker	dummy	equal to 1 if smoker; 0 otherwise
Cigarettes	nr. of cigarettes	number of cigarettes smoked a day
Net monthly household income	dummy	monthly net income of family unit in euro: dummyfied (less than or equal to 1200*; between 1400 and 2500; more than or equal to 3000)
Occupational situation	dummy	occupational situation: dummyfied (full-time employee*; part-time employee; in search of/awaiting employment; not in search of employment; retired; student; homemaker; other)
Work contract qualification	dummy	qualification of work contract: dummyfied (self-employed; dependent)
Type of contract	dummy	Type of contract: dummyfied (permanent; temporary) dummyfied: professional; expert; enthusiast; curious*; indifferent and non-drinker
Typology of consumer	dummy	drinker
Meaning of the acronyms	dummy	equal to 1 if knows the acronyms: docg, doc, igt; 0 otherwise
Meaning of autochthonous	dummy	equal to 1 if knows meaning of autochthonous; 0 otherwise
Meaning of <i>terroir</i>	dummy	equal to 1 if knows the meaning of <i>terroir</i> ; 0 otherwise
Habitual wine purchase place	dummy	dummyfied: hyper/supermarkets*; wine shop; bar; restaurant; winery; others
Wine consumption frequency	dummy	dummyfied: daily; 3-4 times a week*; rarely; never
Type of wine habitually bought	dummy	dummyfied: DOCG, DOC or IGT bottled wine*; common bottled table wine; IGT wine in bulk (from the producer); common table wine in bulk (from the producer) and wine in carton or jerry can
Palizzi IGT	dummy	equal to 1 if heard of Palizzi IGT before this experiment; 0 otherwise
Tasting experience of a Palizzi IGT wine	dummy	equal to 1 if tasted a Palizzi IGT wine before this experiment; 0 otherwise
WTP in restaurant/specialized shop	continuous	willingness to pay (in euro) for a bottle of tasted wine in a restaurant/specialized shop
WTP in hyper/supermarket	continuous	willingness to pay (in euro) for a bottle of tasted wine in a hyper/supermarket
Pleasantness/quality	ordinal	global rating of wine: 1,2,3,4,5,6,7,8,9,10

Note: in Appendix B the criterion for exclusion of variables, observations and registration methods of observations are recorded. Dummy variables indicated with (\*) are the reference group.

**Table 6.a - Descriptive Statistics (experiment 1)**

<b>Variables</b>	<b>Characteristics</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Terroir		401	.5162095	.5003615	0	1
Padua		401	.5760599	.4947984	0	1
Female		400	.37	.4834089	0	1
Age		395	3.919.747	1.465.115	18	86
Age2		395	1.750.554	1.310.755	324	7396
Foreigner		401	.0349127	.1837881	0	1
Region of origin	North	391	.5038363	.5006259	0	1
	Centre	391	.0204604	.1417502	0	1
	South	391	.4757033	.5000492	0	1
Education	Elementary School	401	.0448878	.2073163	0	1
	Middle School	401	.1571072	.3643564	0	1
	High School	401	.4837905	.5003615	0	1
	Degree	401	.3142145	.4647821	0	1
Net (monthly) household income in euro	≤ 1200	401	.2793017	.4492166	0	1
	between 1400 and 2500	401	.4139651	.4931577	0	1
	≥ 3000	401	.3067332	.4617137	0	1
Household size	1	401	.1346633	.3417901	0	1
	2	401	.2119701	.4092143	0	1
	3	401	.2568579	.4374461	0	1
	4	401	.2568579	.4374461	0	1
	5	401	.0997506	.3000416	0	1
	5+	401	.0399002	.1959694	0	1
Married		389	.4652956	.4994365	0	1
Occupational situation	Full-time Job	401	.5336658	.4994885	0	1
	Part-time Job	401	.1221945	.3279195	0	1
	Unemployed	401	.0498753	.2179592	0	1
	Out of the workforce	401	.0099751	.0995	0	1
	Retired	401	.1072319	.3097944	0	1
	Student	401	.0972569	.2966774	0	1
	Housewife/Husband	401	.0374065	.1899928	0	1
	Other	401	.0473815	.212719	0	1
Religious		397	.8161209	.3878744	0	1
Smoker		399	.2631579	.4409002	0	1
Cigarettes		396	3.222.222	7.578.775	0	50
Consumer type	Professional	400	.0225	.1484886	0	1
	Expert	400	.0325	.1775459	0	1
	Enthusiast	400	.3025	.4599158	0	1
	Curious	400	.555	.4975882	0	1
	Indifferent	400	.065	.2468346	0	1
	Nondrinker	400	.03	.1708009	0	1

**Table 7.b - Descriptive Statistics (experiment 1)**

<b>Variables</b>	<b>Characteristics</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Meaning of acronyms Docg, Doc, Igt		386	.7331606	.4428818	0	1
Meaning of Authoctonous		399	.7368421	.4409002	0	1
Meaning of Terroir		395	.2151899	.4114752	0	1
Habitual wine purchase place	Hyper-supermarket	398	.459799	.4990085	0	1
	Restaurant	398	.1005025	.3010473	0	1
	Winery	398	.4045226	.4914172	0	1
	Wineshop	398	.2763819	.4477708	0	1
	Bar	398	.0653266	.2474123	0	1
	Other	398	.1030151	.3043612	0	1
Wine consumption frequency	Everyday	395	.235443	.4248135	0	1
	3/4 times a week	395	.3822785	.4865604	0	1
	Rarely	395	.3544304	.478947	0	1
	Never	395	.0278481	.1647462	0	1
Type of wine habitually purchased	Docg, Doc, Igt	394	.5964467	.4912336	0	1
	Common Table Wine in bottles	394	.3096447	.462935	0	1
	Igt in bulk	394	.2461929	.43134	0	1
	Common Table Wine in bulk	394	.1903553	.3930806	0	1
	Wine in cartoon or jerrycan	394	.0253807	.1574785	0	1
Knowledge of Palizzi IGT		401	.2543641	.4360472	0	1
Tasting experience of a Palizzi IGT wine		401	.1645885	.371272	0	1
Perceived Quality Measures	Rating	401	7.476.309	1.638.616	1	10
	WTP in restaurants	401	1.119.327	792.022	1	70
	WTP in hyper-supermarkets	401	6.958.155	5.132.351	.8	50

**Table 7a - Descriptive Statistics (experiment 2)**

<b>Variables</b>	<b>Characteristics</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Terroir		389	.5655527	.511664	0	1
Padua		389	.6478149	.4782664	0	1
Female		389	.4010283	.4907379	0	1
Age		389	3.700.514	1.389.968	13	83
Age2		389	1.562.085	1.195.291	169	6889
Foreigners		389	.0565553	.2312883	0	1
Region of origin	North	389	.5064267	.5006026	0	1
	Centre	389	.0102828	.1010112	0	1
	South	389	.4832905	.5003643	0	1
Education	Elementary School	389	.0308483	.1731293	0	1
	Middle School	389	.1208226	.3263408	0	1
	High School	389	.5218509	.5001656	0	1
	Degree	389	.3264781	.4695284	0	1
Net (monthly household income in euro)	≥1200	389	.277635	.4484091	0	1
	between 1400 and 2500	389	.403599	.4912507	0	1
	≥3000	389	.3187661	.4665983	0	1
Household size	1	389	.1362468	.3434922	0	1
	2	389	.2082262	.4065624	0	1
	3	389	.2339332	.4238754	0	1
	4	389	.2802057	.449678	0	1
	5	389	.1182519	.323322	0	1
	5+	389	.0231362	.1505298	0	1
Married		386	.3860104	.4874648	0	1
Occupational situation	Full-time Job	389	.5167095	.5003643	0	1
	Part-time Job	389	.1285347	.3351152	0	1
	Unemployed	389	.066838	.2500629	0	1
	Out of the workforce	389	.0257069	.1584634	0	1
	Retired	389	.0539846	.2262783	0	1
	Student	389	.1105398	.3139653	0	1
	Housewife/Husband	389	.0205656	.1421074	0	1
	Other	388	.0747423	.2633146	0	1
Religious		385	.8	.4005205	0	1
Smoker		385	.2909091	.4547727	0	1
Cigarettes		385	3.520.779	6.974.532	0	35
Consumer type	Professional	385	.0285714	.1668154	0	1
	Expert	385	.0285714	.1668154	0	1
	Enthusiast	385	.238961	.4270038	0	1
	Curious	385	.5896104	.4925445	0	1
	Indifferent	385	.0987013	.2986487	0	1
	Nondrinker	385	.0233766	.1512931	0	1

**Table 7b - Descriptive Statistics (experiment 2)**

<b>Variables</b>	<b>Characteristics</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Meaning of acronyms Docg, Doc, Igt		376	.712766	.4530746	0	1
Meaning of Authohtonous		383	.7101828	.4542709	0	1
Meaning of Terroir		377	.1777188	.3827839	0	1
Habitual wine purchase place	Hyper-supermarket	383	.4438642	.4974887	0	1
	Restaurant	383	.1775457	.3826297	0	1
	Winery	383	.4020888	.490961	0	1
	Wineshop	383	.3185379	.4665187	0	1
	Bar	383	.078329	.26904	0	1
	Other	383	.0992167	.2993438	0	1
Wine consumption frequency	Everyday	383	.1879896	.3912149	0	1
	3/4 times a week	383	.4177546	.4938344	0	1
	Rarely	383	.381201	.4863171	0	1
	Never	383	.0130548	.113658	0	1
Type of wine habitually purchased	Docg, Doc, Igt	383	.6214099	.4856701	0	1
	Common Table Wine in bottles	383	.2610966	.439807	0	1
	Igt in bulk	383	.1697128	.3758713	0	1
	Common Table Wine in bulk	383	.1749347	.3804082	0	1
	Wine in cartoon or jerrycan	383	.0234987	.2745225	0	5
Knowledge of Palizzi IGT		389	.2390746	.4270676	0	1
Tasting experience of a Palizzi IGT wine		389	.1285347	.3351152	0	1
Perceived Quality Measures	Rating	389	7.514.139	1.550.833	1	10
	WTP in restaurants	389	116.556	7.957.099	1	75
	WTP in hyper-supermarkets	389	7.611.748	7.482.988	0	100

Table 8 - Dependent variables, sample statistics by area and treatment (experiment 1)

Variables	Province	Treatment	Obs	Mean	Std. Dev.	Min	Max
WTP in restaurant/ specialized shop	Padua	Control	64	8,875	5,409662	1	25
		Terroir	73	11,54178	6,461129	2	30
	Reggio Calabria	Control	107	9,853271	6,003825	2	35
		Terroir	145	14,27021	9,881778	3	75
WTP in hyper- supermarket	Padua	Control	64	5,846875	3,816296	0	20
		Terroir	73	8,534247	9,698901	1,5	80
	Reggio Calabria	Control	107	6,521402	4,255841	0	25
		Terroir	145	8,730897	8,954142	2	100
Rating	Padua	Control	64	7,21875	1,740906	1	10
		Terroir	73	8,164384	1,518531	3	10
	Reggio Calabria	Control	107	6,869159	1,473567	1	10
		Terroir	145	7,793103	1,327574	4	10

Table 9 - Dependent variables, sample statistics by area and treatment (experiment 2)

Variables	Province	Treatment	Obs	Mean	Std. Dev.	Min	Max
WTP in restaurant/ specialized shop	Padua	Control	83	10,33976	6,218833	2	35,5
		Terroir	87	11,76782	9,136847	2	70
	Reggio Calabria	Control	111	8,95045	5,667673	1	35
		Terroir	120	13,44167	9,145689	3	65
WTP in hyper- supermarket	Padua	Control	83	6,086627	3,855622	1,5	23
		Terroir	87	7,870115	6,52703	1,9	50
	Reggio Calabria	Control	111	5,590811	3,426149	0,8	20
		Terroir	120	8,164583	5,684131	1,5	30
Rating	Padua	Control	83	7,373494	1,63581	3	10
		Terroir	87	8,666667	1,308884	5	10
	Reggio Calabria	Control	111	6,801802	1,672341	2	10
		Terroir	120	7,308333	1,364593	1	10

**Table 10 - Regressions of WTP in restaurants/specialized shops on *terroir* and controls (experiment 1)**

VARIABLES	(1) WTP REST	(2) WTP REST	(3) WTP REST	(4) WTP REST	(5) WTP REST
TERROIR	3.193*** (0.766)	3.185*** (0.769)	3.078*** (0.748)	3.400*** (0.835)	3.024*** (0.857)
PADUA		-0.633 (0.797)	-0.687 (0.877)	0.156 (1.154)	
CENTRE					1.432 (4.630)
SOUTH					-2.034* (1.062)
SOCIO-DEMOGRAPHIC CONTROLS	NO	YES	YES	YES	YES
SOCIO-ECONOMIC CONTROLS	NO	NO	YES	YES	YES
WINE-RELATED CONTROLS	NO	NO	NO	YES	YES
Observations	401	387	387	356	349

Note: dependent variable is willingness to pay for one bottle of the tasted wine in restaurants and specialized shops. This table presents the estimated causal effect of the wine *terroir* on perceived quality, measured by WTP in restaurants and specialized shops. Column 2 includes the variable *Padua* (equal to 1 if the observation was collected in Padua) and socio-demographic controls (age, gender, education, nationality, region of origin, household size, religiosity, smoker, number of cigarettes smoked per day), except for the variables that control for the area (region) of origin, because of multicollinearity with the variable *Padua*; column 3 includes also socio-economic controls (net monthly household income, occupational situation); column 4 includes the “wine-related controls” (levels of knowledge of wine and interest in it: type of consumer, consumption habits, knowledge of acronyms, technical terms connected to this study and the appellation of origin being examined.), in order to control for the involvement level; column 5 excludes the variable *Padua* to control for the region of origin. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 11 - Regressions of WTP in hyper-supermarkets on terroir and controls (experiment 1)

VARIABLES	(1) WTP HYPER	(2) WTP HYPER	(3) WTP HYPER	(4) WTP HYPER	(5) WTP HYPER
TERROIR	2.238*** (0.494)	2.335*** (0.511)	2.312*** (0.515)	2.530*** (0.545)	2.323*** (0.562)
PADUA		-0.553 (0.553)	-0.483 (0.504)	-0.314 (0.736)	
CENTRE					-1.590 (1.419)
SOUTH					-0.554 (0.667)
SOCIO-DEMOGRAPHIC CONTROLS	NO	YES	YES	YES	YES
SOCIO-ECONOMIC CONTROLS	NO	NO	YES	YES	YES
WINE-RELATED CONTROLS	NO	NO	NO	YES	YES
Observations	401	387	387	356	349

Note: dependent variable is willingness to pay for one bottle of the tasted wine in hyper- supermarkets. This table presents the estimated causal effect of the wine *terroir* on perceived quality, measured by WTP in hyper- or supermarkets. Column 2 includes the variable *Padua* (equal to 1 if the observation was collected in Padua) and socio-demographic controls (age, gender, education, nationality, region of origin, household size, religiosity, smoker, number of cigarettes smoked per day), except for the variables that control for the area (region) of origin, because of multicollinearity with the variable *Padua*; column 3 includes also socio-economic controls (net monthly household income, occupational situation); column 4 includes the “wine-related controls” (levels of knowledge of wine and interest in it: type of consumer, consumption habits, knowledge of acronyms, technical terms connected to this study and the appellation of origin being examined), in order to control for the involvement level; column 5 excludes the variable *Padua* to control for the region of origin. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



Table 12 - Regressions of rating on terroir and controls (experiment 1)

VARIABLES	(1) RATING	(2) RATING	(3) RATING	(4) RATING	(5) RATING
TERROIR	0.833*** (0.159)	0.736*** (0.156)	0.730*** (0.157)	0.820*** (0.175)	0.739*** (0.175)
PADUA		-0.881*** (0.163)	-0.826*** (0.184)	-0.665*** (0.254)	
CENTRE					0.464 (0.509)
SOUTH					0.146 (0.251)
SOCIO-DEMOGRAPHIC CONTROLS	NO	YES	YES	YES	YES
SOCIO-ECONOMIC CONTROLS	NO	NO	YES	YES	YES
WINE-RELATED CONTROLS	NO	NO	NO	YES	YES
Observations	401	387	387	356	349

Note: dependent variable is global judgment about the quality of the tasted wine. This table presents the estimated causal effect of the wine *terroir* on perceived quality, measured by rating assigned to the wine on a 10-point scale. Column 2 includes the variable *Padua* (equal to 1 if the observation was collected in Padua) and socio-demographic controls (age, gender, education, nationality, region of origin, household size, religiosity, smoker, number of cigarettes smoked per day), except for the variables that control for the area (region) of origin, because of multicollinearity with the variable *Padua*; column 3 includes also socio-economic controls (net monthly household income, occupational situation); column 4 includes the “wine-related controls” (levels of knowledge of wine and interest in it: type of consumer, consumption habits, knowledge of acronyms, technical terms connected to this study and the appellation of origin being examined.), in order to control for the involvement level; column 5 excludes the variable *Padua* to control for the region of origin. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 13 - Regressions of WTP in restaurants/specialized shops on terroir and controls (experiment 2)**

VARIABLES	(1) WTP REST	(2) WTP REST	(3) WTP REST	(4) WTP REST	(5) WTP REST
TERROIR	3.578*** (0.766)	3.384*** (0.728)	3.461*** (0.750)	3.532*** (0.791)	3.544*** (0.789)
PADUA		1.363* (0.765)	1.032 (0.801)	0.702 (0.986)	
CENTRE					0.232 (5.156)
SOUTH					-1.067 (1.066)
SOCIO-DEMOGRAPHIC CONTROLS	NO	YES	YES	YES	YES
SOCIO-ECONOMIC CONTROLS	NO	NO	YES	YES	YES
WINE RELATED CONTROLS	NO	NO	NO	YES	YES
Observations	389	383	382	356	356

Note: dependent variable is willingness to pay for one bottle of the tasted wine in restaurants and specialized shops. This table presents the estimated causal effect of the wine *terroir* on perceived quality, measured by WTP in restaurants and specialized shops. Column 2 includes the variable *Padua* (equal to 1 if the observation was collected in Padua) and socio-demographic controls (age, gender, education, nationality, region of origin, household size, religiosity, smoker, number of cigarettes smoked per day), except for the variables that control for the area (region) of origin, because of multicollinearity with the variable *Padua*; column 3 includes also socio-economic controls (net monthly household income, occupational situation); column 4 includes the “wine-related controls” (levels of knowledge of wine and interest in it: type of consumer, consumption habits, knowledge of acronyms, technical terms connected to this study and the appellation of origin being examined), in order to control for the involvement level; column 5 excludes the variable *Padua* to control for the region of origin. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 14 - Regressions of WTP in hyper-supermarkets on terroir and controls (experiment 2)**

VARIABLES	(1) WTP HYPER	(2) WTP HYPER	(3) WTP HYPER	(4) WTP HYPER	(5) WTP HYPER
TERROIR	2.229*** (0.674)	2.187*** (0.662)	2.275*** (0.686)	2.260*** (0.750)	2.176*** (0.726)
PADUA		-0.0985 (0.813)	-0.202 (0.747)	-1.125 (1.049)	
CENTRE					1.327 (3.154)
SOUTH					-0.183 (0.864)
SOCIO-DEMOGRAPHIC CONTROLS	NO	YES	YES	YES	YES
SOCIO-ECONOMIC CONTROLS	NO	NO	YES	YES	YES
WINE RELATED CONTROLS	NO	NO	NO	YES	YES
Observations	389	383	382	356	356

Note: dependent variable is willingness to pay for one bottle of the tasted wine in hyper- supermarkets. This table presents the estimated causal effect of the wine *terroir* on perceived quality, measured by WTP in hyper- or supermarkets. Column 2 includes the variable *Padua* (equal to 1 if the observation was collected in Padua) and socio-demographic controls (age, gender, education, nationality, region of origin, household size, religiosity, smoker, number of cigarettes smoked per day), except for the variables that control for the area (region) of origin, because of multicollinearity with the variable *Padua*; column 3 includes also socio-economic controls (net monthly household income, occupational situation); column 4 includes the “wine-related controls” (levels of knowledge of wine and interest in it: type of consumer, consumption habits, knowledge of acronyms, technical terms connected to this study and the appellation of origin being examined), in order to control for the involvement level; column 5 excludes the variable *Padua* to control for the region of origin. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 15 - Regressions of rating on terroir and controls (experiment 2)**

VARIABLES	(1) RATING	(2) RATING	(3) RATING	(4) RATING	(5) RATING
TERROIR	0.895*** (0.146)	0.895*** (0.141)	0.946*** (0.142)	0.949*** (0.154)	0.937*** (0.154)
PADUA		-0.436*** (0.165)	-0.344** (0.174)	-0.118 (0.217)	
CENTRE					0.557 (0.913)
SOUTH					-0.0728 (0.180)
SOCIO-DEMOGRAPHIC CONTROLS	NO	YES	YES	YES	YES
SOCIO-ECONOMIC CONTROLS	NO	NO	YES	YES	YES
WINE RELATED CONTROLS	NO	NO	NO	YES	YES
Observations	389	383	382	356	356

Note: dependent variable is global judgment about the quality of the tasted wine. This table presents the estimated causal effect of the wine *terroir* on perceived quality, measured by rating assigned to the wine on a 10-point scale. Column 2 includes the variable *Padua* (equal to 1 if the observation was collected in Padua) and socio-demographic controls (age, gender, education, nationality, region of origin, household size, religiosity, smoker, number of cigarettes smoked per day), except for the variables that control for the area (region) of origin, because of multicollinearity with the variable *Padua*; column 3 includes also socio-economic controls (net monthly household income, occupational situation); column 4 includes the “wine-related controls” (levels of knowledge of wine and interest in it: type of consumer, consumption habits, knowledge of acronyms, technical terms connected to this study and the appellation of origin being examined), in order to control for the involvement level; column 5 excludes the variable *Padua* to control for the region of origin. Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table 16 - Regressions of WTP in restaurants/specialized shops on terroir and controls (experiments1&2)**

VARIABLES	(1) WTP REST	(2) WTP REST	(3) WTP REST	(4) WTP REST	(5) WTP REST	(6) WTP REST	(7) WTP REST
TERROIR	3.401*** (0.538)	3.313*** (0.522)	3.294*** (0.525)	3.337*** (0.552)	3.209*** (0.552)	3.338*** (0.551)	3.200*** (0.549)
PADUA		0.376 (0.549)	0.230 (0.576)	0.504 (0.752)		0.507 (0.752)	
CENTRE					2.156 (3.258)		2.176 (3.261)
SOUTH					-1.450* (0.758)		-1.453* (0.757)
WAVE2						-0.0307 (0.627)	0.142 (0.627)
SOCIO-DEMOGRAPHIC CONTROLS	NO	YES	YES	YES	YES	YES	YES
SOCIO-ECONOMIC CONTROLS	NO	NO	YES	YES	YES	YES	YES
WINE RELATED CONTROLS	NO	NO	NO	YES	YES	YES	YES
Observations	790	770	769	712	705	712	705

Note: dependent variable is willingness to pay for one bottle of the tasted wine in restaurants and specialized shops. This table presents the estimated causal effect of the wine *terroir* on perceived quality, measured by WTP in restaurants and specialized shops. Column 2 includes the variable *Padua* (equal to 1 if the observation was collected in Padua) and socio-demographic controls (age, gender, education, nationality, region of origin, household size, religiosity, smoker, number of cigarettes smoked per day), except for the variables that control for the area (region) of origin, because of multicollinearity with the variable *Padua*; column 3 includes also socio-economic controls (net monthly household income, occupational situation); column 4 includes the “wine-related controls” (levels of knowledge of wine and interest in it: type of consumer, consumption habits, knowledge of acronyms, technical terms connected to this study and the appellation of origin being examined), in order to control for the involvement level; column 5 excludes the variable *Padua* to control for the region of origin. Columns 6 and 7 add to columns 4 and 5, respectively, the *Wave2* dummy. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 17 - Regressions of WTP in hyper-supermarkets on terroir and controls (experiments 1&2)

VARIABLES	(1) WTP HYPER	(2) WTP HYPER	(3) WTP HYPER	(4) WTP HYPER	(5) WTP HYPER	(6) WTP HYPER	(7) WTP HYPER
TERROIR	2.259*** (0.424)	2.264*** (0.430)	2.277*** (0.442)	2.380*** (0.446)	2.288*** (0.441)	2.351*** (0.440)	2.256*** (0.435)
PADUA		-0.270 (0.498)	-0.193 (0.431)	-0.257 (0.746)		-0.308 (0.737)	
CENTRE					-0.877 (1.450)		-0.811 (1.415)
SOUTH					-0.589 (0.638)		-0.600 (0.640)
WAVE2						0.475 (0.566)	0.485 (0.580)
SOCIO-DEMOGRAPHIC CONTROLS	NO	YES	YES	YES	YES	YES	YES
SOCIO-ECONOMIC CONTROLS	NO	NO	YES	YES	YES	YES	YES
WINE RELATED CONTROLS	NO	NO	NO	YES	YES	YES	YES
Observations	790	770	769	712	705	712	705

Note: dependent variable is willingness to pay for one bottle of the tasted wine in hyper- supermarkets. This table presents the estimated causal effect of the wine *terroir* on perceived quality, measured by WTP in hyper- or supermarkets. Column 2 includes the variable *Padua* (equal to 1 if the observation was collected in Padua) and socio-demographic controls (age, gender, education, nationality, region of origin, household size, religiosity, smoker, number of cigarettes smoked per day), except for the variables that control for the area (region) of origin, because of multicollinearity with the variable *Padua*; column 3 includes also socio-economic controls (net monthly household income, occupational situation); column 4 includes the “wine-related controls” (levels of knowledge of wine and interest in it: type of consumer, consumption habits, knowledge of acronyms, technical terms connected to this study and the appellation of origin being examined), in order to control for the involvement level; column 5 excludes the variable *Padua* to control for the region of origin. Columns 6 and 7 add to columns 4 and 5, respectively, the *Wave2* dummy. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 18 - Regressions of rating on terroir and controls (experiments 1&2)

VARIABLES	(1) RATING	(2) RATING	(3) RATING	(4) RATING	(5) RATING	(6) RATING	(7) RATING
TERROIR	0.864*** (0.108)	0.855*** (0.106)	0.853*** (0.106)	0.882*** (0.114)	0.848*** (0.114)	0.872*** (0.113)	0.840*** (0.114)
PADUA		-0.689*** (0.117)	-0.616*** (0.129)	-0.413** (0.165)		-0.431*** (0.166)	
CENTRE					0.402 (0.414)		0.418 (0.409)
SOUTH					0.103 (0.148)		0.0999 (0.148)
WAVE2						0.168 (0.118)	0.117 (0.119)
SOCIO-DEMOGRAPHIC CONTROLS	NO	YES	YES	YES	YES	YES	YES
SOCIO-ECONOMIC CONTROLS	NO	NO	YES	YES	YES	YES	YES
WINE RELATED CONTROLS	NO	NO	NO	YES	YES	YES	YES
Observations	790	770	769	712	705	712	705

Note: dependent variable is global judgment about the quality of the tasted wine. This table presents the estimated causal effect of the wine *terroir* on perceived quality, measured by rating assigned to the wine on a 10-point scale. Column 2 includes the variable *Padua* (equal to 1 if the observation was collected in Padua) and socio-demographic controls (age, gender, education, nationality, region of origin, household size, religiosity, smoker, number of cigarettes smoked per day), except for the variables that control for the area (region) of origin, because of multicollinearity with the variable *Padua*; column 3 includes also socio-economic controls (net monthly household income, occupational situation); column 4 includes the “wine-related controls” (levels of knowledge of wine and interest in it: type of consumer, consumption habits, knowledge of acronyms, technical terms connected to this study and the appellation of origin being examined), in order to control for the involvement level; column 5 excludes the variable *Padua* to control for the region of origin. Columns 6 and 7 add to columns 4 and 5, respectively, the *Wave2* dummy. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Appendix A

---

## Anonymous Questionnaire

---

### ANONYMOUS QUESTIONNAIRE

**Only people who are 18 and over can participate in this experiment**

*The aim of the research in question is to carry out a scientific research concerning the perception of wine quality for my thesis.*

*The compilation of this questionnaire will only take a few minutes. Please read the text carefully, follow the instructions and answer the questions in the order in which they are presented. Data received in the questionnaire are gathered in a strictly anonymous way and they will be used only for scientific research purposes. I will try not to take away too much of your time.*

Date \_\_/\_\_/\_\_\_\_

Time \_\_:\_\_

#### **PHASE 1 – Socio-demographic information**

1) Sex:  Male  Female

2) Age: \_\_\_\_\_

3) Title of study:

Elementary School Diploma

High School Diploma

Middle School Diploma

University Degree and related

4) Nationality \_\_\_\_\_

*Please, answer question 5) only if your answer to the previous question was “Italian” or you have Italian residency.*

5) What is your region of origin? \_\_\_\_\_



6) Please, indicate which figure is closest to the net monthly income of your family (*sum up the total of income from all the members of the family*). I remind you that this test is absolutely **anonymous** and the data given will only be used for scientific research. (Just one answer)

- |   |   |
|---|---|
| <input type="checkbox"/> less than 800 euro | <input type="checkbox"/> 2.000 euro           |
| <input type="checkbox"/> 800 euro           | <input type="checkbox"/> 2.500 euro           |
| <input type="checkbox"/> 1000 euro          | <input type="checkbox"/> 3.000 euro           |
| <input type="checkbox"/> 1.200 euro         | <input type="checkbox"/> 4.000 euro           |
| <input type="checkbox"/> 1.400 euro         | <input type="checkbox"/> 5.000 euro           |
| <input type="checkbox"/> 1.600 euro         | <input type="checkbox"/> more than 5.000 euro |
| <input type="checkbox"/> 1.800 euro         |   |

7) How many people are there in your family, including yourself?

- |                                 |                                      |
|---------------------------------|--------------------------------------|
| <input type="checkbox"/> single | <input type="checkbox"/> 4           |
| <input type="checkbox"/> 2      | <input type="checkbox"/> 5           |
| <input type="checkbox"/> 3      | <input type="checkbox"/> more than 5 |

8) Are you married?  Yes  No

9) Indicate your professional condition:

- Full-time employee
- Unemployed (in search of/awaiting employment)
- Not in search of employment
- Retired
- Student
- Housewife (homemaker)
- Other

*Please, answer questions 10) and 11) only if you are employed*

10) How is your work contract qualified?

- Self-employed
- Dependent

11) What type of contract have you got?

- Permanent
- Temporary

12) Are you religious?  Yes  No

13) Are you practicing?  Yes  No

14) Do you smoke?  Yes  No

15) How many cigarettes do you smoke a day? \_\_\_\_\_

16) Based on your knowledge of wine, how would you describe yourself as a consumer?

- Professional (working professionally in this sector)
- Expert (you have a good knowledge of wine and you are a part of the sector)
- Enthusiast (you buy and taste wine often and you participate in wine events)
- Curious (occasional consumption)
- Indifferent
- Non-drinker

*- Information concerning the knowledge of wines and consumption habits*

17) Do you know the meaning of the acronyms DOCG, DOC or IGT?  Yes  No

18) Do you know the meaning of autochthonous?  Yes  No

19) Do you know what “terroir” is?  Yes  No

20) Where do you normally purchase wine?

- In hyper/supermarkets
- In restaurants
- In wine shops
- At wineries
- In bars
- Other

21) How often do you drink wine? (tick one box only)

- Every day
- Rarely
- 3-4 times a week
- Never

22) Which of the following types of wine do you normally buy? (two boxes are allowed)

- DOCG, DOC or IGT bottled wine
- Common bottled table wine
- IGT wine in bulk (from the producer)

- Common table wine in bulk (from the producer)
- Wine in carton or jerry can

**PHASE 2** – Please, taste the wine that you have been offered and then answer the questions in PHASE 3

**PHASE 3** – Please, answer the following questions

23) Give a mark from 1 to 10 about the wine you have tasted, expressing a judgment on the sensorial attributes indicated below, where 1 is the lowest and 10 is the highest.

a) Color

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

b) Nose

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

c) Palate

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

24) Give a mark from 1 to 10 about the wine you have tasted, expressing a global judgment on the pleasantness/quality, where 1 is the lowest and 10 is the highest.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

25) What price (in euro) would you be willing to pay approximately for one bottle of the wine you have just tasted in a restaurant/specialized shop? \_\_\_\_\_

26) What price (in euro) would you be willing to pay for one bottle of the wine you have just tasted in a hyper-supermarket? \_\_\_\_\_

27) Have you ever heard of Palizzi IGT?  Yes  No

28) If yes, have you ever tasted a Palizzi IGT red wine?  Yes  No

# Technical Cards

## Experimental Treatment: experiments 1&2



**Palizzi IGT Rosso**

Il vino che degusterete è un Palizzi IGT Rosso, prodotto nel comune di Palizzi in provincia di Reggio Calabria: territorio molto vocato alla produzione di vini di qualità. Le vigne sono gestite a spalliere ed alberello, sistema tipico di allevamento del Palizzi, si trovano a circa 500 mt. sul livello del mare, a breve distanza dalla costa, caratterizzate da una discreta pendenza ed esposte a sud. Il terreno è medio impasto tendenzialmente argilloso.

Il clima è mediterraneo, sottotipo: Csa con estate calda. Le cultivar sono autoctone: Calabrese Nero, Nerello Cappuccio e Nocera. Gli interventi colturali sono gestiti prevalentemente con lavoro manuale, così anche la raccolta.

La vinificazione in cantina prevede una diraspatura delicata, macerazione lunga e fermentazione a temperatura controllata, pressatura soffice, fine fermentazione alcolica, fermentazione malolattica, affinamento in botti piccole per dieci mesi; imbottigliamento e affinamento in bottiglia per cinque mesi.

*Appellation of Origin*

*Terroir Information*

### RED PALIZZI IGT

*The wine that you are going to taste is a Palizzi IGT red wine, produced in Palizzi in the province of Reggio Calabria: a territory highly suited to the production of quality wines.*

*The vineyards use the technique of espalier and “alberello”, which is a typical growing system in Palizzi, and are found at 500 m above sea level. They are not far from the coast, they are characterized by a discrete slope and face southwards.*

*The climate is Mediterranean, subtype: warm with hot summers. The autochthonous cultivations are: Calabrese Nero, Nerello Cappuccio and Castiglione.*

*The cultivation interventions are carried out mainly by hand, as is the harvest.*

*Winemaking in cellars includes a gentle rasping, long maceration and fermentation at a controlled temperature, soft pressing, alcoholic fermentation, malolactic fermentation, aging in small barrels for 10 months; bottling and, finally, aging in bottles for 5 months.*

## Control Treatment: experiment 2



*Appellation of Origin*

*Neutral' Information*

### RED PALIZZI IGT

*The wine that you are going to taste is a Palizzi IGT red wine, produced by a family winery, which use grapes coming both from owned and rented vineyards. The winery produces nine wines, among which four reds.*

*This bottle has to be opened 30 minutes before tasting. Ideal service temperature: 18°C.*

*It has to be tasted in wine glasses with slightly tall and narrow opening. Bottling is mechanical: replenishment, corking and labelling. Bottles used for this wine have this shape (see picture). This wine was bottled in 2014. It has to be stored in a clean, dark place, at a temperature between 12 and 16°C and constant humidity at around 75%, positioning the bottles horizontally.*

*This wine is packed in six bottle wine cases.*

# Appendix B

---

## Criteria for exclusion from the observations

The questionnaire observations were excluded if:

- at least one of the answers concerning dependent variables missed;
- the net monthly household income was omitted (as it is considered to be a relevant control);
- the day and/or time was not registered, jeopardizing the possibility of determining where and when the experiment was carried out and the condition to which the respondent had been randomly assigned;

## Registration of observations

The accepted observations were listed onto an Excel worksheet and then imported into the Stata Data Editor.

Missing answers were recorded by leaving the box empty. Missing values in the question on the number of cigarettes smoked per day were indicated with a “0”.

Some respondents indicated a range (instead of an exact figure) of the number of cigarettes they smoked per day and their willingness to pay. In this case, we used the average.

Questions regarding nationality and the region of origin are open (see Appendix A). Initially the answers to these questions were registered by using the Istat code for both the nations and the Italian regions. Afterwards, dummy variables were created. As far as the nations are concerned, given the small number of foreigners in the sample, a dummy (“*Foreigner*”) was created and takes the value of 1 if the respondent is a foreigner and 0 otherwise. The Italian regions were grouped into North, Centre and South.

The answers concerning the net monthly family income were grouped into three ranges: “less than 1200”, “between 1400 and 2500” and “more than 3000”.

## Criterion for variables exclusion

Variables with at least 10 missing observations were excluded, with the exception of the variable that garners the effect of being married and the one that takes value 1 if the respondent knows the meaning of the acronyms DOCG, DOC, IGT, 0 otherwise, as they are considered relevant for this study.

According to this criterion, the dummy variable which captures the effect of practicing a religion and those regarding job contracts (self-employed/dependent, permanent/temporary) were excluded.

### **Experiment Instruments (Setup)**

As has been highlighted before, the experiments were carried out within three shopping malls with hypermarkets.

The set-up included a tasting table, covered by a white tablecloth, which was positioned near the cash registers of the hypermarket (outside the hypermarket), and a banner, which serves to signal our presence and gave greater credibility to our initiative (the logo of Padua University and the Department of Economics and Management and the name of the experimenter were reported).

On the table were placed: the bottle of wine (which stayed wrapped in foil and was sealed with plugs after every use), the wine glasses<sup>15</sup>, the questionnaires, a spit bucket, used to rinse<sup>16</sup> the glasses and for those who did not wish to swallow the wine, and a Plexiglas ballot box in which to put the completed and folded questionnaires. The ballot box was used to guarantee further anonymity.

During the experiments the experimenter used mono-use sterile latex gloves for hygienic reasons.

---

<sup>15</sup> The glasses used were made of transparent glass.

<sup>16</sup> All of the glasses were rinsed in wine at the time of tasting to eliminate any possible odor absorbed from the environment.

## Chapter 2

---

### **Criminal firms: Exploring Negative Externalities on Non-Criminal Competitors.**

**Michele Fabrizi\***

*University of Padova*

**Patrizia Malaspina**

*University of Padova*

**Antonio Parbonetti**

*University of Padova*

#### **Abstract**

The aim of this paper is to provide empirical evidence of the economic consequences due to the presence of firms connected with mafia-type criminal organizations located in developed areas. In particular, we verify for the first time how these criminal firms affect non-criminal competitors' performance and we investigate the negative externalities that they inflict by using firm-level data. Our empirical analysis exploits exogenous shocks imposed by operations against Mafia (from 2008 to 2011) at municipality level to implement a difference-in-difference strategy that compares the change in performance of non-criminal firms with the change in performance of a control group of (non-criminal) firms that operate in either an industry or a municipality that have not been affected by these police operations. The underlying idea is that these operations 'clean' the industries and the municipalities where the targeted criminal firms operate, with a consequent beneficial effect on non-criminal competitors located in the geographical proximity. Results suggest that treated competitors experience a statistically significant and sizeable increase in EBITDA/Total Assets and ROA after the operation, with respect to comparison groups that have not been exposed to this shock. Further explorations permit us to verify that this positive effect is not merely due to a decrease in the industry size after the operations. Organized crime and criminal firms bring inefficiencies in the institutional and business environment that cause many distortions, such as in the access to procurement markets, especially for smaller firms.

*\* Authors are listed alphabetically*



## 1. Introduction

The aim of this paper is to provide empirical evidence of the economic consequences of organized crime in developed areas, by investigating the negative externalities due to the presence of firms connected with mafia-type criminal organizations (from now on 'criminal firms') on legal firms.

Economic analysis has directed attention to the strong relationship between the quality of the institutional environment, economic performance and growth (e.g. Pinotti, 2015a; Daniele and Marani, 2015; Gries and Ha, 2014; De Clercq et al., 2010; Dal Bo et al., 2006; Acemoglu et al., 2005; Sachs and Warner, 1997). In this respect, crime, mainly organized crime, represents one of the most prominent dimensions related to the health of an institutional context (Daniele and Marani, 2015) affecting economic outcomes.

During last decades organized crime has developed into a worldwide, widespread phenomenon that entails deep economic and social consequences, producing *direct* – i.e. racketeering – and *indirect* – *undermining the institutional system* - effects (Albanese and Marinelli, 2013). In such a context, empirical explorations of the costs that organized crime imposes on economic systems, by endangering business environments, are becoming always more urgent and important.

Organized crime is traditionally described as an important obstacle to the economic development of Southern Italy, Latin American countries and former communist republics (e.g. Pinotti, 2011), areas that share two main features: poor economic performance and weak state enforcement. The presence of organized crime is usually related to these two conditions (Buonanno et al., 2015) and they are linked by spurious causal relationship (causality goes in both directions). On the one hand, criminal organizations seem to find 'fertile ground' in poorest areas with a weak institutional environment. On the other one, this presence has detrimental effects both in the short term, by harming the stock of physical and human capital, and in the long run, undermining the growth potential of the economy, by increasing the uncertainty and riskiness of business and political environments (Pinotti, 2015a; Daniele and Geys, 2015).

The social and economic consequences due to criminal organizations arise from a broad range of illegal activities committed by criminal organizations, such as supplying illicit goods and services to different consumers, practicing extortion and other predatory activities against other individuals and, finally, offering private protection in those areas where law enforcement is low (Pinotti, 2015b).

Criminal organizations are characterized by two distinctive features that make them a recognizable and sizeable phenomenon:

(a) the use of violence, as core business, to guarantee strong control and power on legal and illegal markets and extract rent from other agents in the economy (Schelling, 1971 - see Pinotti, 2015b); (b) the nature of organization; like large corporations, they are able to exploit a huge amount of resources to maintain their (criminal) enterprise, conduct more complex illicit activities and expand their business on a larger scale (Pinotti, 2015a). Pinotti (2015a) report that, according to the United Nations (2011), the 1.5% of global GDP (\$1.6 trillion) derive from the profits of transnational organized crime and they correspond to about 70% of all criminal earnings.

These characteristics help in understanding why for example mafia-type organizations are becoming more and more powerful, leaving their traditional and distinctive configuration (exerting territorial control, providing protection ‘services’: *power syndicate*<sup>1</sup>) to acquire a more entrepreneurial identity<sup>2</sup>, mainly in those areas where their expansion is more recent, as in Northern and Central Italy (Albanese and Marinelli, 2013).

In last decades, this development has been recognized in existing literature and anecdotal evidence pointed out that mafia-type criminal organizations use apparently “clean” firms to enlarge the power of criminal organizations and launder money.

However, there is scant literature analyzing the effects of firms connected with criminal organizations. Particularly, it is far from being clear whether the presence of criminal connected firms harms competitors located in the same geographical area. On one side, a criminal connected firm may use the criminal resources to spoil competitions and increase economic wealth and power. At the opposite, criminal connected firms supporting criminal organizations in laundering money may prefer to be unnoticed. It is unclear and unexplored whether criminal connected companies contribute to shape an institutional environment that has negative impact on competitors located in the same geographical area. Therefore this paper tries to answer the following questions: how do corporate criminal connections affect competitors’ performance? What are the negative externalities that corporate criminal connections impose on competitors?

We answer to these questions by using firm-level data and we exploit exogenous shocks imposed by operations against mafia (from 2008 to 2011) in central and northern Italy at municipality level to implement a difference-in-difference strategy that explores the effects of corporate criminal connections on non-criminal competitors. The underlying idea is that these operations ‘clean’ the municipalities and the industries where the targeted criminal firms operate, with a consequent beneficial effect on non-criminal competitors. In order to detect non-criminal competitors, we started from the identification of investigative and judicial operations and criminal firms.

---

<sup>1</sup> Sciarrone (2009); Asmundo (2011).

<sup>2</sup> Financial Times published an article about mafia gains in 2009: mafia business experienced an increase by 3.7% in turnover terms, while Italian GDP fell by 5%.

Afterwards, we track in the whole universe of non-criminal firms in northern and central Italy those that operate in municipalities that have been interested by one operation between 2008 and 2011 and in the same industry of criminal ones. We compare our 'treated' firms with a benchmark of non-criminal firms operating in 'treated' municipalities but in different industries. Then we identify an alternative comparison group, which is composed by firms operating in 'never-treated' municipalities, but in the same industry of criminal and treated non-criminal firms. Additional analyses support our hypothesis and demonstrate the robustness of our results.

We concentrate our attention on Italy, a country where some of the largest mafia-like organizations ('Ndrangheta, Cosa Nostra and Camorra) operate (Barone and Narciso, 2012). Italy is a perfect setting to study the effect of criminal firms for the following reasons: 1) the Italian Penal Code regulates specifically mafia-related crimes and this permits us to identify unambiguously criminal firms connected to mafia; 2) Mafia-like organizations born in south of Italy, but in the last 30 years they expanded their activities capturing or establishing legal firms even in the central and northern part of the country. However, the presence of organized crime in this area is less pervasive than in southern regions: this helps us to identify more easily non-criminal competitors and explore the effects on their economic performance of criminal connections.

Even though focusing the analysis on a specific country may undermine the external validity of our findings, one should keep in mind that Italian mafia represents the 'prototype' for other criminal organizations in other countries (Pinotti, 2015a) and then our results could offer interesting insights about criminal organizations at global level.

Main results of our study show that those non-criminal firms that benefit from police and judicial operations targeting their criminal competitors exhibit a sizeable and statistically significant increase in their performance after this shock, with respect to the benchmark groups. Further analyses demonstrate that this result is not a mere effect of experiencing a lower competition, but the consequence of a more efficient and less distortive business environment. From this work we learn that the presence of criminal firms in a given area inflicts costs on non-criminal competitors. This paper enriches weak current knowledge on the relationship between institutional environment and firm performance. More specifically, it clarifies the microeconomic consequences of organized crime, intended as an entity contributing to shape a poor institutional context. Even though research on the economic consequences of organized crime has arisen the interest of economists, economic analysis from an empirical perspective has been largely neglected. Up to now, existing economic and social research has mainly focused on macro dimensions, while research at micro level is still less developed. In particular little is known about the relationship between organized crime and measures of economic outcomes, and even less about the

mechanisms and channels through which it affects performance at a micro level. Focusing on the effects on non-criminal firms could provide the missing evidence on how organized crime introduces inefficiencies into institutional environment and competitive markets.

This study is structured as follows. In the following section we report a review of the theoretical background and we formulate our hypothesis. Then we describe the empirical strategy, and present our main results and robustness checks. The final section concludes.

## **2. Background and Conceptual Framework**

The first economic explorations of organized crime date back to the seminal papers of Becker, (1968) Schelling (1971) and Ehrlich (1973).

Following those studies, empirical literature on the economics of crime has focused on the estimate of the costs of organized crime through different methods (Soares, 2009) and it has little explored the relationship between organized crime and quality of the institutional context in both directions. A stream of research explores the origins of organized crime. They are largely associated to relative endowment of natural resources (*resource curse*) and weak institutional environment in Sicily (Gambetta, 1993; Skaperdas, 2001; Bandiera, 2003; Dimico et al., 2012; Konrad and Skaperdas, 2012; Buonanno et al., 2015) and Russia (Frye and Zhuravskaya, 2000). More specifically Dell (2011) assesses the effects of law enforcement on drug-trade related violence and routes. The findings suggest that organized crime emerges and develops in those areas where it responds to society's needs that are not satisfied by formal institutions (Pinotti, 2015a). Public spending represents a big piece of the story, as the presence of weak institutions allows the spread of organized crime (and no other kinds of violent crimes) to be predicted by the increase in public spending (Gennaioli and Onorato, 2010).

A second stream of research looks at poor economic performance, along different outcomes, as the result of unfavorable institutional environment originated by the presence of organized crime. Large evidence exists on the effects of organized crime on government efficiency (Godson and Williams, 1998; Allum and Siebert, 2003), money laundering (Schneider, 2010), and economic development and productivity through different channels (e.g. Felli and Fria, 1999; Tullio and Quarella, 1999; Felli and Fria, 2000; Peri, 2004; Centorrino and Ofria, 2008; Barone and Narciso, 2015; Pinotti, 2015a).

The main idea is that the activity of organized crime imposes negative externalities, as it contributes to worsen the institutional environment, which, in turns, represents a source of inefficiencies and of low productivity growth (Felli and Tria, 2000).

Peri (2004) shows the existence of a strong relationship between organized crime (proxied by murder rate) and low economic development, even after controlling for other economic and geographic dimensions. The presence of criminal organizations makes markets less transparent as they operate through apparently clean (legal) firms in order to have access to more, even public, resources with the use of violence rather than because of higher competitiveness (Felli and Fria, 1999). Organized crime is found to divert the allocation of public subsidies to business at municipality level (Barone and Narciso, 2015): the presence of criminal organizations enhances the probability of obtaining funding and the relative amounts of public funds and it leads to episodes of corruption in the public administration. Explorations of the joint effect of organized crime and government expenditures on Southern Italy convergence demonstrate that the latter increases the financial strength of organized crime and its control over the territory, with strong negative consequences on GDP per capita and growth rate (Tullio and Quarella, 1999). Pinotti (2015a) demonstrates that the impact on GDP per capita reflects a net economic loss due to the replacement of private capital with less productive public investments, rather than a reallocation of activity from the official to the unofficial sector, arguing that this *'finding is consistent with theoretical models of political capture, in which criminal organizations secure profit opportunities with the public sector by either threatening or corrupting politicians'* (p. F172). In this regard, other studies concern specifically, the relation with the political environment, as a measure of the institutional quality. It is found that, for the period 1946-1992 in Sicily, organized crime negatively affects electoral competitions, by 'supporting' those political parties that secure mafia services in exchange of economic advantage for their activities in the construction industry (De Feo and De Luca, 2013). This study points out that the strongest party is the one more willing to pay for mafia services and that the higher the political competition and the efficiency of the mafia, the larger the volume of electoral trade. Consequently, negative effects are found on the quality of the political class (Pinotti, 2013; Daniele and Geys, 2015). Indeed corruption and crime are found to be systematically related across countries, but criminal organizations may exercise control over politicians' decisions also through means of threat (Pinotti, 2005a).

Negative effects on labor productivity are identified in southern Italy regions mainly in the building sector, one of the most infiltrated by Italian mafia, and with some approximations also in other industries, such as: agriculture, forestry and fisheries; trade; hotels and restaurants; transports and communications; manufacturing (Centorrino and Ofria, 2008).

Another channel through which crime contributes to worsen the institutional environment and economic outcomes is the labor market, with a lower employment rate identified in regions mostly ridden by mafia (Tullio and Quarella, 1999). Furthermore, signals of unfavorable socio-institutional environment, which derive from high level of some crimes (such as organized crime), represent a strong deterrent for foreign direct investments and economic development (Daniele and Marani, 2011).

At a more micro level, Albanese and Marinelli (2013) estimate production function over a stratified sample of Italian firms and they find a negative effect on their productivity. In another study (Bonaccorsi di Patti, 2009), organized crime is found to influence access to credit and evidence is brought on the effects on bank loans pricing: crime-related risk turns out to impact on the cost of short-term credit and to increase the demand for collateral.

Recently a study of the Bank of Italy (Donato et al., 2013) investigates the relationship between sequestrated and confiscated firms and the bank system. They find that after this legal measure, firms are not penalized under the credit profile with respect to other firms operating within the same industry, same geographical areas or exhibiting similar mode of governance.

Finally, Matrobuoni (2015) analyzes the economic value of criminal network connections inside the American-Italian ‘Cosa Nostra’, between the 50s and 60s, and uses this particular setting to point out the importance of networks for economic success.

As we can easily observe, up to this point scholars focused more on the macroeconomic consequences of organized crime, while few studies attempted to assess at a micro level the costs imposed on socio-economic systems, in terms of poor institutional environment and economic performance.

## **2.1. Hypothesis**

Organized crime is largely found to influence the quality of institutions (e.g. Centorrino and Ofria, 2008; Peri, 2004; Pinotti, 2015a).

The presence of cartels imposed by criminal organizations may represent a source of negative externalities, as they undermine the economic activities of non-criminal firms and, at the same time, they bring inefficiencies as they do not have to respond to competition pressures (Felli and Tria, 2000). Furthermore, they are capable to divert public resources (Barone and Narciso, 2015) with the use of violence and by systematically resorting to corruption. Such an institutional environment represents a source of low productivity growth.

Overall effects on local economic and noneconomic systems of the pervasiveness of organized crime damage directly all the firms, regardless of their size and sector (Albanese and Marinelli, 2013).

Starting from these considerations, we develop the following hypothesis.

**H<sub>p</sub>**: Criminal firms negatively affect the performance of non-criminal competitors.

### 3. Research Design

#### 3.1. Identifying criminal firms

To empirically investigate our research question, we construct an innovative and hand-collected dataset on firms connected to mafia-type organizations.

Since, it is not possible to recognize and observe criminal firms until investigation activities and legal procedures unmask them, we identify *ex post* our sample by relying on official investigative reports and trials' sentences.

Although the presence of firms connected with a criminal organization is a worldwide phenomenon, we focus on Italy (in particular, northern and central Italy) for several reasons. First, some of the largest mafia-like organizations, such as Cosa Nostra, 'Ndrangheta, and Camorra, operate in this country and their presence is particularly accentuated. According to the Italian national agency for the administration of assets confiscated to the organized crime (ANBSC), in December 2012 Italy counted more than 1,700 firms confiscated to the Mafia or other mafia-like organizations. This sizable number is due to the huge investments that Mafia has been making in Italian firms to launder the enormous financial liquidity it accumulates from drug trafficking and extortion rackets, and to increase their power. For this reason, these criminal organizations are heavily contaminating the economy by entering legitimate businesses. Second, central and northern part of Italy is an economically developed area where mafia-type organizations systematically infiltrate apparently legal firms. This feature is particularly relevant because it allows us to estimate Mafia's impact on microeconomic outcomes in a relatively rich area and, at the same time, to deal with type I error, as we clarify later in this section. Third, another essential aspect of this research setting, that greatly improves our ability of identifying criminal firms, is the presence of a specific crime for individuals which are part of Mafia-type organizations. As explained below, the possibility of identifying from public sources those individuals convicted because they were part of a Mafia-type organization is an essential feature of our research strategy. Lastly, focusing our analysis on Italy does not undermine the external validity of our findings, as

Italian mafia represents the ‘prototype’ for (other) criminal organizations in other countries (Pinotti, 2015a) and for this reason it is the most explored setting in the academic literature on organized crime.

The criteria we set up to identify criminal firms in our sample are in line with the definition of politically connected firms (Faccio, 2006). In particular, we define a firm as criminal if either: (i) it has been confiscated or sequestered by Italian authorities because of connections with mafia-type organizations; (ii) a person convicted because of connections with mafia-type organizations sits on the board of directors; (iii) a person convicted because of connections with mafia-type organizations is a large shareholder; (iv) it is a subsidiary or parent company of a criminal firm.

In order to track our sample of criminal firms, we proceeded in a systematic way using official sources of information and moving from the major operations against mafia.

We started by analyzing the investigative and judicial operations in northern and central Italy against Mafia for the period 2005-2014. We decide to exclude previous operations for two main reasons: (a) information about the operations and financial data of firms are not easily available before 2004; (b) data older than 10 years cannot be straightly comparable to more recent ones, and this condition would undermine the *ceteris paribus* condition and the strength of this study’s policy implications. The sources we drew on to retrieve investigative and judicial operations were mainly reports of anti-mafia commissions of the Italian Parliament; web sites of anti-mafia organizations; national and international press; books dealing with mafia-linked topics. We drop operations for which the first instance trial has not been concluded and, overall, we identified and analyzed 120 official investigations over the period 2005-2014. From these official documents, we gathered data (full name, date and place of birth, address) of all people convicted because of connections to mafia organizations. We subsequently excluded those individuals who have been found innocent at second or third instances. On the whole, we retrieved information for 1,567 individuals.

After we obtained demographic information of people convicted because of connections with Mafia-type organizations, we searched them in the database *Telemaco*, which collects financial and governance information from the Italian Chambers of Commerce on the universe of all Italian firms. This procedure allowed us to identify all limited companies in which a person convicted because of connections with Mafia-type organizations sits in the board of directors and/or is a large shareholder<sup>3</sup>. Once, we obtained our sample of criminal firms, by using the database *Aida*, offered through Bureau Van Dijk, we retrieved financial data for these firms for their full infiltration period, which spans from the date in which the person convicted because of connections with

---

<sup>3</sup> An interesting finding of this search was that around 25% of the convicted subjects were shareholders, managers and entrepreneurs in Italian limited companies.



Mafia-type organizations started her position as director in the company (or became a shareholder) until the investigative activity unmasked the criminal firm (or the individual left her position as director or shareholders in the company). Since the database Aida only provides financial data on Italian limited companies starting from 2005, this is the first year in which we observe a criminal firm. We hand-collected financial data from Telemaco if they were not available in Aida. The final sample is composed by 2,412 firm-year observations generated from 597 unique criminal limited companies located in Northern-Central Italy.

It is important to clarify that the procedure to identify criminal firms is designed to minimize both type I and II errors. In our setting, type I error refers to the possibility of identifying as criminal firms that actually are not. To deal with this problem, the identification of criminal companies is based on official rulings issued by Italian Courts and not on noisy proxies, such as press reports or rumours. In contrast, type II error consists in considering as non-criminal firms that are actually criminal and not yet unmasked by Italian authorities. In order to cope with this problem, we restrict the analysis on central and northern Italy, as in these areas mafia expansion is more recent and its presence is less pervasive. To appreciate the difference between Northern-Central Italy and Southern Italy in this regard, one could consider that, putting equal to 1 an index of the average presence of Mafia-type organizations in Italy, this index is equal to 0.17 (2.52) for the Northern-Central (Southern) Italian Provinces (Asmundo, 2013). Furthermore, Figures 1, 2 and 3 show the geographical distribution across Italian provinces of organized crime measured with alternative dimensions.

<< Insert Figures 1, 2 and 3 about here >>

### **3.2. Difference-in-difference Approach**

In our empirical analysis, we do not directly compare the performance of criminal and non-criminal firms to examine the effect of the presence of criminal firms on competitors' performance, because endogeneity concerns would not allow us to draw any causal inference from our results. Indeed, Mafia's decision to leak in certain companies instead of others is entirely endogenous, and unobservable characteristics that induce Mafia-type organizations to choose the target firms could determine observed differences in the performance of criminal and non-criminal companies. In contrast, we use as natural experiment the exogenous shock provided by police operations that in a specific year unmasked criminal firms and therefore eliminate from a given area and industry the presence of firms linked to criminal organizations. If our hypothesis holds true, we should

observe that after such police operations, the performance of non-criminal competitors improve. In order to identify the effect of the presence of criminal firms, we employ a difference-in-difference approach in which we compare the change in performance of non-criminal firms with the change in performance of a control group of firms that are not affected by the police operation. In the following, we first describe how we identify the treated firms (i.e. the non-criminal competitors) and second we discuss how we define the control group. Finally, we present our regression model and robustness checks.

### *3.2.1. Treated firms*

For each criminal firm we have available the following information: i) the geographical area and the industry in which it operates; ii) the year in which it has been targeted/detected by the police operation; iii) the infiltration period. Using these pieces of information, we could identify all companies in the same geographical area and industry of at least one criminal company, while they were actually criminal (infiltrated). We outline the geographical areas in terms of municipalities and consider the two-digit industry code to define the industry. This group of companies represents our *treatment group*, which is non-criminal companies operating in the same geographical area and industry than a criminal one and that at a certain point in time have experienced the elimination of a criminal competitor. To improve our identification strategy we imposed the following requirements:

- We considered only police operations that took place from 2008 until 2011, in order to observe our sample for at least three years before and after the shock. All the firms operating in municipalities that have been affected by a police operation in years 2005-2007 and 2012-2014 were excluded from the analysis.
- We deleted companies operating in municipalities targeted/shocked by more than one operation over our sample period, as in these cases it is not possible to uniquely identify a pre- and post- infiltration period.

This sample selection procedure resulted in 29,758 treated observations over the period 2005-2014 generated from 5,998 unique firms.

### *3.2.2. Control group*

In our empirical strategy, we use a difference in difference approach in which we compare the change in performance of non-criminal competitors after the police operation with the change in performance of a group of companies not affected by such police operation. In our main analyses,

we use as control group all the firms operating in the same municipality but in different industries than the treated ones. In other words, we compare the change in performance of non-criminal competitors with the change in performance of non-criminal non-competitor companies that operate exactly in the same geographical area. This choice allows us to keep constant the (geographical) institutional environment in which treated and control firms are, thereby reducing the probability that other unobservable factors drive our results. It is important to notice that we are testing our research hypothesis in a conservative setting: indeed, the removal of criminal firms might positively affect not only non-criminal competitors but also all non-criminal firms that operate in a given geographical area, regardless of the industry, because of positive spillover effects. If this is true, it is more difficult to find a result on the treated firms. In additional analyses, we verify whether our results are robust to using a different control group.

This sample selection procedure resulted in 150,714 control observations over the period 2005-2014 generated from 31,119 unique firms. Since in additional analyses we focus on the effect of criminal firms on procurement costs, we excluded from the analysis firms with a ratio of raw material to total assets above 100%<sup>4</sup>.

### 3.2.3. Regression model

The following regression model is used to investigate the effect of the presence of criminal firms on non-criminal competitors' performance (firm and year subscripts omitted):

$$Performance = \beta_0 + \beta_1 Post + \beta_2 Competitors + \beta_3 Competitors*Post + \sum Controls + \sum Year Fixed Effects + \sum Industry Fixed Effects + \sum Municipality Fixed Effects + \varepsilon \quad (1)$$

In the above model, *Performance* is computed as firm's EBITDA standardized by total assets measuring the firm's operating performance. We choose EBITDA because it is not affected by firms' accounting policies in terms of depreciation and amortization. Moreover, it is a good proxy for the operating cash generated by the company. As alternative measure we use ROA, which is computed as operating performance divided by total assets. *Post* is a dummy variable that takes value 1 (0) for the period after (before) the police operation affected a given municipality. *Competitors* is a dummy variable that takes value 1 (0) for the treated (control) firms defined as in sections 4.2.1 and 4.2.2, respectively. The coefficient on the interaction term ( $\beta_3$ ) tests our research

---

<sup>4</sup> To make sure that this restriction does not alter our inferences, we estimated model (1) including those observations and results are unchanged. Results are available upon request.

hypothesis and examines whether the performance of non-criminal competitors improves after criminal firms are removed from an industry in a certain geographical area.

The regression model includes a vector of control variables. *lnRevenues* is the log transformation of the firm's annual revenues and it controls for differences in size that might drive operating performance; *Leverage* is the ratio of total liabilities to total assets and controls for the firm's capital structure; *Liquidity* is the ratio of the firm's cash to total assets and it controls for differences in the amount of cash holdings across firms; *Fixed Assets* is the ratio of fixed assets to total assets and controls for the composition of the firm's assets; and *Labor Costs* is the ratio of costs for wages and salary to total operating costs and it controls for the company's business model. Finally, our empirical strategy relies on an extensive structure of fixed effects included in the regression. Specifically, we include year fixed effects, industry fixed effects and municipality fixed effects. To mitigate the undue influence of outliers, all variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentile. Standard errors are clustered at the firm and year level.

## 4. Main Results

### 4.1. Criminal Firms: Industry composition and descriptive statistics

In Table 1, we report the industry composition of our sample of criminal firms. In the analysis, we define the industry using the 2-digit Italian Industry classification. For the sake of clarity, Table 1 groups the different industries into 17 macro-categories, which represent the top-tier industry classification. As it is possible to observe, construction and real estate are the industries with the largest number of criminal firms in our sample (about 45%). Nonetheless, Table 1 allows to appreciate how the presence of criminal firms is not restricted to just few industries, but it spreads over several different industries. Manufacturing, Water and waste management, Wholesale and retail, Professional activities are all industries with a non-trivial presence of criminal firms.

<< Insert Table 1 about here >>

Table 2 shows descriptive statistics for the sample of criminal firms. On average, criminal firms have annual revenues of € 4.30 million and total assets equal to € 7.69 million. Median values for revenues and total assets are much smaller, thus suggesting that there is a lot of variability among the identified criminal firms. The mean (median) revenues for the universe of Italian firms that operate in Northern-Central Italy is € 1.70 (0.27) million while the mean (median) total assets is €

2.51 (0.54) million<sup>5</sup>. Consequently, regardless of whether one considers mean or median value, criminal firms appear to be larger than other non-criminal firms. This testifies further the importance of the phenomenon under investigation. The mean (median) EBITDA of criminal firms is 2.1% (3.2%), ROA is -2.5% (1.4%), and leverage is extremely high. Indeed, the average criminal firms has a leverage ratio of 88.9% which implies a capital structure which highly unbalanced towards debt. On average, criminal firms hold the 10.39% of their assets as cash. Finally, fixed assets represents on average the 29.04% of criminal firms' assets, while 9.71% of operating costs are made by salaries and wages.

<< Insert Table 2 about here >>

#### **4.2. Difference in difference analysis**

As previously explained, the estimation of model (1) does not consider directly the sample of criminal firms described in the previous paragraph, whilst it is estimated on a sample of 29,758 treated observations from companies that have experienced the elimination of at least one criminal firm from the geographical area and the industry in which they operate, and 150,714 control observations belonging to firms that are in the same geographical area but in a different industry of the treated companies. Overall, model (1) is estimated on a sample of 180,472 firm-year observations. Table 3 and 4 report descriptive statistics and correlations for variable included in model (1), respectively.

The mean (median) revenues of the sample firm is 1.269 (0.237) million with a highly skewed distribution. In the regression analysis, we use the log transformation of firm's sales, which is more uniformly distributed (mean: 4.889, median: 5.475). On average, sample firms are profitable with mean (median) EBITDA over assets of 4.10% (4.58%) and ROA 0.8% (2.3%). Companies in our sample are highly levered with mean (median) leverage ratio of 75.87% (74.80%) and their cash holdings represent, on average, the 10.65% of total assets (median cash holding: 3.02%). Fixed assets represent the 31.00% of total assets for the average firm (median fixed assets: 18.75%), while labor costs are the 10.14% of total operating costs (median labor costs: 4.04%).

<< Insert Table 3 about here >>

---

<sup>5</sup> Statistics for the sample of Norther-Central Italian firms are computed on 5,196,737 observations retrieved from the database Aida over the period 2005-2014.

Correlations among variables included in the regression model show that larger firms have higher operating performance than smaller ones. Moreover, companies that rely on debt largely underperform those companies with low leverage. The correlation between operating performance and liquidity indicates that, as firms' cash holding increases, operating performance improves. Interestingly, small companies tend to maintain larger cash holdings than big firms, possibly because of lower investment opportunities.

<< Insert Table 4 about here >>

Table 5 presents regression results from estimating model (1). As previously discussed, our variable of interest is the interaction term between *Competitors* and *Post*. Therefore, H1 is tested by examining the sign and statistical significance of  $\beta_3$ . Column 1 in Table 5 presents our main inferences in which performance is measured using EBITDA and we control for municipality fixed effect. Column 2, replicates model (1) measuring performance using ROA. Finally, the last column of Table 5 estimates model (1) including province level fixed effects: provinces are a broader definition of the geographical areas than municipalities and this alternative approach implies including a lower number of fixed effects in the model. Regardless of the model specification we used, the interaction coefficient between *Post* and *Competitors* is positive and statistically significant. These results indicates that when a criminal firm is eliminated from an industry, the performance of non-criminal competitors significantly increases, compared to a group of firms that operate in same geographical area but in different industries. Importantly, estimates reported in Table 5 are not only statistically but also economically significant. Indeed, considering that the average EBITDA/Assets for treated firms in the sample is 0.0288, the coefficient  $\beta_3$  in column 1 implies that after a police operation that eliminates a criminal company from an industry, the performance of non-criminal competitors increase by 23.14% compared to non-competitor firms that operate in the same geographical area.

<< Insert Table 5 about here >>

## 5. Additional Analyses

### 5.1. An alternative control group

The use of a difference in difference analysis allows us to have a clean identification strategy in which we can compare the increase in performance for a group of treated firms with increases in

performance of un-treated firms. This approach allows us to tease out the effect of the elimination of a criminal company from general time trends affecting our sample firms over the investigated period. Nonetheless, results from such an analysis may be sensitive to the definition of the control group. In this section, we investigate whether our main inferences are robust to the definition of a different control group. Specifically, in the next estimation, we no longer use as control group all companies that operate in the same geographical area but in different industries than the treated firms; rather we compare the increase in performance of the non-criminal competitors with a matched sample of firms that operate in the same industry but in a different municipality that has never been affected by the police operation. The main difference between the analysis reported in Table 5 and this one lies in the institutional level we consider: in the first case, treated and control firms are exposed to the same institutional environment intended as geographically defined; in this second analysis, we consider the institutional dimension at industry level. This test is particularly relevant, since we have observed that our main result appears to be industry specific.

In order to identify our control group, we performed a one-to-one Nearest Neighbour Matching matching<sup>6</sup>, requiring the closest match possible for Revenues, Leverage, Liquidity, Fixed Assets and Labor Costs (all computed the year before the police operation), and exact matching on industry. Results from the estimation of model (1) on this matched sample are reported in Table 6. The model specifications reported in Table 6 mirror those delivered in Table 5. Specifically, column 1 reports results estimated using the new control group; column 2 proxies for performance using ROA and column 3 reports results from including in the model province fixed effects rather than municipality fixed effects. In Table 6, the coefficient on the interaction term between *Post* and *Competitors* is positive and statistically significant across all the reported model specifications. Overall, results from using a different control group consistently provide support for our research question.

<< Insert Table 6 about here >>

## **5.2. Is the estimated effect due to a less competitive environment?**

This work mainly claims that investigative operations against mafia 'clean' a given industry by the presence of criminal firms and that this change brings positive spillovers on the performance of non-criminal competitors operating in the geographical proximity. Our story, through our results, suggests that treated competitors benefit from this positive shock in their competitive environment,

---

<sup>6</sup> Computations are based on the algorithm introduced by Abadie and Imbens (2006).

as they are no longer or less exposed to the negative externalities imposed by organized crime and criminally connected firms.

At the same time, since sequestered firms can no longer operate, it could be argued that the estimated improvement in treated firms' performance, documented in Table 5 (and Table 6), is not necessarily unique to criminal firms since, after their elimination, the number of firms operating in the industry decreases and thus competition pressure diminishes. Consequently, our main results might be the mechanic effect of reducing the number of firms that compete in the same industry. As we extensively discussed in the theoretical development, the effect of the presence of a criminal firm is well beyond the one of having an additional firm that competes in the market: firms connected with a criminal organization subtracts resources to sound and clean firms and introduces distortions in the market. Therefore, we expect that the benefit of eliminating a criminal firm from an industry is not limited to a mere reduction in the number of competitors.

In order to better investigate this issue and rule out this possibility, we verify the robustness of our main results using a subsample of treated firms that compete in an industry and geographical area that have not experienced a decrease in the number of competitors, after the removal of the criminal competitor. This case is observable either because of new firms entering the market or because the arrest and conviction of managers do not necessarily come along with the sequestration of the firm. Excluding, from both treatment and control groups, firms that operate in industries and geographical areas in which competition decreased after the police operation, significantly affects the sample size, which is reduced to 123,442 firm-year observations. Table 7 presents results from this analysis. As it is possible to notice, the coefficient on the interaction term *Post\*Competitors* is still positive and statistically significant across all the estimated specifications. This result suggests that the positive effect of the elimination of a criminal firm is also present in those industries in which competition does not decrease after a police operation. The idea is that the negative effect on non-criminal competitors of the presence of a criminal firm is not simply due to having one more competitor in the market, rather having a competitor that operate in a given industry with the support of a criminal organization.

So, we demonstrate that our results are not driven by a simple reduction of competitive pressure and, again, our hypothesis is met.

<< Insert Table 7 about here >>



### 5.3. Procurement costs

Finally, to investigate better the channels through which performance of non-criminal competitors increase after the removal of a criminal firm, we verify whether criminal firms introduce distortions on procurements. To tackle this issue, in Table 8, we analyze how the cost for raw materials changes for non-criminal competitors, after criminal companies are removed from the industry. Columns 1 and 2 of Table 8 estimate model (1) using as dependent variable the cost of raw material standardized by total assets. Sample mean and median values for the variable Raw Material are 21.26% and 5.12%, respectively, with a standard deviation of 0.2995. Results reported in Table 8 suggest that, after the removal of the criminal firm, the costs for raw material of non-criminal competitors significantly decrease compared to the control group. We expect this result to be stronger for small firms that rely more on the local market for their procurement needs. In column (3) and (4) of Table 8, we generate a dummy which takes value 1 (0) for firms with total sales above (below) the sample median, and we let it to interact with the variables *Post* and *Competitors*. This three-way interaction term investigates whether the decrease in procurement costs after the elimination of the criminal firm is stronger for small firms compared to large firms. Results strongly support this conjecture and show that the effect on procurement costs is significantly higher for small firms.

<< Insert Table 8 about here >>

## 6. Conclusions

The aim of this paper is to provide empirical evidence of the economic consequences due to the presence of firms connected with mafia-type criminal organizations located in developed areas. In particular, we verify for the first time how corporate criminal connections affect non-criminal competitors' performance by harming the institutional and business environment in which they operate, and we explore the negative externalities that these connections impose on competitors by using firm-level data.

To this purpose, we use an innovative, hand-collected and representative panel dataset with yearly firm-level observations from 2005 to 2014 on non-criminal firms from northern and central Italy that operate in the same industry of criminal ones.

Our empirical analysis exploits exogenous shocks imposed by operations against mafia from 2008 to 2011 at municipality level to implement a difference-in-difference strategy that explores the effects of corporate criminal connections on non-criminal competitors. The underlying idea is that

these operations ‘clean’ the municipalities and the relative industries where the targeted criminal firms operate, with a consequent beneficial effect on non-criminal competitors' performance. In order to detect treated competitors, we started from the identification of investigative and judicial operations and criminal firms. To this purpose we adopt an *ex post* analysis approach, we rely on official order for pretrial detention and attachments and court trial sentences and we set up criteria to identify criminal firms in line with the one adopted in studies on politically connected firms (Faccio, 2006). After having identified our sample of criminal firms, we track in the whole universe of non-criminal firms in northern and central Italy those that operate in municipalities that have been interested by at least one operation between 2008 and 2011 and in the same industry of criminal ones. For our main analysis, we rely on a benchmark composed by firms located in the same municipality of criminal firms and their competitors, but operating in different industries. In our diff-in-diff model we include firm-level characteristics and municipality, industry and year fixed effects. We implement the analysis only on those municipalities that have been “treated” only one time in the considered period. Alternative robustness checks are performed to test the reliability of our results. First, we used an alternative control group of non-criminal firms operating in ‘never-treated’ municipalities, but in the same industry of criminal and treated competitors. This analysis enables us to consider institutional environment at industry level, rather than at a local level. Results from the estimation of our model using both control groups suggest that the shock imposed by police operations affect non-criminal competitors’ performance. Non-criminal competitors operating in 'cleaned' municipalities and industries exhibit a statistically significant and sizeable increase EBITDA/Total Assets and ROA after the operation, with respect to benchmarks that do not benefit from this shock.

It seems that organized crime, through infiltrated firms, clearly injures the local business environment. These results are found to be robust to analyses conducted to rule out the possibility that the estimated effect is driven by a simple lower competitive pressure to which treated firms are exposed, once a (criminal) competitor disappears from the industry in which they operate. Our findings turn out to not be sensitive to a reduction in the number of competitors in a given industry. The negative effects of being exposed to a criminal competitor go well beyond experiencing a (higher) competition. Mafia's firms impose strong distortions as they do not operate 'fairly', bringing inefficiencies and affecting market transparency. When we look at the impact of competing against a criminal firm on our treated sample's procurement costs, it comes out negative with a strong evidence, and it is larger especially for smaller firms that are more forced to rely on local markets.

This work sheds light on the unexplored mechanisms through which the presence of organized crime imposes negative externalities on economic outcomes. From this study we learn that the presence of criminal firms in a given area inflicts costs on non-criminal competitors, in terms of lower operating performance. Furthermore, our innovative and representative dataset offered us the possibility to quantify empirically the costs that organized crime inflicts on economic systems.

## References

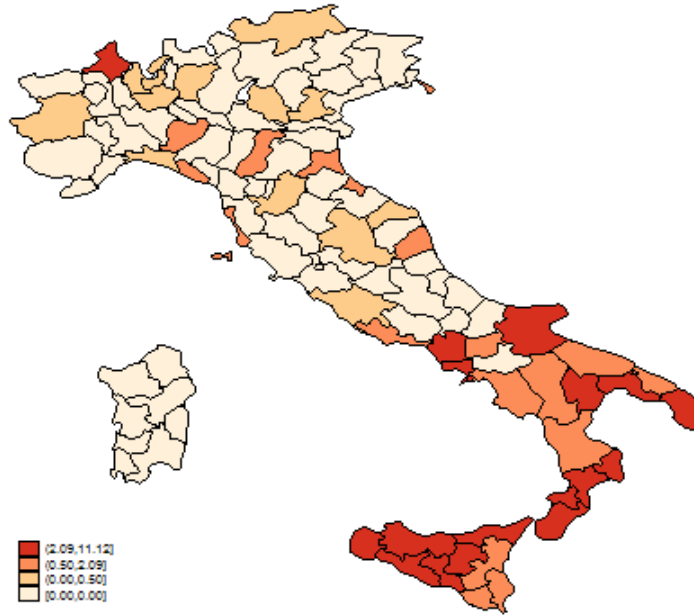
- Acemoglu, D., Johnson, S., Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. *Handbook of economic growth*, 1, 385-472.
- Albanese, J. S. (1996). *Organized crime in America* (pp. 193-95). Anderson Publishing Company.
- Albanese, G., Marinelli, G. (2013). Organized crime and productivity: Evidence from firm-level data. *Rivista Italiana degli Economisti*, 18 (December), 367-394.
- Allum, F., Siebert, R. (2003). Conclusion: organized crime and democracy. *Organised Crime and the Challenge to Democracy*, 195.
- Asmundo, A. (2011). Indicatori e costi di criminalità mafiosa. Analisi ed evidenze empiriche (2004-2007), in R. Sciarrone (ed.), *Alleanze nell'ombra. Mafie ed economie locali in Sicilia e nel Mezzogiorno*, Bari, Donzelli.
- Bandiera, O. (2003). Land reform, the market for protection, and the origins of the Sicilian mafia: theory and evidence. *Journal of Law, Economics, and Organization*, 19(1), 218-244.
- Barone G., Narciso G. (2012). The Effect of Mafia on Public Transfers, *mimeo*
- Barone, G., Narciso, G. (2013). The effect of organized crime on public funds. *Bank of Italy, Temi di Discussione (Working Paper) No, 916*.
- Barone, G., Narciso, G. (2015). Organized crime and business subsidies: Where does the money go? *Journal of Urban Economics*, 86, 98-110.
- Becker, G.S. (1968). Crime and punishment: an economic approach, *Journal of Political Economy*, 76(2), 169–217.

- Bonaccorsi di Patti, E. (2009). Weak institutions and credit availability: the impact of crime on bank loans. *Bank of Italy Occasional Paper*, (52).
- Buonanno, P., Durante, R., Prarolo, G., Vanin, P. (2015). Poor institutions, rich mines: resource curse in the origins of the Sicilian mafia. *The Economic Journal*, 125(586), F175-F202.
- Centorrino, M., Ofria, F. (2008). Criminalità organizzata e produttività del lavoro nel Mezzogiorno: un'applicazione del modello Kaldor-Verdoorn. *Rivista Economica del Mezzogiorno*: 163-189.
- Council of Europe (2002). Crime Analysis: Organized crime – Best practice survey no. 4, Strasbourg, France.
- Dal Bó, E., Dal Bó, P., Di Tella, R. (2006). “Plata o Plomo?”: Bribe and Punishment in a Theory of Political Influence. *American Political Science Review*, 100(01), 41-53.
- Daniele, V., Marani, U. (2011). Organized crime, the quality of local institutions and FDI in Italy: A panel data analysis, *European Journal of Political Economy*, 27, 132-142.
- Daniele, G., Geys, B. (2015). Organized crime, institutions and political quality: empirical evidence from Italian municipalities, *The Economic Journal*, 125(586), F233–55.
- De Clercq, D., Danis, W. M., Dakhli, M. (2010). The moderating effect of institutional context on the relationship between associational activity and new business activity in emerging economies. *International Business Review*, 19(1), 85-101.
- Dell, M. (2011). Trafficking networks and the Mexican drug war, Working Paper, Harvard University.
- De Feo, G., De Luca, G. (2013). Mafia in the ballot box, Working Paper No. 57, DEM, University of Pavia.
- Dimico, A., Isopi, A. Olsson, O. (2012). Origins of the Sicilian Mafia: the market for lemons, Gothenburg University, Department of Economics.
- Donato, L., Saporito, A., Scognamiglio, A. (2013). Aziende Sequestrate Alla Criminalità Organizzata: Le Relazioni Con Il Sistema Bancario (Businesses Seized from Organized Crime Groups: Their Relations with the Banking System). *Bank of Italy Occasional Paper*, (202).
- Ehrlich, I. (1973). Participation in illegitimate activities: a theoretical and empirical investigation, *Journal of Political Economy*, 81(3), 521–65.

- Faccio, M. (2006). Politically connected firms, *The American Economic Review*, 96 (1), 369-386.
- Felli E., Tria G. (2000). Produttività e crimine organizzato: un'analisi delle regioni italiane. *Sviluppo Economico* 1, 79-101.
- Frye, T., Zhuravskaya, E. (2000). Rackets, regulation, and the rule of law, *Journal of Law, Economics and Organization*, 16(2), 478–502.
- Gambetta, D. (1993). *The Sicilian Mafia: The Business of Private Protection*, Cambridge: Harvard University Press.
- Gennaioli, C. Onotato, M. (2010). *Public spending and organized crime: The Case of the 1997 Marche and Umbria Earthquake*. Mimeo.
- Godson, R., Williams, P. (1998). *Strengthening cooperation against transnational crime: a new security imperative*, in (P. Williams and D. Vlassis, eds.), *Combating Transnational Crime: Concepts, Activities and Responses*, 256–62, London: Frank Cass.
- Gries, T., Ha, V. D. (2014). *Institutional environment, human capital, and firm growth: Evidence from Vietnam* (No. 83). University of Paderborn, CIE Center for International Economics.
- Konrad, K., Skaperdas, S. (2012). The market for protection and the origin of the state, *Economic Theory*, 50, 417–43.
- Marshall, C., Yeager, P. (1980). Corporate Crime.
- Mastrobuoni, G. (2015). The value of connection: evidence from the Italian-American mafia, *Economic Journal*, 125(586), F256–88.
- Mian, A. R., Khwaja, A. I. (2005). Do Lenders Favor Politically Connected Firms? Rent Provision in an Emerging Financial Market. *Quarterly Journal of Economics*, 120(4), 1371-1411. Print.
- Peri, G. (2004). Socio-cultural variables and economic success: Evidence from Italian Provinces 1951-1991. *The BE Journal of Macroeconomics. Topics in Macroeconomics*, 4, 1-34.
- Pinotti, P. (2011). The Economic Consequences of Organized Crime: Evidence from Southern Italy. *Bank of Italy*.
- Pinotti, P. (2013). Organized crime, violence and the quality of politicians: evidence from Southern Italy, in (P. Cook, S. Machin, O. Marie and G. Mastrobuoni, eds.), *Lessons from the*

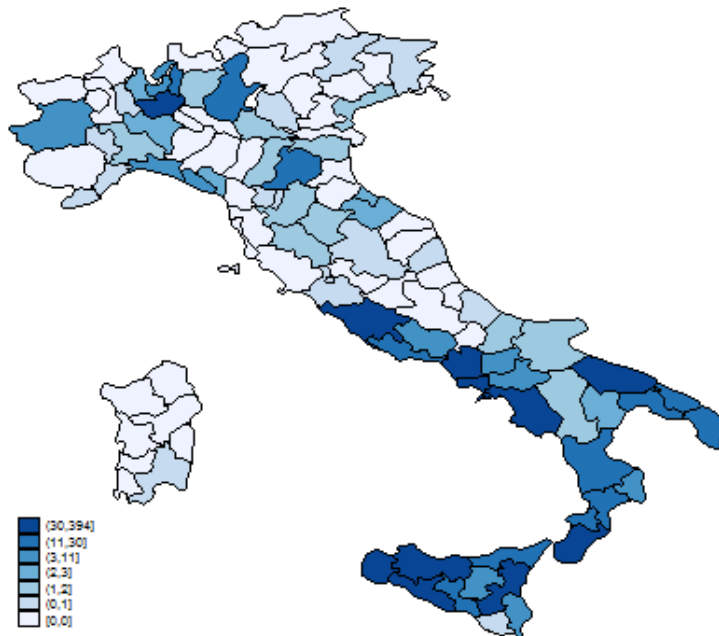
- Economics of Crime: What Works in Reducing Offending? pp. 175–200, Cambridge, MA: MIT Press.
- Pinotti, P. (2015a). The Causes and Consequences of Organised Crime: Preliminary Evidence Across Countries. *The Economic Journal*, 125(586), F158-F174.
- Pinotti, P. (2015b). The economic costs of organized crime: evidence from southern Italy, *The Economic Journal*, 125(586), F203–32.
- Sachs, J. D., Warner, A. M. (1997). Fundamental sources of long-run growth. *The American economic review*, 87(2), 184-188.
- Schelling, T.C. (1971). What is the Business of Organized Crime? *Journal of Public Law*, 20, 71-84.
- Schneider, F. (2010). Turnover of organized crime and money laundering: some preliminary empirical findings. *Public Choice*, 144(3-4), 473-486.
- Sciarrone, R. (2009). *Mafie vecchie, mafie nuove: Radicamento ed espansione* [New mafias, old mafias. Settlement and expansion]. Roma: Donzelli.
- Simpson, S. S. (2002). *Corporate crime, law, and social control*. Cambridge University Press.
- Skaperdas, S. (2001). The political economy of organized crime: providing protection when the state does not. *Economics of Governance*, 2(3), 173-202.
- Soares, R.R. (2009). *Welfare costs of crime and common violence: a critical review*, Working Paper, The World Bank.
- Tullio G., Quarella S. (1999). Convergenza economica tra le regioni italiane: il ruolo della criminalità e della spesa pubblica 1960-1993. *Rivista di Politica Economica*, 89, 77-128.

**Figure 1 - Mafia Association Index at province level (average 2004 - 2007)**



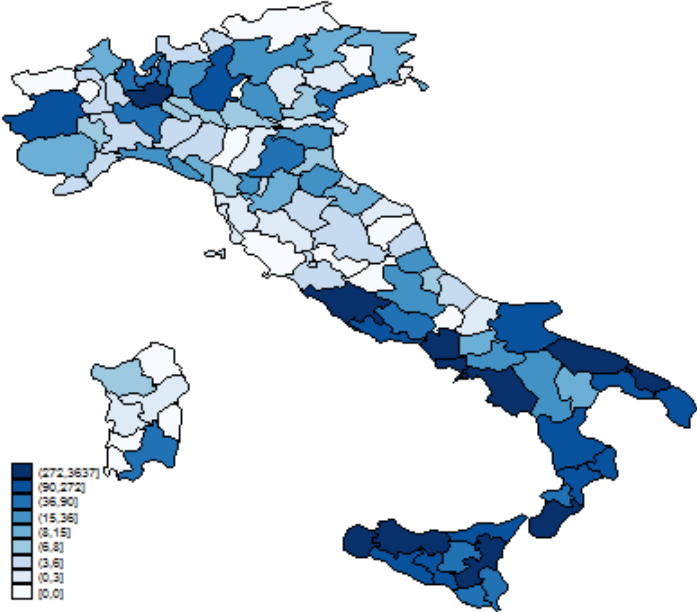
Source: Report Res 2010, "Alleanze nell'ombra. Mafie ed economie locali in Sicilia e nel Mezzogiorno", Ch. 2: Indicatori e costi di criminalità mafiosa.

**Figure 2 - Confiscated firms at province level**



Source: National Agency for the Sequestered and Confiscated Properties (ANBSC)

Figure 3 - Confiscated properties at province level



Source: National Agency for the Sequestrated and Confiscated Properties (ANBSC)



**Table 1. Industry Composition of Criminal Firms**

<b>Industry</b>	<b>Codes</b>	<b># obs</b>	<b>%</b>
Agriculture	from 01 to 03	18	0.7%
Manufacturing	from 10 to 33	184	7.6%
Electricity and Gas	35	41	1.7%
Water and Waste Management	from 36 to 39	168	7.0%
Constructions	from 41 to 43	553	22.9%
Wholesale and Retail	from 45 to 47	209	8.7%
Transportation and Warehousing	from 49 to 53	137	5.7%
Hospitality	from 55 to 56	61	2.5%
Information and communication	from 58 to 63	49	2.0%
Financial firms	from to 64 to 66	59	2.4%
Real Estate	68	488	20.2%
Professional activities	from to 69 to 75	187	7.8%
Leasing, Travelling and Service firms	from 77 to 82	125	5.2%
Education	85	19	0.8%
Healthcare	from 86 to 88	19	0.8%
Sport and Entertainment	from 90 to 93	76	3.2%
Other services	from 94 to 96	19	0.8%
		<b>2412</b>	<b>100%</b>

Note: the table reports the industry distribution of the criminal sample. Two-digit industry codes are grouped by macro-categories.

**Table 2. Descriptive Statistics of Criminal Firms**

	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>p25</b>	<b>p50</b>	<b>p75</b>
Revenues (/000)	2412	4,303.7	13,117	1.1180	293.77	1,886.8
Total Assets (/000)	2412	7,689.8	26,381	225.52	952.04	3,841.9
EBITDA/Assets	2412	0.0211	0.1983	-0.0099	0.0316	0.0904
ROA	2412	-0.0247	0.2761	-0.0257	0.0142	0.0587
Leverage	2412	0.8886	0.9397	0.5859	0.8385	0.9562
Liquidity	2412	0.1039	0.1977	0.0028	0.0219	0.0901
Fixed Assets	2412	0.2904	0.3184	0.0218	0.1434	0.5188
Labor Costs	2412	0.0971	0.1411	0.0000	0.0204	0.1573

Note: the table reports descriptive statistics for the sample of criminal firms. *Revenues* is the euro amount of the firm's sales; *Total Assets* is the euro amount of the firm's total assets; *EBITDA/Assets* is Earnings before Interest, Taxes, Depreciation and Amortization standardized by total assets; *Leverage* is the ratio total liabilities over total assets; *Liquidity* is the firm's cash holding standardized by total assets; *Fixed Assets* is fixed assets divided by total assets; *Labor Costs* is salary and wages divided by operating costs.

**Table 3. Descriptive Statistics of Treated and Control Firms**

	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>p25</b>	<b>p50</b>	<b>p75</b>
Revenues (/000)	180472	1,269.7	3,503	32.3080	237.53	889.5
lnRevenues	180472	4.8885	2.7292	3.5058	5.4745	6.7918
EBITDA/Assets	180472	0.0410	0.1887	-0.0027	0.0458	0.1078
ROA	180472	0.0080	0.1964	-0.0126	0.0235	0.0685
Leverage	180472	0.7587	0.6586	0.4688	0.7480	0.9147
Liquidity	180472	0.1065	0.1701	0.0043	0.0302	0.1307
Fixed Assets	180472	0.3100	0.3159	0.0388	0.1875	0.5287
Labor Costs	180472	0.1014	0.1344	0.0000	0.0404	0.1678

Note: the table reports descriptive statistics for variables included in model (1). *Revenues* is the euro amount of the firm's sales; *lnRevenues* is the log transformation of *Revenues*; *EBITDA/Assets* is Earnings before Interest, Taxes, Depreciation and Amortization standardized by total assets; *Leverage* is the ratio total liabilities over total assets; *Liquidity* is the firm's cash holding standardized by total assets; *Fixed Assets* is fixed assets divided by total assets; *Labor Costs* is salary and wages divided by operating costs.

**Table 4. Correlation Matrix**

	1	2	3	4	5	6
1 EBITDA/Assets	1					
2 ROA	0.962***	1				
3 lnRevenues	0.298***	0.258***	1			
4 Leverage	-0.386***	-0.403***	-0.169***	1		
5 Liquidity	0.034***	0.024***	-0.092***	-0.072***	1	
6 Fixed Assets	0.012***	-0.025***	-0.061***	-0.119***	-0.240***	1
7 Labor Costs	0.095***	0.062***	0.386***	-0.084***	-0.002	-0.062***

Note: the table reports the Pearson correlation coefficients among the variables included in model (1). *EBITDA/Assets* is Earnings before Interest, Taxes, Depreciation and Amortization standardized by total assets; *lnRevenues* is the log transformation of firm's revenues; *Leverage* is the ratio total liabilities over total assets; *Liquidity* is the firm's cash holding standardized by total assets; Fixed Assets is fixed assets divided by total assets; Labor Costs is salary and wages divided by operating costs. N: 202,715. \*, \*\*, \*\*\* indicate statistical significance at 10%, 5%, 1% level, respectively.

**Table 5. Results from a difference in difference approach**

VARIABLES	(1) EBITDA/Assets	(2) ROA	(3) EBITDA/Assets
Post	0.0024 [0.972]	0.0011 [0.415]	0.0013 [0.549]
Competitors	-0.0043*** [-2.734]	-0.0027* [-1.661]	-0.0044*** [-2.896]
Post*Competitors	<b>0.0067***</b> <b>[3.387]</b>	<b>0.0061***</b> <b>[2.955]</b>	<b>0.0067***</b> <b>[3.390]</b>
LnRevenues	0.0183*** [96.427]	0.0167*** [82.135]	0.0183*** [96.481]
Leverage	-0.0963*** [-61.171]	-0.1092*** [-62.068]	-0.0963*** [-61.197]
Liquidity	0.0298*** [7.988]	0.0074* [1.882]	0.0298*** [7.987]
Fixed Assets	-0.0037*** [-2.884]	-0.0351*** [-25.445]	-0.0039*** [-3.016]
Labor Costs	-0.0730*** [-18.053]	-0.0854*** [-20.435]	-0.0733*** [-18.112]
Constant	0.0581 [1.354]	0.0490 [0.911]	0.0477 [1.121]
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
Municipality Fixed Effects	YES	YES	NO
Province Fixed Effects	NO	NO	YES
Observations	180,472	180,472	180,472
R-squared	0.225	0.221	0.224

Note: the table reports obtained by estimating model (1) through OLS. In this analysis, the control group is made by all companies that operate in the same municipality than the non-criminal competitors but in a different industry. *EBITDA/Assets* is Earnings before Interest, Taxes, Depreciation and Amortization standardized by total assets; *ROA* is operating income over total assets, *Post* is a dummy variable equal to one for firm-year observations subsequent an investigative operation that removed a criminal company from a municipality, zero otherwise; *Competitors* is a dummy variable equal to one for firms operating in the same municipality and the same industry than a criminal firm; *LnRevenues* is the log transformation of firm's revenues; *Leverage* is the ratio total liabilities over total assets; *Liquidity* is the firm's cash holding standardized by total assets; Fixed Assets is fixed assets divided by total assets; Labor Costs is salary and wages divided by operating costs. \*,\*\*,\*\*\* indicate statistical significance at 10%, 5%, 1% level, respectively. t-statistics are reported in brackets. Firm-year clustered standard errors.

**Table 6. Difference-in-difference estimation: an alternative control group**

VARIABLES	(1) EBITDA/Assets	(2) ROA	(3) EBITDA/Assets
Post	-0.0042 [-0.953]	-0.0033 [-0.735]	-0.0030 [-0.688]
Competitors	0.0374 [1.523]	0.0299 [1.168]	-0.0049 [-0.832]
Post*Competitors	<b>0.0065***</b> <b>[2.829]</b>	<b>0.0059**</b> <b>[2.471]</b>	<b>0.0055**</b> <b>[2.353]</b>
LnRevenues	0.0147*** [52.874]	0.0137*** [46.962]	0.0146*** [54.981]
Leverage	-0.0967*** [-33.836]	-0.1064*** [-34.102]	-0.0964*** [-34.648]
Liquidity	0.0253*** [3.739]	-0.0024 [-0.339]	0.0274*** [4.183]
Fixed Assets	0.0051*** [2.771]	-0.0190*** [-9.864]	0.0051*** [3.000]
Labor Costs	-0.0645*** [-6.825]	-0.1031*** [-10.695]	-0.0574*** [-6.360]
Constant	0.0047 [0.153]	-0.0126 [-0.395]	0.0492*** [3.486]
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
Municipality Fixed Effects	YES	YES	NO
Province Fixed Effects	NO	NO	YES
Observations	54,711	54,711	54,711
R-squared	0.250	0.241	0.209

Note: the table reports obtained by estimating model (1) through OLS. In this analysis, the control group is composed by a one-to-one matched sample with companies that operate in the same industry than the non-criminal competitors but in a different municipality. *EBITDA/Assets* is Earnings before Interest, Taxes, Depreciation and Amortization standardized by total assets; *ROA* is operating income over total assets, *Post* is a dummy variable equal to one for firm-year observations subsequent an investigative operation that removed a criminal company from a municipality, zero otherwise; *Competitors* is a dummy variable equal to one for firms operating in the same municipality and the same industry than a criminal firm; *LnRevenues* is the log transformation of firm's revenues; *Leverage* is the ratio total liabilities over total assets; *Liquidity* is the firm's cash holding standardized by total assets; Fixed Assets is fixed assets divided by total assets; Labor Costs is salary and wages divided by operating costs. \*, \*\*, \*\*\* indicate statistical significance at 10%, 5%, 1% level, respectively. t-statistics are reported in brackets. Firm-year clustered standard errors.

**Table 7. Difference-in-difference estimation under an unaffected competitive environment**

VARIABLES	(1) EBITDA/Assets	(2) ROA	(3) EBITDA/Assets
Post	0.0012 [0.340]	0.0009 [0.238]	-0.0007 [-0.203]
Competitors	-0.0070*** [-3.825]	-0.0059*** [-3.108]	-0.0072*** [-3.946]
Post*Competitors	<b>0.0071***</b> <b>[3.270]</b>	<b>0.0062***</b> <b>[2.740]</b>	<b>0.0073***</b> <b>[3.358]</b>
LnRevenues	0.0181*** [79.113]	0.0166*** [67.625]	0.0181*** [79.173]
Leverage	-0.0975*** [-51.957]	-0.1100*** [-52.528]	-0.0976*** [-51.986]
Liquidity	0.0285*** [6.362]	0.0065 [1.382]	0.0285*** [6.359]
Fixed Assets	-0.0034** [-2.209]	-0.0346*** [-21.046]	-0.0035** [-2.241]
Labor Costs	-0.0669*** [-13.657]	-0.0794*** [-15.654]	-0.0672*** [-13.720]
Constant	0.0333 [0.930]	0.0321 [0.799]	0.0273 [0.769]
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
Municipality Fixed Effects	YES	YES	NO
Province Fixed Effects	NO	NO	YES
Observations	123,442	123,442	123,442
R-squared	0.231	0.229	0.231

Note: the table reports regression results obtained by estimating model (1) through OLS. The sample is restricted to firms in industries and geographic areas in which the number of firms in the market did not decrease after the elimination of the criminal firm. The control group is the one used in table 5. *EBITDA/Assets* is Earnings before Interest, Taxes, Depreciation and Amortization standardized by total assets; *ROA* is operating income over total assets, *Post* is a dummy variable equal to one for firm-year observations subsequent an investigative operation that removed a criminal company from a municipality, zero otherwise; *Competitors* is a dummy variable equal to one for firms operating in the same municipality and the same industry than a criminal firm; *LnRevenues* is the log transformation of firm's revenues; *Leverage* is the ratio total liabilities over total assets; *Liquidity* is the firm's cash holding standardized by total assets; Fixed Assets is fixed assets divided by total assets; Labor Costs is salary and wages divided by operating costs. \*, \*\*, \*\*\* indicate statistical significance at 10%, 5%, 1% level, respectively. t-statistics are reported in brackets. Firm-year clustered standard errors.

**Table 8. Analysis on procurement costs**

VARIABLES	(1) Raw Material	(2) Raw Material	(3) Raw Material	(4) Raw Material
Post	0.0003 [0.084]	-0.0006 [-0.186]	-0.0016 [-0.477]	-0.0026 [-0.774]
Competitors	0.0132*** [4.804]	0.0127*** [4.665]	0.0145*** [5.261]	0.0140*** [5.120]
<b>Post*Competitors</b>	<b>-0.0110***</b> <b>[-3.400]</b>	<b>-0.0108***</b> <b>[-3.353]</b>	0.0068 [1.355]	0.0070 [1.389]
<b>Post*Competitors*Small</b>			<b>-0.0287***</b> <b>[-5.839]</b>	<b>-0.0289***</b> <b>[-5.888]</b>
Small			-0.1813*** [-118.577]	-0.1816*** [-118.725]
LnRevenues	0.0410*** [144.800]	0.0410*** [145.193]		
Leverage	0.0174*** [10.141]	0.0174*** [10.151]	0.0030* [1.733]	0.0030* [1.722]
Liquidity	-0.0392*** [-9.272]	-0.0394*** [-9.308]	-0.0538*** [-12.389]	-0.0539*** [-12.426]
Fixed Assets	-0.1751*** [-92.507]	-0.1752*** [-92.507]	-0.1572*** [-82.454]	-0.1572*** [-82.404]
Labor Costs	-0.2894*** [-68.265]	-0.2897*** [-68.297]	-0.2359*** [-54.082]	-0.2361*** [-54.095]
Constant	0.0690 [1.379]	0.0511 [1.037]	0.3812*** [7.791]	0.3635*** [7.514]
Year Fixed Effects	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES
Municipality Fixed Effects	YES	NO	YES	NO
Province Fixed Effects	NO	YES	NO	YES
Observations	180,472	180,472	180,472	180,472
R-squared	0.377	0.377	0.352	0.351

Note: the table reports regression results obtained by estimating model (1) through OLS using the cost of raw material purchases standardized by total assets as dependent variable (*Raw Material*). The control group is the one used in table 5. *EBITDA/Assets* is Earnings before Interest, Taxes, Depreciation and Amortization standardized by total assets; *ROA* is operating income over total assets, *Post* is a dummy variable equal to one for firm-year observations subsequent an investigative operation that removed a criminal company from a municipality, zero otherwise; *Competitors* is a dummy variable equal to one for firms operating in the same municipality and the same industry than a criminal firm; *LnRevenues* is the log transformation of firm's revenues; *Small* is a dummy variable that takes the value of 1 (0) for firms with sales below (above) the sample median; *Leverage* is the ratio total liabilities over total assets; *Liquidity* is the firm's cash holding standardized by total assets; *Fixed Assets* is fixed assets divided by total assets; *Labor Costs* is salary and wages divided by operating costs. \*, \*\*, \*\*\* indicate statistical significance at 10%, 5%, 1% level, respectively. t-statistics are reported in brackets. Firm-year clustered standard errors.

## Chapter 3

---

### **Does Thinking about Death make us more Generous? It depends! An Experimental Approach in Cooperation with UNICEF.**

**Patrizia Malaspina**

*(University of Padova)*

#### **Abstract**

In this study I draw on Social Identity Theory (SIT) and Terror Management Theory (TMT) to expand our understanding of the phenomenon of ingroup bias in charitable giving. I aim at investigating the effect of the use of death priming in emotive charity advertisement on potential donors' decisions and ingroup bias. In particular I compare implicit and explicit priming of death thoughts against priming of thoughts related to disease and I explore the role of various dimensions of subjects' self-esteem in moderating their responses to implicit stimuli. To this purpose I conduct a field experiment in cooperation with UNICEF, which has involved 547 subjects. Main findings of this study show that in the control group we observe that on average ingroup bias is in favor of ingroup (white-skinned - Caucasian) recipients, rather than outgroup (black-skinned - African) ones. When thoughts of death are activated, both implicitly and explicitly, discriminatory behavior emerges at the expense of donors' ingroup and favorable towards the outgroup. Furthermore, implicit death effects arise independently from the level of general self-esteem and self-esteem's relevant domains. This study produces interesting findings not only for the direct field of application. The integration of SIT and TMT offers valuable sparks for forthcoming economic analyses of ingroup bias in different settings.



## 1. Introduction

In the economic literature on Social Identity Theory (Tajfel and Turner, 1979), the presence of an ingroup bias in social preferences, such as charitable giving behavior, is well documented and has reached broad consensus (e.g. Darity et al., 2006; Ben-Ner et al., 2009; Chen and Li, 2009; Ockenfels and Werner, 2014). Ingroup bias is observed when people tend to be more generous towards those that they perceive as similar (ingroup favoritism) at the expense of those they perceive as dissimilar (outgroup discrimination).

This evidence suggests strong negative implications on the marketing of charities and large humanitarian organizations, which aim at fundraising money in help of disadvantaged people that can be easily perceived by potential donors as members of their outgroup. In real world fundraising campaigns, different communication strategies attempt to reduce the psychological distance between donors and recipients and some of them are explored in existing economic literature, such as identifying a specific victim versus statistical ones (e.g. Small and Loewenstein, 2003; Kogut and Ritov, 2005; Charness and Gneezy, 2008)<sup>1</sup>, whereas little is known about the use of death priming in charity fundraising campaigns. Indeed almost every day we are exposed to media "assail" with images and videos depicting dying children, whose possibility to survive depends entirely on generosity of more advantaged people. What are the effects of this death priming on donors' behavior and ingroup bias? A well-known socio-psychological theory, Terror Management Theory (Greenberg, Pyszczynski and Solomon, 1986), suggests that when people are forced to think about their own death (under *mortality salience* stimuli - from now on "MS"), ingroup bias in charitable giving gets larger (e.g. Jonas et al., 2013)<sup>2</sup>, in particular when these thoughts of mortality are induced implicitly.

Although TMT experiments on prosocial behavior produce interesting findings, they do not bring direct and valuable policy implications. Hence some questions naturally arise: does priming of recipients' death affect donors' behavior? Are fundraising campaigns using this death priming actually more effective with respect to the ones that do not emphasize death thoughts, as they signal a more grave and urgent need? Would we observe an effect on ingroup bias in charitable giving also when mortality salience stimuli are related to third-party victims?

I use data gathered through a field experiment run to address all these issues. In particular this investigation aims at:

---

<sup>1</sup> These research works do not directly explore the effects on ingroup bias.

<sup>2</sup> More precisely ingroup favoritism increases and outgroup discrimination remains unchanged when subjects are asked to allocate money between national or international charities and both increase when they are asked to donate either to an 'ingroup charity' or an 'outgroup' one.

1. verifying whether the use of death priming (MS stimuli) in charity campaigns affects donors' decision, even if primed death thoughts are related to third-party victims (charity recipients) rather than to donors (decision makers);
2. exploring and comparing the effects on donors' decisions of both explicit and implicit death priming, in other words, two different communication strategies of conveying thoughts of death;
3. verifying death priming effects on ingroup bias in donors' choices;
3. assessing the role of donors' self-esteem in moderating implicit death priming effects; in particular the focus is on giving and money based self-esteems, as giving and having money may represent two relevant self-esteem domains in (monetary) giving behavior.

To this purpose, I conduct an experiment in cooperation with one of the largest charitable organizations in the world: UNICEF. Subjects are economics undergraduate students that are assigned to six different treatments in a between-subjects factorial design. In each group, they are exposed to a charity advertisement used to manipulate death thoughts and operationalize ingroup bias. Afterwards they are asked to declare their willingness to donate and to actual deliver their monetary donations to UNICEF volunteers.

This work extends the understanding of research on ingroup bias by putting together Social Identity Theory (SIT) and Terror Management Theory (TMT).

I draw on SIT to gather knowledge on group identity formation, useful to find a proper identity attribute along which intergroup discrimination arises. TMT fundamentals assist me in designing an experiment that induces death priming and explores the effects on ingroup bias under death thoughts priming.

Indeed this integration in an experimental setting enriches existing knowledge offered by SIT studies by exploring the effect of death priming on social distance and ingroup bias in charitable giving contexts and the role of self-esteem in this process. With respect to previous TMT studies on prosocial behavior (e.g. Jones et al., 2008; Jones et al., 2013; Hirschberger et al., 2008; Zaleskiewicz et al., 2015), I introduce a number of novelties to produce more reliable results, better and direct policy implications for the marketing of charities and, more in general, prosocial behavior under death priming. First, thoughts of death are related to charity recipients (third party victims) rather than to donors (decision makers): in other words givers are not forced to think about their own death, but the charity cause represents the source of mortality awareness activation. This implies that thoughts of death are activated within a natural occurring scenario, rather than in an "artificial" context unrelated to charity donation. Second, I investigate for the first time donors' responses to explicit death priming used in charity campaigns, which represents

a tool that we observe in real world situations, and I compare such effect with the one of implicit death priming. 9Lastly, I analyze for the first time the role of self-esteem and self-esteem relevant domains (giving and money) as moderating dimensions of implicit death priming in prosocial processes.

From this study we learn that, even when related to charity recipients, death thoughts affect donors' decisions and ingroup bias, but in an unexpected direction: discrimination is at the expense of the donors' ingroup and favoritism is toward outgroup and no statistically significant difference is estimated between implicit and explicit death priming. Furthermore, implicit death effects arise independently from the level of general self-esteem and self-esteem's relevant domains.

This paper is organized as follows. The next section presents the theoretical background this experiment is built on. Section 3 describes the experimental design. Section 4 explores the results and Section 5 concludes.

## **2. Theoretical Background**

In the last decades economic and psycho-sociological research on prosocial and charitable behaviors has flourished. The analysis has focused both on donors (supply side) and fundraisers (demand side). Research on the demand side has been challenged by the increasing sophistication in charitable organizations' activity of money raising and the need of understanding how they choose their fundraising strategies and how givers respond (e.g. Andreoni, 2006; Rege and Telle, 2004; Landry et al., 2006). On the offer side, since a sizable part of income for charities is provided by individuals (Hibbert and Horne, 1996), investigations focused mainly on individuals' socio-economic and psychological characteristics in order to identify and explore drivers of assignment of financial resources to prosocial initiatives.

One of the most important issues that scholars have been addressing is the presence of social preferences in people's economic decision-making and the willingness of economic agents to share their material assets with other agents, even anonymous (Camerer, 2003; Cartwright, 2014). People often engage in activities that are costly for themselves but beneficial to others (e.g. Buraschi and Cornelli, 2014). Why should self-interested agents donate fraction of their income for the benefit of strangers? Among all, the most prominent models that capture individuals' preferences over others' payoffs are inequality aversion (e.g. Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000), various forms of altruism (e.g. Charness and Rabin, 2002), and reciprocity (e.g. Fehr and Gächter, 2000).

Being generous and less selfish, sharing personal endowments with others more in need are commonly considered to be the result of personality, good intention and genuine altruism of the helper. Anyway, decades of research have demonstrated that important aspects of phenomena related to donations cannot be explained simply by other-regard preferences (Bénabou and Tirole, 2005) and pure altruism (Andreoni, 1998, 2007). This altruistic nature quite often hides more egoistic and self-interested motives and reveals the ambivalence nature of prosocial behavior: acting unselfishly is often in givers' self-interest. Some models suggest that public benefits of the charity enter givers' utility functions and charity can be identified as a privately provided public good. Economists commonly justify the direct private utility that people get from the act of giving with the model of warm-glow of giving (Andreoni, 1989), that captures the data better than 'pure altruism' models (Andreoni, 2007). People's actions may derive from a mixture of social or self-image concern, altruistic motivation, material self-interest and this mix varies across situations and individuals (Bénabou and Tirole, 2005). In particular, egotistical aspects are reflected in concerns for self-protection and self-promotion (Hirschberger et al., 2008). For example self-efficacy (Basil et al., 2008; Chueng and Chan, 2000), self-esteem, recognition (Bennet, 2003, Sargeant, 1999) are found to be important motivations and drivers for giving.

Egotistical motives may positively affect prosocial behavior in those subjects with high developmental needs, such as self-esteem (Snyder and Omoto, 1992) or when being generous may repair self-esteem after failures (Brown and Smart, 1991).

In more recent times, economic analysis has been going beyond a focus on individual-level incentives in decision making and it is widely exploring group identity, as central concept to understand dynamics behind a number of intergroup interactions.

All these considerations pave the road to the importance and the understanding of the role of social norms and group identity in prosocial behavior.

In this regard, two socio-psychological theories provide interesting insights: Social Identity Theory and Terror Management Theory.

### **2.1. Social Identity Theory and charitable giving**

Tajifel and Turner (1986) introduce a distinction between personal and social (group) identity, recognizing the second one as a person's sense of self derived from perceived membership in social groups (Chen and Li, 2009). Tajifel and Turner (1979) develop the Social Identity Theory (SIT) to explain and describe the psychological basis for ingroup bias (outgroup discrimination), which is recognized as one of several identity maintenance strategy. They suggest that group membership is a source of identity and self-esteem boosting. Hence people strive to achieve and

maintain a positive group identity, which largely derives from favorable comparisons between their ingroup and relevant outgroup and the consequent adoption of behaviors consistent with stereotypes and relative social norms associated with their group identity. It follows that people act more favorably towards individuals that belong to their ingroup compared to persons that are perceived as different (outgroup).

Tajfel and Turner (1986) identify three major components necessary for social identity to emerge: categorization, identification and comparison. The first one (categorization) is the process of labelling people and the self with categories or attributes. A large variety of identity categories exist and are explored in the existing literature: gender (e.g. Akerlof and Kranton, 2000; Wade, 2001), race, ethnicity (Alderfer, 1997; Wade, 2001), nationality (Wade, 2001), socio-economic status (Cartwright et al., 1978; Akerlof and Kranton, 2000) and so on. In order to be relevant for group identity, a category must be a one people identify with and along which they do not identify themselves with outgroup members (identification). Finally, people have to be able to compare and evaluate similarities and dissimilarities between their group members and others (comparison).

Whether an individual is recognized as ingroup or outgroup member may vary over time, across situational social contexts and extension of interactions, all factors that contribute to determine which categorization is salient. For example, ethnicity gets more important in presence of multiple ethnic groups at the expense of other attributes (e.g. political philosophy), and, as other surface-level attributes (e.g. gender and race), it is relevant also in less extended interactions (Ben-Ner et al., 2009). So, the way people perceive their group with respect to others' one, in terms multiple characteristics, depends on which comparative domain prevails (Ellemers et al., 2002). Furthermore sources of group identity must be relevant in order the other group to be considered as important and ingroup bias to emerge. At the same time, in order to enhance a positive identity (sense of self) of ingroup members, the other group must be compared unfavorably.

This process is context-dependent till the point that even an arbitrary assignment (artificial induction) of identity in experimental settings can elicit discriminatory behavior, as in minimal groups experiments (Tajfel and Turner, 1986; Cheng and Li, 2009). In these experiments, groups are created using trivial and almost meaningless tasks, such as preference for either Klee's paintings or Kandinsky's ones.

The recognition of social identity in various interactions as relevant for economic theory and policies leads to its systematic introduction into economic literature, starting with the works of Akerlof and Kranton (2000, 2002, 2005). Social identity theory was applied to the study of social

preferences (Chend and Li, 2009) and a large deal of evidence shows the existence of ingroup bias in other-regarding behavior and charity (Brown, 1978; Winterich et al., 2009).

Chen and Li (2009) conduct a laboratory experiment using the minimal group paradigm to explore the effects of induced group identity on social preferences. They find that participants are more altruistic toward their ingroup: when matched with an ingroup member, subjects increase charity concerns, decrease in envy, and are more likely to reward for good behavior and to choose social-welfare-maximizing actions.

Ben-Ner et al. (2009) verify the existence of favoritism for ingroup and discrimination against outgroup and their relative strength, considering multiple identity categories, such as body type, nationality, religion, political views. Their investigations concern different contexts: giving money in a dictator game, sharing office, commuting and work. In the first study, situations are hypothetical and people imaginary, while, in the second one, dictator game is incentivized by introducing actual money and real receivers. Results from this work supports SIT's claims: subjects' behaviors towards others are influenced by their identities and they exhibit a more favorable behavior towards those who belong to their ingroup in almost all categories and contexts considered in this exploration. Furthermore, they find that participants act in similar ways in both hypothetical and incentivized dictator games.

Fong and Luttmer (2011) conduct a dictator game experiment to explore whether fairness and race matter in generosity. Donors are participants from a nationally representative sample, while recipients are local charities that serve the poor. They find a significant racial discrimination in giving operating through racially biased perceptions of the worthiness of recipients, rather than their real racial composition.

The following paragraphs extensively introduce Terror Management Theory, offering a review of the main literature on TMT and giving behavior, highlighting the role of social norms and identity and the shared perspectives with SIT.

## **2.2. Terror Management Theory and charitable giving**

TMT is a quite popular theory that has been giving birth to a long tradition of research since its introduction by Greenberg, Pyszczynski and Solomon in 1986: more than 400 studies have been produced in 16 countries until 2011 (Burke et al., 2010; Greenberg and Arndt, 2011). It has found large evidence and applications within psychology (even consumer psychology), sociology and anthropology. Even though TMT bears relevant implications in a number of fields, it received little attention in economic research. At this time, I identified only two marketing papers (Mandel and Heine, 1999; Ferraro et al., 2005).

TMT offers insights into a large range of human behaviors. Existing literature provides evidence of the importance of TMT for peace process (e.g. Niesta et al., 2008), understanding of prejudice and intergroup conflicts (e.g. Hirschberger et al., 2009), political attitude (e.g. Greenberg and Kosloff, 2008), consumer behavior (e.g. Mandel and Heine, 1999), religiosity (e.g. Jonas and Fischer, 2006) and so on. One of the most important TMT applications concerns individuals' prosocial behavior.

TMT is based on the simple idea that the unconscious thoughts of death affect every human behavior and generate a status of anxiety and terror that must be managed continuously (Greenberg and Arndt, 2011). The potential for anxiety results from the juxtaposition of death awareness and the instinct of self-preservation.

TMT describes a dual process model: (1) when thoughts of death are activated explicitly and are still conscious, *proximal* defenses are observed: people act to suppress, either consciously or unconsciously, death-related thoughts and concern, in an effort to distract themselves with either avoidant or proactive strategies;

(2) when death thoughts are activated implicitly (either supraliminally or subliminally) and death concern is not in focal attention (it is unconscious), individuals tend to reduce anxiety by believing that some valued parts of themselves will continue after their biological cessation, either literally or symbolically (*distal* defenses).

In particular, in this latter case, culture is found to provide people with protection from death-related fear, as it enables them to perceive themselves as a valuable contributor to a meaningful reality and provide them with a sense of meaning (Jonas et al., 2013). More specifically culture offers two anxiety-buffering functions:

(a) a cultural worldview of standards and values that enables those who live up to it to feel valuable and achieving death transcendence, either literal (e.g. heaven, nirvana) or symbolical (e.g. artworks, publications);

(b) self-esteem, which is the belief of how well one is meeting those standards.

Thus, death reminders motivate people to maintain faith in their cultural worldviews (cultural prescriptions) and live up to them, by bolstering their self-esteem in those domains (such as smoking, risky driving, healthy habits) that are relevant for their self-worth, in order to overwhelm potential anxiety (e.g. Greenberg et al. 1997; Solomon et al., 1991; Jonas et al., 2002). Self-esteem serves as a defense against unconscious concern about mortality and moderates the effects of implicit death priming (Jones et al., 2002). TMT posits that reminders of death (mortality salience stimuli) pose a threat and increase the importance of social norms and conformity to them as they represent a source of protection.

To the extent that prosocial behaviors are valued by one's culture and group, they are a primary mean of worldview validation and self-esteem attainment. In other words, acting prosocial could serve as defense against the threat of (unconscious) mortality awareness.

Within the field of prosocial behavior, previous researchers find that making human mortality salient leads people to become more generous and less selfish in their choices and, then, it induces an increase of prosocial attitude and charitable behaviors (Zaleskiewicz et al., 2015). Jonas et al. (2002) demonstrate that subjects that are interviewed directly in front of a funeral home (a supraliminal mortality stimulus) exhibit a more positive attitude towards charity. They find also that making people to think about their own death increases the amount of money they donate, but this response occurs only in favor of charitable organizations that benefit donors' own culture (national charity). This finding is justified by the fact that people protect themselves by adhering to their cultural worldview, hence they are more willing to support those who share their culture and social norms (ingroup), rather than those who challenge their worldview. Hence, death increases prosocial behavior towards nonthreatening worldview-consistent causes. Social Identity Theory has already provided evidence of ingroup bias in helping behavior, but unconscious mortality salience (MS) enhances this reaction, leading to larger ingroup bias (Jones et al., 2002). The nature of the prosocial cause is found to matter: implicit death stimuli may have negative effects on donors' decisions when the prosocial cause rekindles conscious death thoughts, such as signing organ donations card, helping to a wheelchair bound person (Hirschberger et al., 2008). A more recent study (Jones et al., 2013) combines TMT with the focus theory of normative conduct (Cialdini et al., 1991) in order to identify further conditions under which death reminders lead to prosocial shift, mainly towards outgroup beneficiaries. Consistently with previous researches, they find that unconscious MS reduces donations to a foreign charity, but this negative effect is eliminated when generosity and fairness social norms are primed. Results from this study confirm that culture matters in moderating death thoughts effects on prosocial behavior. Given the importance of fairness in contributing to a more safe and controllable social environment (Fehr and Schmidt, 1999), it provides defense against death anxiety. In summary, considerable evidence suggests that mortality thoughts lead to more prosocial attitudes and behaviors, especially towards givers' ingroup.

Zaleskiewicz et al. (2015) further investigate the drivers of this effect, using dictator game, ultimatum game and a quasi-naturalistic giving situation. They demonstrate that not only unconscious MS increases prosocial acts, but also satisfaction associated with helping actions. They argue that generosity can fulfil psychological needs (such as self-esteem, belongingness and competence), which reduce the sense of vulnerability and finiteness. They also find that the



joy derived from giving is higher in presence of death thoughts (in absence of death priming being generous came at a personal psychological cost). They conclude that unconscious MS acts in a way that are more conducive to happiness, an intrinsic determinant of donation decision making process that is found to matter also in previous studies (e.g. Dunn et al., 2014).

### **2.3. Terror Management and Social Identity Theories: an integration**

In this paper I suggest that Social Identity Theory (SIT) and Terror Management Theory (TMT) share some fundamentals and predict the same phenomena, where the latter specifically predict subjects responses to death priming.

Both of them identify and describe the presence of ingroup bias in giving behavior.

Social Identity Theory argues that people tend to favor a member of their (contingent) ingroup at the expense of their outgroup, to satisfy an identity need and to increase their (and maintaining high) self-esteem levels. Terror Management Theory states that in presence of death priming, preference for protection of the self increases in order to deal with the threat posed by death related thoughts. Consequently, people increase their defenses by adopting behaviors that are coherent with social norms shared within their culture and to bolster their self-esteem in those domains that are fundamental for their self-worth.

On one side, SIT suggests that ingroup bias is the result of a preference for social identity, linked to self-esteem needs, and clearly describes how group identity arises. Need for self-esteem is presumed as ultimate development need, without explaining the reason. On the other hand, TMT refers to a generic group identity, but it clarifies why people need self-esteem and its role in ingroup favoritism processes. Furthermore, while SIT focuses on the need of social identity (defined as sense of positive self derived from group membership), self-protection is the main motif in TMT.

Anyways, it is easy to detect common elements to integrate these two theories. In both of them, favorable behavior with respect to decision makers' ingroup derives by a need of adhering to cultural prescriptions of the reference group. Since prosocial behavior is endorsed and valued in many cultures and it is widely represented in social norms, it follows that: (i) decision makers direct their prosocial actions mainly at the benefit of their ingroup members, that are those who share their same social values and they identify with (SIT); (ii) this favorable behavior is enhanced when people are exposed to death stimuli that exacerbate their need for self-protection (TMT).

To conclude, the virtue of SIT is that it offers instruments to understand how groups are defined and why ingroup bias is observable in several settings. TMT theoretical and experimental settings

do not explain how social identity emerges (its existence is taken for granted), but they permit to explain the desire to enhance self-esteem and explore the effects on intergroup discrimination (intragroup favoritism) under mortality stimuli. Hence, in this study I rely on SIT to identify the conditions and the group identity attribute along which manipulating ingroup favoritism and outgroup discrimination, and on TMT to design an experiment that permits me to assess the effects of the use of death priming in emotive charity advertising on donors' decision and ingroup bias.

### **3. The Experiment**

My experiment is designed to explore the effect of two different forms of death priming on givers' decisions and ingroup bias in charitable behavior.

It has been conducted in cooperation with UNICEF at the beginning of December 2015. The experimental setting is designed as a real UNICEF immunization campaign in favor of children living in the Third World. Subjects are exposed to alternative vaccination campaigns, used to manipulate experimental treatments. Experimental campaign material is displayed using power point presentations and it is based on real and publicly available UNICEF advertisements. It has been approved and its distribution during the experiment has been authorized by the chief of the local UNICEF Committee.

After being exposed to the experimental treatments, participants are asked to contribute with monetary donations. I opt for voluntary contribution mechanism (VCM) as it is adopted by UNICEF and it is one of the most common mechanism used in face-to-face fundraising races (Onderstal et al., 2014).

In order to make the campaign more reliable, volunteers exhibiting UNICEF logo have been present during the entire duration of the experiment.

It involves 547 economics undergraduate students at the University of Padua. Participants are not aware of taking part in an experiment. Before the beginning of the experiment, they are told that UNICEF is fundraising money in favor of children in need of vaccination and that a PhD student interested in the cause and some volunteers are hosted to present the campaign and explain how to contribute.

The experiment is divided into two parts: the first (Campaign Presentation) takes place at the end of regular classes and the second (Fundraising) on the day after, in the nearby of the buildings of

the Department of Economics and Management where UNICEF volunteers collected subjects' donations.

I select classes of Mathematics and Macroeconomics, for the following reasons: (i) they are mandatory for both business and economics students; (ii) students are split into three groups according to the first letter of their family name (namely, A-E; F-O; P-Z); (iii) lectures are held on the same day at different hours; (iii) lectures are scheduled on three consecutive days, and this allows me to divide the experiment into the two main phases.

### 3.1. Experiment treatments

Overall I implement six different treatments, as shown in Table 1 and Table 3.

Subjects are randomly assigned to conditions in a 3 (mortality salience manipulations – MS<sub>C</sub>; MS<sub>1</sub>; MS<sub>2</sub>) x 2 (Ingroup/Outgroup) between-subjects factorial design (Table 1).

The six visual presentations are designed to be identical, except for the experimental manipulations.

I choose race as group identity attribute and group identity is manipulated using images: subjects assigned to the Ingroup conditions are exposed to pictures of white-skinned (Caucasian) children, while Outgroup treatments show pictures depicting black-skinned (African) children<sup>3</sup>.

Death priming (mortality salience) treatments are varied by changing salient words in the explanatory texts. Explicit Death (MS<sub>1</sub>) treatment exploits an adaptation of real texts of UNICEF vaccination campaign that employ and emphasize words connected to death (“death”, “dying”, “lethal diseases”, “passing”) and prime death thoughts at a conscious level. In the Implicit Death (MS<sub>2</sub>) condition, same words related to death are flashed for 30ms every 3 seconds on the screen during the entire duration of the visual presentations. For *ceteris paribus*, neutral words of the same length (“abcde”, “abcdef”, “abcdefg”) are flashed also during the other treatments. The campaign material is the same as the one showed to the control group (MS<sub>C</sub>).

The control treatment (MS<sub>C</sub> - Disease) is modified by substituting death-related words with others related to disease (“disease”, “getting sick”, “risky diseases”, “pathologies”).

---

<sup>3</sup> Original UNICEF pictures are used.

**Table 1 - Experiment Treatments**

	<i>INGROUP RECIPIENTS</i>	<i>OUTGROUP RECIPIENTS</i>
<i>CONTROL – DISEASE (MS<sub>c</sub>)</i>	<i>Group 1</i>	<i>Group 2</i>
<i>EXPLICIT DEATH (MS<sub>1</sub>)</i>	<i>Group 3</i>	<i>Group 4</i>
<i>IMPLICIT DEATH (MS<sub>2</sub>)</i>	<i>Group 5</i>	<i>Group 6</i>

Note: by comparing groups 1 and 2, I identify a ‘baseline’ ingroup bias, as predicted by Social Identity Theory. Comparisons among groups 1,3,5 and 2,4,6 allow me to answer to the first research question, while by comparing groups 3 v. 5 and 4 v. 6 I address the second question. By comparing groups 3 v. 4 and 5 v. 6, it is possible to identify ingroup bias under death priming and answer to the third research question. In order to address the last one, I compare groups 1 v. 5 and 2 v. 6 by exploring interactions with observed self-esteem dimensions.

In the following part, I provide explanations and clarifications about the main choices behind the experiment treatments.

*Race as group identity attribute.* The choice to prime race, a natural social category, to induce social identity follows several considerations. First, it is recognized in existing literature as one of the most important category for group identity (Ben-Ner, 2009; Brown, 2000). Second, it satisfies the three main mechanisms outlined by Tajifel and Turner (1986): categorization, identification and comparison. As surface-level attribute, it is easily identifiable and comparable in a context such as charity campaign. Third, it is coherent with this experimental setting, it contributes to make the experiment more credible and it does not compromise the reliability of my findings. Current TMT experiments identify ingroup/outgroup with national and foreign charities. This option is not exempt from criticisms. Indeed the estimated effect could be driven by a greater familiarity with a national organization rather than with a foreign one, by organizations’ reputation or attitudes towards them (for example, organizational values, donors’ religiosity, identification or past experience with the organization). Fourth, it has been preferred over other attributes related to charity setting, such as nationality (e.g. Italian v. Eritrean), to avoid donors’ perception of victims worthiness to drive the effect: e.g. Italian children in need may be perceived as more privileged, as they can benefit from better networks and infrastructures, or African children as in a more desperate situation and less likely to be saved. In order to reduce this risk, in all the presentations a list of the recipients countries is displayed, not only to make the campaign more reliable, but also to clarify that white-skinned children do not live in Western economies, possibility that again might alter potential givers perceptions of recipients’ worthiness. Furthermore, it is not specified in which country children live, in order to avoid unobservable individual preferences and prejudice to affect their choices. In addition, countries where terroristic groups actively operate have been excluded.

Campaign pictures show both male and female children, as gender could be a relevant group identity attribute. For this reason and to avoid that the specific characteristics that must be made salient in the presentation of an identifiable victim represent relevant identity categories for potential donors, this experimental cause is designed to assist statistical victims rather than identifiable ones. Furthermore, for policy implication concerns, I decide to use a setting that could be as generic as possible.

*Control (Disease) treatment.* Usually, in TMT experiments the control group is primed with negative treatments (e.g. dental pain) unrelated to the experimental setting. In this case, control treatment has to be more realistic, in order to make the experiment more credible and to produce indications about good practices. It is sufficient to watch charity advertisements on TV to figure out that disease and death represent the main motifs in emotive charity advertising and they are quite often alternatively used. Hence, coherently with many campaigns of large charitable organizations, the focus is on disease rather than death.

*Explicit Death treatment.* Victims are not depicted as gravely ill and dying. They are described as in risk of dying (getting sick in the control conditions), without emphasizing a different urgency or need that could affect givers' perception of recipients' worthiness and, subsequently, their donation decisions. Furthermore, individual unobservable (e.g. generosity) could drive estimates. Then in this setting vaccination is the perfect charity cause to this purpose.

*Implicit Death treatment.* Even though implicit induction used in this experiment seems not easily doable in charity campaigns, it represents a proper experimental manipulation and it may be transposed into the real world through the use of images, small print texts or introducing an element of distraction able to push death thoughts out of consciousness.

### 3.2. Experiment Phases

Table 2 – Experiment Phases

DAY 1			DAY 2
Phase 1	Phase 2	Phase 3	Phase 4
Vaccination Campaign Presentation	Donation Decision (part 1) Willingness to Donate	Anonymous Questionnaire	Donation Decision (part 2) Fundraising

**Phase 1.** The experimenter introduces and presents the campaign, while displaying the power point presentations. In this stage, request appeal is crucial and the presenter uses always the same mode of ask and techniques that are found to increase donors' compliance in face-to-face forms of solicitation: e.g. legitimizing contributions, using sentences like "every penny will help" (Sargeant, 1999). The presentation contains also the relevant information about donation procedure and transparency (subjects are apprised that a brief report about the campaign's results would have been uploaded by professors on the University e-learning platform).

**Phase 2.** Subjects are provided with a sheet, on which they have to write the amount in euro they would like to donate, an empty envelope and a questionnaire. They are asked to fill the sheet and to drop it in apposite boxes and, at the same time, they are told to take the envelope home, put the cash corresponding to the amount they have declared inside, seal and deliver it before or after classes to UNICEF volunteers positioned in the nearby of Department's buildings on the day after. This procedure contributes to confer a sense of privacy and anonymity, and to avoid distortive effects on subjects' decisions (Hirschberger, 2008). Furthermore, asking givers to leave their donations into an envelope permits to keep track of individual choices. Indeed both the sheet and the envelope report the same serial number, necessary to identify subjects, along with UNICEF logo.

**Phase 3.** Anonymous questionnaires are used to collect information on individual characteristics (background and attitude), that can potentially confound the relationship between treatments and outcomes of interest. They are tagged with the same serial number reported on the other experimental material. The experimenter justified the administration of the questionnaire (in Phase 1, during the presentation) as part of a study on charitable giving conducted by the Department of Economics and Management of the University of Padua in cooperation with UNICEF.

Information requested in the questionnaire are reported below:

(a) Demographic and socio-economic factors: age, gender, area of origin and where they are currently living, net monthly household income. Existing research suggests that gender, age, income, geographic characteristics have some effects on prosocial behavior and in particular monetary contributions (e.g. Schlegelmilch et al., 1997; Bennett, 2003; Lee and Chang, 2007).

(b) Past giving behavior: whether donated in the past, type of donation, frequency of giving, last donation time, last and average amount in euro of their donations (if they donated money before), previous donations to UNICEF and/or to other organizations. Past donation experience deserves particular attention, as it matters in shaping donors' future behavior (e.g. Sargeant, 1999). In particular it has been emphasized the importance for charities of creating and maintaining good

relationship with their donors, as: *i*) donors prefer to develop relationship with organizations they decide to support; *ii*) once the donors have been recruited, they will be more likely to give again in the future; *iii*) giving regularly strengthens the norm attached to the role and donors' satisfaction with their decisions. Furthermore the effect of past donation experiences (decisions) on future ones may be explained by behavioral spillovers. For example, if behaving prosocially has a positive weight attached to it, giving today (wearing a charity pin) can boost one's self-image and then favor other generous decisions in the future (e.g. monetary donations). At the same time, altruistic choice today may lead to *permitting* spillovers tomorrow in two cases: *i*) utility from self-image is a substitute for direct satisfaction from donating money and this may lead to subsequent lower donations to charity; *ii*) accomplishing or attending to a pro-sociality motive leaves lower resources that can be, consciously or unconsciously, redirected toward other accounts and it results in donating less to charity in the immediate future (Dolan and Galizzi, 2015).

(c) Implicit death priming moderating variables: general self-esteem, giving and money based self-esteem. General self-esteem is measured using the Rosenberg (1965) self-esteem scale. The scales used to assess giving and money based self-esteem (Table 5 and Table 6) are adapted from Rosenberg (1965), Hansen et al.(2010), Ben Ari et al. (1999), Shehryar and Hunt (2005).

(d) Perceived closeness to charity recipients. Participants are asked to declare on a 10-point scale how close they perceive themselves to campaign recipients. Even though past research suggests that monetary contributions are more likely to be predicted by demographic and socio-economic conditions than psychographic and attitudinal-based factors (Lee and Chang, 2007), social and psychological distance has been found to affect giving decisions and ingroup bias (e.g. Fong and Luttmer, 2011).

(e) Other Controls. Even though vaccination is the proper cause for the sake of death priming manipulations, it is not exempt from other concerns. In the last years, disputes and controversies about vaccination efficacy and alleged detrimental effects arose and they could affect potential givers' opinion and their giving behavior. Hence, questions that capture participants' opinion about vaccination are included in the questionnaire, along with others asking for the reason why they eventually decided to not donate.

**Phase 4.** The following day, UNICEF volunteers position themselves close to the main accesses to the Department buildings where classes are held and collect (in anonymous form) the envelopes containing students' donation.

I decide to separate the time in which subjects declare their willingness to donate and the one in which they materially deliver money in order to avoid their contributions to be affected by the amount of cash they have in their wallets, which represents an unobservable budget constraint that cannot be captured by any dimension of their socio-economic status.

Informing the students about the event the day before, in order they take extra cash with them, is not an option. Their preconception and other factors could affect their decision prior to the treatments administration in a non-random way, according to unobservable individual preferences and characteristics. Furthermore, this procedure mimics the one that UNICEF actually implements in street fundraising: potential donors are informed and asked to declare their willingness to donate and to provide contacts (including bank account or credit card number); a couple of days later they are contacted to authorize the money transfer. Lastly, this choice enables me to explore both potential donors' intention to donate (hypothetical measure) and their real donation. In previous studies (e.g. Ben-Ner et al., 2009), subjects are found to contribute with similar amounts and discriminate between ingroup and outgroup in similar degrees in the hypothetical and incentivized dictator games.

It is important to highlight that, in this experiment, variations among the six treatments are designed to reduce the likelihood of 'contamination' across experimental groups: differences are minimal and concern only the relevant words that have been highlighted and pictures depicting children, to manipulate treatments.

## **4. Data Analysis and Results**

In presenting my results I proceed as follows. First, I describe the construction of the self-esteem scores. Second, I define criteria for observations and variable exclusion. Finally, I report results of the main data exploration and analysis.

### **4.1. Self-esteem scores construction**

Table 4 reports the Rosenberg (1965) self-esteem scale. Since it is a validated instrument to measure individuals' self-esteem, self-esteem total score is the sum of the ten items' score.

Conversely, scales used do assess giving and money based self-esteems (Table 5 and Table 6 respectively) are not validated. They are adapted from Rosenberg (1965) and other scales used to assess self-esteem based on: smoking (Hansen et al., 2010), drinking (Shehryar and Hunt, 2005), and risky driving (Ben Ari et al., 1999).



In this case, before generating the score, a valid approach is to perform a confirmatory factor analysis in order to verify scale construction and operationalization.

Table 7 and Table 8 report the results of the confirmatory factor analysis for each scale. Both the two tables show that scales items map together in one factor. Only seven items from giving self-esteem scales load, while all the money based self-esteem's items do. Then, for each scale, raw scores corresponding to all the items loading on the factor are summed (items with negative loadings are subtracted).

Before the construction of the scores, I verified the presence of missing items. The observations for which more than the half of the row items are missing are not used in the construction of the scales. In the other cases I replace them with the average of the available row items' scores, since items are missing at random. Randomness is verified by running a logistic regression of a dummy that takes value 1 if at least one row item is missing (0 otherwise) on all the available variables that could affect the probability of not answering. None of the observable variables has a statistical significant effect on the outcome dummy.

#### **4.2. Observations and variables exclusion**

Next to the construction of the self-esteem scores, I perform some checks to clean my dataset.

After a first exploratory analysis, I set some criteria for both observations and variables exclusion.

Observations are excluded if missing observations are on at least one dependent variable. According to this criterion, 10 observations are dropped.

Variables with more than 10 missing observations are not considered in the analysis, with the exception of variables that are relevant for this study, such as household income dummies. Control variables that survive this selection are: age, male, previous donation (binary), closeness to victims, household income, and variables capturing the effect of subjects' opinion about vaccination (see Table 9). Furthermore, I decide to exclude the variable measuring the amount participants declare to be willing to donate, as it is not a reliable measure. By asking to subjects this information, I meant to create the pretext to capture the intention to donate and the interest in the presented charity cause.

#### **4.3. Data Analysis and Results**

Starting with Table 12, that reports sample statistics of the dependent variables by treatment, we observe that a very small fraction of participants actually decide to contribute to the charity cause with a monetary donation. Table 13 delivers the number (and relative percentage) of subjects that

declare to be willing to donate and that actually donate and we can observe that very few subjects actually give. Table 14 shows that 2 subjects assigned to the DE-Outgroup condition and 4 to the ED-Outgroup one declare to not be willing to donate, but then they contribute in some extent. Because of the few observations of *Donation Choice* dummy, I am forced to rely on the outcome variable *Willing to Donate* only. Data are analyzed and presented as follows. First, I explore ingroup bias in the base group (MS<sub>C</sub> – Disease), also in *Donation Choice* and *Donation Amount*. Then I run alternative specifications of logistic regressions of the outcome variable *Willing to Donate* on the main treatment variables and controls to explore how mortality treatments affect subjects' decisions towards ingroup and outgroup and whether these effects are different in a statistical significant way. Finally, I add interaction terms to assess the role of subjects' self-esteem in responses to implicit death priming.

#### 4.3.1. Results

First I explore the presence of ingroup bias in the control group (Disease – MS<sub>C</sub>). I perform a t-test for each dependent variable (Table 15) and, as predicted by Social Identity Theory, I find a statistical significant favoritism in intention to donate at the benefit of ingroup recipients with respect to those that belong to the outgroup. Since a very small fraction of participants actually donates, I perform also a Mann Whitney Wilcoxon test (Table 16), as it does not require the assumption of normal distribution, and also this test delivers similar results.

Table 17 shows exactly the opposite path: when pushed to think about recipients' death, donors in the sample are less willing to donate to ingroup recipients and more likely to donate to outgroup beneficiaries under both explicit and implicit death priming (MS<sub>1</sub> and MS<sub>2</sub>) with respect to those exposed to the “disease” (MS<sub>C</sub>) treatment. These effects are robust to the inclusion of controls capturing the effects of self-esteem and other variables gathered through the questionnaire, with a loss of statistical significance on the effects of implicit and explicit death priming on willingness to donate to ingroup (WTD<sub>I</sub>) and outgroup (WTD<sub>O</sub>) respectively when all the controls are included (probably because of a huge drop in the observations).

The bottom part of Table 17 shows that the difference between the coefficients of explicit and implicit death priming is not statistically significant. Postestimation tests in Table demonstrate that, under death priming, ingroup bias is still there but with reversed sign: we observe outgroup favoritism and ingroup discrimination. Again, the result is robust to the inclusion of all the controls (Table 19).

Table 20 answers to the fourth research question by reporting interactions effects between Implicit Death and Self-esteem dummies plus demographic controls. If we look at the subsample

of subjects with high level of self-esteem (top part of the table) that are not exposed to any death priming, we observe that they are less willing to give to ingroup recipients with respect to those in the control group, while the negative effect on  $WTD_O$  is not statistically significant. Subjects in the control groups high in giving based self-esteem exhibit a different behavior: both the effects on  $WTD_I$  and  $WTD_O$  are positive, but only the latter is statistically significant. The opposite is found when we focus on those that highly base their self-esteem on money: negative attitude is statistically significant only towards ingroup, not towards outgroup.

When exposed to Implicit Death we observe that subjects are less willing to donate to their experimental ingroup and more willing to donate to the outgroup (negative sign of non-statistically significant effects on  $WTD_O$  turns positive and statistically different from zero) regardless of self-esteem levels and domains. Postestimation tests reported at the bottom part of each group of regressions show that, given high level of general, giving and money based self-esteems, Implicit Death priming exacerbates negative attitude towards ingroup and positive attitude towards outgroup. Subjects are less (more) willing to donate to their ingroup (outgroup) in a statistically significant way when implicitly exposed to death thoughts rather than to ones related to disease. At the same time, under Implicit Death priming, no difference is observed at different levels of self-esteem.

## **5. Discussion and Conclusions**

In this study I draw on Social Identity Theory (SIT) and Terror Management Theory (TMT) to expand our understanding of ingroup bias in charitable giving. I aim at investigating the effect of the use of death priming in emotive charity advertisement on potential donors' decisions and ingroup bias. In particular I compare implicit and explicit priming of death thoughts against priming of thoughts related to disease and I explore the role of various dimensions of subjects' self-esteem in moderating their responses to implicit stimuli. To this purpose I conduct a field experiment in cooperation with one of the largest and most reliable charities: UNICEF. The experiment involves 547 undergraduate economics students that are assigned to six conditions in a 3 (death priming) x 2 (ingroup/outgroup) between subjects design. They are exposed to six different charity advertising of an immunization campaign, which are used to manipulate experimental treatments. Group identity is operationalized through images of beneficiaries using race as identity attribute. Thoughts of death are manipulated in the explanatory texts.

From this study we learn that:

- (i) in the base (control) group, ingroup bias emerges in the intention to donate in a way coherent with SIT predictions and we observe ingroup favoritism and outgroup discrimination;
- (ii) level and domains of self-esteem moderate subjects' responses to the control treatment;
- (iii) when death thoughts are primed in relation to charity recipients, discrimination is at the expense of the ingroup (Caucasian children) and favoritism toward the outgroup (African children);
- (iv) implicit death effects arise independently from the level of general self-esteem and self-esteem's relevant domains;
- (v) difference in the effects of explicit and implicit death priming on intention to donate is not statistically significant when death thoughts are related to third party victims (charity beneficiaries).

Some of these findings deserve particular attention.

(ii) Level and domains of self-esteem moderate subjects' responses to the control treatment.

In the base group, ingroup bias emerges at the expenses of the outgroup, as predicted by SIT.

When we look at the subgroup of subjects with high levels of general self-esteem, we note that they are less willing to donate to the ingroup and no difference is observed in their intention to donate to the outgroup.

Why? The answer lies on simple explanation: ingroup is composed by low socio-economic status (low-SES) individuals. *Ingroup distancing effect* assists us in understanding this phenomenon, suggesting that Whites negatively react to low-socio economic status racial ingroup, as they represent a threat to their personal and group-level status (Kunstman et al., 2016). Coherently with this prediction, SIT suggests that one favors his own ingroup as long as it confers a positive identity. In this study this is not the case: ingroup is composed by victims, poor people in need of help, that obstacle the construction of potential donors' positive image of the self. But why does this reaction happen only when self-esteem is high? People high in self-esteem do not identify themselves with their salient ingroup in the experiment in larger extent with respect to those with low self-esteem. When self-esteem is low, the need of identity is higher and it is harder to take distance (psychologically) with respect to the ingroup without proper incentives.

At the same time, decrease in the intention to donate to outgroup is not statistically significant. Again the *ingroup distancing effect* (Kunstman et al., 2016) provides us a valuable explanation: participants explicitly perceive low-SES ingroup (Whites) as greater status and prestige threats of their racial ingroup than low-SES Blacks.

If we look at the specific self-esteem domains we observe effects in the predicted direction: high self-esteem in giving corresponds to higher intention to donate, high self-esteem in money leads

to a decrease in willingness to give. The first effect is significant on willingness to donate to outgroup, the second to the ingroup. The evidence is stronger where the ‘natural’ tendency to be generous or materialistic is coherent with subjects’ attitude towards their experimental ingroup and outgroup: one is generous and he gives more to outgroup recipients, as they do not represent a threat to his positive identity; one is more materialistic and he gives less to the ingroup beneficiaries, as they endanger his positive self-image. The effect of giving based self-esteem is stronger probably because giving less to the ingroup comes at a psychological cost for the donors in absence of death priming (Zaleskiewicz et al., 2015), even if they are high in money-based self-esteem.

(iii) When death thoughts are related to charity recipients, discrimination is at the expense of the ingroup (Caucasian children) and favoritism is toward the outgroup (African children).

These results do not replicate main findings of previous TMT studies under different perspectives (Jones et al., 2002; Jones et al., 2013), likely because priming of death thoughts is related to third party victims rather than to donors. In the discussion of this finding, I keep self-esteem hypothesis apart for a while and I offer some explanations starting from the estimated negative effect of both implicit and explicit death priming on willingness to donate to ingroup. TMT states that mortality awareness increases the need to have a positive image of the ingroup and consequently participants negatively overreact towards ingroup members that represent a menace to their positive self-image (*ingroup distancing effect*). Furthermore, participants can take distance from ingroup as a tactic to avoid death thoughts (less willing to donate), as these thoughts are related to their ingroup. As concerns the positive effect on willingness to donate to outgroup, I can argue that participants may not feel a direct threat of death stimuli, as these stimuli are not related to them or their relevant ingroup. I identify two possibilities. First, death thoughts related to outgroup victims do not represent a threat at all and participants react with a proactive strategy (more willing to donate) to the more urgent need of help posed by death with respect to disease. Second, death thoughts associated to the low SES outgroup satisfy the need to have a positive image of the contingent relevant ingroup (e.g. other classmates, friends) and the self in comparison to the experimental outgroup. Consequently death stimuli positively affect intention to donate to the outgroup, as in this case giving may underline ‘superiority’ of the donors.

(iv) Implicit death effects arise independently from the level of general self-esteem and self-esteem’s relevant domains.

I consider the self-esteem hypothesis again. Implicit death priming exacerbates subjects’ reactions towards ingroup and outgroup with respect to the control conditions, independently from the level of their self-esteem.

In this case, ingroup discrimination and outgroup favoritism emerge also for low self-esteem people: under implicit death priming, detachment from the ingroup and favorable attitude towards outgroup do not come at a psychological cost (Zaleskiewicz et al., 2015).

It is interesting to notice that both giving and money based self-esteem measures exhibit similar paths, under implicit death priming. Under this treatment, also highly materialistic people are more willing to donate to the outgroup and the more generous are less willing to donate to the ingroup.

So neither the level nor the domains of subjects' self-esteem moderate people reactions to implicit death priming.

Even though willingness to donate is «cheap talks», I obtain results that are robust and coherent with theoretical predictions. This study offers interesting intuitions for the marketing of charities and large humanitarian organizations. Caution is recommended in the use of death priming in the advertising campaigns supporting victims that can be perceived by donors as members of their ingroup. Given the distortions we observe in the attitudes towards ingroup, further explorations about the role of self-esteem is suggested in order to identify a strategy to deal with them. Conversely, when charity recipients clearly belong to a donors' relevant outgroup, activation of death thoughts is suggested.

To conclude, the integration between SIT and TMT is of particular interest for economic analysis, as it allows a better understanding of the fundamentals of ingroup bias in social preferences, the role of self-esteem and responses to one of the most common real world stimuli: death. Besides prosocial and charity behaviour, a further development of this integration could assist in the study of decision makers' reactions to phenomena such as terroristic attacks, large environment disasters, and wars.

## References

- Aaker, J., Akutsu, S. (2009). Why do people give? The role of identity in giving.
- Alderfer, C.P., (1997). Embedded intergroup relations and racial identity development theory. In: Thompson, C.E. (Ed.), *Racial Identity Theory: Application to Individual, Group and Organizational Interventions*. Lawrence Erlbaum Associates, Inc., Mahwah, NJ, US, pp. 237–263.
- Akerlof, G.A., Kranton, R.E. (2000). Economics and identity. *The Quarterly Journal of Economics*, 115, 715–753.
- Akerlof, G.A., Kranton, R.E. (2002). Identity and schooling: some lessons for the economics of education. *Journal of Economic Literature*, 40, 1167–1201.
- Akerlof, G.A., Kranton, R.E. (2005). Identity and the economics of organizations. *Journal of Economic Perspectives*, 19, 9–32.
- Andreoni, J. (1998). Toward a theory of charitable fund-raising. *Journal of Political Economy*, 106(6), 1186-1213.
- Andreoni, J. (2006). Philanthropy. *Handbook of the Economics of Giving, Altruism and Reciprocity*, 2, 1201-1269.
- Andreoni, J. (2007). Charitable Giving. *The New Palgrave, Second Edition, Palgrave Macmillan*.
- Andreoni, J., Petrie, R. (2004). Public goods experiments without confidentiality: A glimpse into fund-raising. *Journal of Public Economics*, 88(7), 1605-1623.
- Anik, L., Aknin, L. B., Norton, M. I., Dunn, E. W. (2009). Feeling good about giving: The benefits (and costs) of self-interested charitable behavior. *Harvard Business School Marketing Unit Working Paper*, (10-012)
- Arndt, J., Greenberg, J., Solomon, S., Pyszczynski, T., Simon, L. (1997). Suppression, accessibility of death-related thoughts, and cultural worldview defence: Exploring the psychodynamics of terror management. *Journal of Personality and Social Psychology*, 73(1), 5.
- Baldwin, M. W., Wesley, R. (1996). Effects of existential anxiety and self-esteem on the perception of others. *Basic and Applied Social Psychology*, 18(1), 75-95.

- Basil, D. Z., Ridgway, N. M., Basil, M. D. (2008). Guilt and giving: A process model of empathy and efficacy. *Psychology & Marketing*, 25(1), 1-23.
- Bénabou, R., Tirole, J. (2005). *Incentives and Prosocial Behavior*, National Bureau of Economic Research.
- Ben-Ner, A., McCall, B. P., Stephane, M., Wang, H. (2009). Identity and in-group/out-group differentiation in work and giving behaviors: Experimental evidence. *Journal of Economic Behavior & Organization*, 72(1), 153-170.
- Bennett, R. (2003). Factors underlying the inclination to donate to particular types of charity. *International Journal of Nonprofit and Voluntary Sector Marketing*, 8(1), 12-29.
- Bernheim, B. D. (1994). A theory of conformity. *Journal of Political Economy*, 841-877.
- Bolton, G. E., Ockenfels, A. (2006). Inequality aversion, efficiency, and maximum preferences in simple distribution experiments: comment. *The American economic review*, 96(5), 1906-1911.
- Brown, J. D., Smart, S. (1991). The self and social conduct: Linking self-representations to prosocial behavior. *Journal of Personality and Social Psychology*, 60(3), 368.
- Brown, R. (1978). Divided we fall: An analysis of relations between sections of a factory workforce. *Differentiation between Social Groups: Studies in the Social Psychology of Intergroup Relations*, 395-429.
- Brown, S., (2000). Evolutionary models of music: from sexual selection to group selection. In: Tonneau, F., Thompson, N.S. (Eds.), *Perspectives in Ethology: Evolution, Culture and Behavior*. Kluwer Academic/Plenum Publishers, New York, pp. 221–281.
- Buraschi, A., Cornelli, F. (2014). The economics of donations and enlightened Self-interest. *European Financial Management*, 20(1), 1-32.
- Burke, B. L., Martens, A., Faucher, E. H. (2010). Two decades of terror management theory: A meta-analysis of mortality salience research. *Personality and Social Psychology Review: An Official Journal of the Society for Personality and Social Psychology, Inc*, 14(2), 155-195.
- Camerer, C. (2003). *Behavioral game theory: Experiments in strategic interaction* Princeton University Press.



- Cartwright, R.A., Hargreaves, H.J., Sunderland, E., (1978). Social identity and genetic variability. *Journal of Biosocial Science*, 10, 23–33.
- Cartwright, E. (2014). *Behavioural economics*, Routledge.
- Charness, G., Gneezy, U., (2008). What's in a name? Anonymity and social distance in dictator and ultimatum games. *Journal of Economic Behavior and Organization*, 68, 29–35.
- Charness, G., Rabin, M. (2002). Understanding social preferences with simple tests. *Quarterly journal of Economics*, 817-869.
- Chen, Y., Li, S. X. (2009). Group identity and social preferences. *The American Economic Review*, 431-457.
- Cheung, C., Chan, C. (2000). Social-cognitive factors of donating money to charity, with special attention to an international relief organization. *Evaluation and Program Planning*, 23(2), 241-253.
- Cialdini, R. B., Kallgren, C. A., Reno, R. R. (1991). A focus theory of normative conduct: A theoretical refinement and reevaluation of the role of norms in human behavior. *Advances in Experimental Social Psychology*, 24(20), 1-243.
- Dana, J. D., Kuang, X. J., Weber, R. A. (2004). Exploiting moral wriggle room: Behavior inconsistent with a preference for fair outcomes. *Roberto A., Exploiting Moral Wriggle Room: Behavior Inconsistent with a Preference for Fair Outcomes (September 24, 2004)*.
- Darity, W. A., Mason, P. L., Stewart, J. B. (2006). The economics of identity: the origin and persistence of racial identity norms. *Journal of Economic Behavior & Organization*, 60(3), 283-305.
- Dolan, P., Galizzi, M. M. (2015). Like ripples on a pond: Behavioral spillovers and their implications for research and policy. *Journal of Economic Psychology*.
- Dunn, E. W., Aknin, L. B., Norton, M. I. (2008). Spending money on others promotes happiness. *Science (New York, N.Y.)*, 319(5870), 1687-1688.
- Ellemers, N., Spears, R., Doosje, B., (2002). In-group and social identity. *Annual Review of Psychology*, 53, 161–186.
- Fehr, E., Gächter, S. (2000). Fairness and retaliation: The economics of reciprocity. *The journal of economic perspectives*, 14(3), 159-181.

- Fehr, E., Gächter, S. (2002). Do incentives contracts undermine voluntary cooperation? *Institute for Empirical Research in Economics, University of Zurich, Working Paper*, (34)
- Fehr, E., Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *Quarterly Journal of Economics*, 817-868.
- Ferraro, R., Shiv, B., Bettman, J. R. (2005). Let us eat and drink, for tomorrow we shall die: Effects of mortality salience and self-esteem on self-regulation in consumer choice. *Journal of Consumer Research*, 32(1), 65-75.
- Fong, C. M., Luttmer, E. F. (2011). Do fairness and race matter in generosity? Evidence from a nationally representative charity experiment. *Journal of Public Economics*, 95(5), 372-394.
- Freeman, D., Aquino, K., McFerran, B. (2009). Overcoming beneficiary race as an impediment to charitable donations: Social dominance orientation, the experience of moral elevation, and donation behavior. *Personality & Social Psychology Bulletin*, 35(1), 72-84.
- Gaertner, S. L., Dovidio, J. F., Johnson, G. (1982). Race of victim, nonresponsive bystanders, and helping behavior. *The Journal of Social Psychology*, 117(1), 69-77.
- Galizzi, M. M. (2014). What is really behavioral in behavioral health policy? And does it work? *Applied Economic Perspectives and Policy*.
- Glazer, A., Konrad, K. A. (1996). A signaling explanation for charity. *The American Economic Review*, 1019-1028.
- Greenberg, J., Arndt, J. (2011). Terror management theory. *Handbook of Theories of Social Psychology*, 1, 398-415.
- Greenberg, J., Kosloff, S. (2008). Terror management theory: Implications for understanding prejudice, stereotyping, intergroup conflict, and political attitudes. *Social and Personality Psychology Compass*, 2(5), 1881-1894.
- Greenberg, J., Pyszczynski, T., Solomon, S. (1986). The causes and consequences of a need for self-esteem: A terror management theory. *Public self and private self* (pp. 189-212) Springer.
- Greenberg, J., Pyszczynski, T., Solomon, S., Simon, L., Breus, M. (1994). Role of consciousness and accessibility of death-related thoughts in mortality salience effects. *Journal of Personality and Social Psychology*, 67(4), 627.

- Greenberg, J., Solomon, S., Pyszczynski, T. (1997). Terror management theory of self-esteem and cultural worldviews: Empirical assessments and conceptual refinements. *Advances in Experimental Social Psychology*, 29, 61-139.
- Harbaugh, W. T. (1998). What do donations buy?: A model of philanthropy based on prestige and warm glow. *Journal of Public Economics*, 67(2), 269-284.
- Harmon-Jones, E., Simon, L., Greenberg, J., Pyszczynski, T., Solomon, S., McGregor, H. (1997). Terror management theory and self-esteem: Evidence that increased self-esteem reduced mortality salience effects. *Journal of Personality and Social Psychology*, 72(1), 24.
- Hibbert, S., Horne, S. (1996). Giving to charity: Questioning the donor decision process. *Journal of Consumer Marketing*, 13(2), 4-13.
- Hirschberger, G., Florian, V., Mikulincer, M., Goldenberg, J. L., Pyszczynski, T. (2002). Gender differences in the willingness to engage in risky behavior: A terror management perspective. *Death Studies*, 26(2), 117-141.
- Hirschberger, G., Ein-Dor, T., Almakias, S. (2008). The self-protective altruist: Terror management and the ambivalent nature of prosocial behavior. *Personality & Social Psychology Bulletin*, 34(5), 666-678.
- Hirschberger, G., Pyszczynski, T., Ein-Dor, T. (2009). Vulnerability and vigilance: Threat awareness and perceived adversary intent moderate the impact of mortality salience on intergroup violence. *Personality & Social Psychology Bulletin*, 35(5), 597-607.
- Holmes, J. G., Miller, D. T., Lerner, M. J. (2002). Committing altruism under the cloak of self-interest: The exchange fiction. *Journal of Experimental Social Psychology*, 38(2), 144-151.
- Joireman, J., Duell, B. (2005). Mother Teresa versus Ebenezer Scrooge: Mortality salience leads proselves to endorse self-transcendent values (unless proselves are reassured). *Personality & Social Psychology Bulletin*, 31(3), 307-320.
- Jonas, E., Fischer, P. (2006). Terror management and religion: Evidence that intrinsic religiousness mitigates worldview defence following mortality salience. *Journal of Personality and Social Psychology*, 91(3), 553.
- Jonas, E., Schimel, J., Greenberg, J., Pyszczynski, T. (2002). The scrooge effect: Evidence that mortality salience increases prosocial attitudes and behavior. *Personality and Social Psychology Bulletin*, 28(10), 1342-1353.

- Jonas, E., Sullivan, D., Greenberg, J. (2013). Generosity, greed, norms, and death—Differential effects of mortality salience on charitable behavior. *Journal of Economic Psychology*, 35, 47-57.
- Kogut, T., Ritov, I. (2005). The "Identified Victim" Effect: An Identified Group, or Just a Single Individual?. *Journal of Behavioral Decision Making*, 18(3), 157.
- Landry, C., Lange, A., List, J. A., Price, M. K., Rupp, N. G. (2005). *Toward an understanding of the economics of charity: Evidence from a field experiment*. (No. w11611). National Bureau of Economic Research.
- Lee, Y., Chang, C. (2007). Who gives what to charity? Characteristics affecting donation behavior. *Social Behavior and Personality: An International Journal*, 35(9), 1173-1180.
- Liu, W., Aaker, J. (2008). The happiness of giving: The time-ask effect. *Journal of Consumer Research*, 35(3), 543-557.
- Mandel, N., Heine, S. J. (1999). Terror management and marketing: He who dies with the most toys wins. *Advances in Consumer Research*, 26, 527-532.
- Niesta, D., Fritsche, I., Jonas, E. (2008). Mortality salience and its effects on peace processes. *Social Psychology*, 39(1), 48-58.
- Ockenfels, A., Werner, P. (2014). Beliefs and ingroup favoritism. *Journal of Economic Behavior & Organization*, 108, 453-462.
- Onderstal, S., Schram, A. J., Soetevent, A. R. (2013). Bidding to give in the field. *Journal of Public Economics*, 105, 72-85.
- Pyszczynski, T., Greenberg, J., Solomon, S. (1999). A dual-process model of defence against conscious and unconscious death-related thoughts: An extension of terror management theory. *Psychological Review*, 106(4), 835.
- Pyszczynski, T., Greenberg, J., Solomon, S., Arndt, J., Schimel, J. (2004). Why do people need self-esteem? A theoretical and empirical review. *Psychological Bulletin*, 130(3), 435.
- Rege, M., Telle, K. (2004). The impact of social approval and framing on cooperation in public good situations. *Journal of Public Economics*, 88(7), 1625-1644.

- Rosenblatt, A., Greenberg, J., Solomon, S., Pyszczynski, T., Lyon, D. (1989). Evidence for terror management theory: I. the effects of mortality salience on reactions to those who violate or uphold cultural values. *Journal of Personality and Social Psychology*, 57(4), 681.
- Salamon, L. M., Sokolowski, S. W., Haddock, M. A., Tice, H. S. The State of Global Civil Society and Volunteering: Latest findings from the implementation of the UN Nonprofit Handbook. Working Paper No. 49. (Baltimore: Johns Hopkins Center for Civil Society Studies, 2012).
- Sargeant, A. (1999). Charitable giving: Towards a model of donor behaviour. *Journal of Marketing Management*, 15(4), 215-238.
- Schlegelmilch, B. B., Love, A., Diamantopoulos, A. (1997). Responses to different charity appeals: The impact of donor characteristics on the amount of donations. *European Journal of Marketing*, 31(8), 548-560.
- Shehryar, O., Hunt, D. M. (2005). A terror management perspective on the persuasiveness of fear appeals. *Journal of Consumer Psychology*, 15(4), 275-287.
- Small, D. A., Loewenstein, G. (2003). Helping a victim or helping the victim: Altruism and identifiability. *Journal of Risk and Uncertainty*, 26(1), 5-16.
- Small, D. A., Simonsohn, U. (2008). Friends of victims: Personal experience and prosocial behavior. *Journal of Consumer Research*, 35(3), 532-542.
- Snyder, M., & Omoto, A. M. (1992). Volunteerism and society's response to the HIV epidemic. *Current Directions in Psychological Science*, 1(4), 113-116.
- Soetevent, A. R. (2005). Anonymity in giving in a natural context—a field experiment in 30 churches. *Journal of Public Economics*, 89(11), 2301-2323.
- Tajfel, H., Turner, J.C., (1979). An integrative theory of intergroup conflict. In: Austin, W.G., Worchel, S. (Eds.), *The Social Psychology of Intergroup Relation*. Brooks-Cole, Monterey, CA, pp. 33–48.
- Tajfel, H., Turner, J.C., (1986). The social identity theory of intergroup behaviour. In: Austin, W.G., Worchel, S. (Eds.), *Psychology of Intergroup Relations*. Nelson-Hall, Chicago, pp. 7–24.
- Tidwell, M. V. (2005). A social identity model of prosocial behaviors within nonprofit organizations. *Nonprofit Management and Leadership*, 15(4), 449-467.

- Twenge, J. M., Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., Bartels, J. M. (2007). Social exclusion decreases prosocial behavior. *Journal of Personality and Social Psychology*, 92(1), 56.
- Wade, P., (2001). Racial identity and nationalism: a theoretical view from Latin America. *Ethnic and Racial Studies*, 24, 845–865.
- Winterich, K. P., Mittal, V., Ross Jr, W. T. (2009). Donation behavior toward in-groups and out-groups: The role of gender and moral identity. *Journal of Consumer Research*, 36(2), 199-214.
- Zaleskiewicz, T., Gasiiorowska, A., Kesebir, P. (2015). The scrooge effect revisited: Mortality salience increases the satisfaction derived from prosocial behavior. *Journal of Experimental Social Psychology*, 59, 67-76.

**Table 3 - Summary of experimental design**

<b>Treatments</b>	<b>Description</b>
<i>DE-Ingroup (Control)</i>	Disease/Ingroup recipients
<i>DE-Outgroup (Control)</i>	Disease/Outgroup recipients
<i>ED-Ingroup</i>	Explicit Death/Ingroup recipients
<i>ED-Outgroup</i>	Explicit Death/Outgroup recipients
<i>ID-Ingroup</i>	Implicit Death/Ingroup recipients
<i>ID-Outgroup</i>	Implicit Death/Outgroup recipients

**Table 4 – Rosenberg Self-esteem Scale, Rosenberg (1965)**

<b>Variable</b>	<b>Item</b>	<b>Statements</b>	<b>Range</b>
Self-esteem	Item1	On the whole, I am satisfied with myself.	0-3
	Item2	At times I think I am no good at all. *	0-3
	Item3	I feel that I have a number of good qualities.	0-3
	Item4	I am able to do things as well as most other people.	0-3
	Item5	I feel I do not have much to be proud of. *	0-3
	Item6	I certainly feel useless at times. *	0-3
	Item7	I feel that I'm a person of worth, at least on an equal plane with others.	0-3
	Item8	I wish I could have more respect for myself. *	0-3
	Item9	All in all, I am inclined to feel that I am a failure. *	0-3
	Item10	I take a positive attitude toward myself.	0-3

Note: validated scale; self-esteem measure equals the sum of the ten items' scores; \* items reversed for scoring.

**Table 5 – Giving based Self-esteem scale**

<b>Variable</b>	<b>Item</b>	<b>Statements</b>	<b>Range</b>
Giving based Self-esteem	ItemG1	Giving brings out unwanted aspects of my character.	1-7
	ItemG2	Giving hurts my social relationships.	1-7
	ItemG3	Giving allows me to be one of the group *, #	1-7
	ItemG4	Giving allows others to derogate me.	1-7
	ItemG5	Giving allows me to make a good impression on others. *, #	1-7
	ItemG6	Giving allows me to feel valued by others. *, #	1-7
	ItemG7	Giving damages my positive self-image.	1-7
	ItemG8	While Giving, I feel uncomfortable being with others. *	1-7
	ItemG9	Giving allows me to feel worthy. *, #	1-7
	ItemG10	Giving allows me to feel useful. *, #	1-7
	ItemG11	Giving allows me to be proud of myself. *, #	1-7
	ItemG12	Giving allows me to be satisfied with myself. *, #	1-7

Note: adapted from Rosenberg Self-Esteem scale (Rosenberg, 1965), Driving-based Self-Esteem scale (Ben-Ari et al., 1999), Drinking-based Self-Esteem scale (Shehryar and Hunt, 2005), and Smoking-based Self-Esteem scale (Hansen et al., 2010); scale validated through Confirmatory Factor Analysis; \* items reversed for scoring; # loading factors (Eigenvalue > 2.5)



**Table 6 - Money based Self-esteem scale**

<b>Variable</b>	<b>Item</b>	<b>Statements</b>	<b>Range</b>
Money based Self-esteem	ItemM1	Having money brings out unwanted aspects of my character. #	1-7
	ItemM2	Having money hurts my social relationships. #	1-7
	ItemM3	Having money allows me to be one of the group. *, #	1-7
	ItemM4	Having money allows others to derogate me. #	1-7
	ItemM5	Having money allows me to make a good impression on others. *, #	1-7
	ItemM6	Having money allows me to feel valued by others. *, #	1-7
	ItemM7	Having money damages my positive self-image. #	1-7
	ItemM8	Having money showing to have money, I feel uncomfortable being with others. *, #	1-7
	ItemM9	Having money allows me to feel worthy. *, #	1-7
	ItemM10	Having money allows me to feel useful. *, #	1-7
	ItemM11	Having money allows me to be proud of myself. *, #	1-7
	ItemM12	Having money allows me to be satisfied with myself. *, #	1-7

Note: adapted from Rosenberg Self-Esteem scale (Rosenberg, 1965), Driving-based Self-Esteem scale (Ben-Ari et al., 1999), Drinking-based Self-Esteem scale (Shehryar and Hunt, 2005), and Smoking-based Self-Esteem scale (Hansen et al., 2010); scale validated through Confirmatory Factor Analysis; \* items reversed for scoring; # loading factors (Eigenvalue > 2.5)

**Table 7 – Giving based self-esteem, factor analysis**

<b>Items</b>	<b>Loading</b>	<b>Uniqueness</b>
Giving allows me to be one of the group.	0.5302	0.7189
Giving allows me to make a good impression on others.	0.6854	0.5302
Giving allows me to feel valued by others.	0.7476	0.4411
Giving allows me to feel worthy.	0.6977	0.5132
Giving allows me to feel useful.	0.6302	0.6029
Giving allows me to be proud of myself.	0.8164	0.3335
Giving allows me to be satisfied with myself.	0.8250	0.3193

Note: observations 514; number of item in the scale 7; Cronbach's alpha 0.8664; loading threshold 0.3

**Table 8 - Money based self-esteem, factor analysis**

<b>Items</b>	<b>Loading</b>	<b>Uniqueness</b>
Having money brings out unwanted aspects of my character.	-0.4407	0.8058
Having money hurts my social relationships.	-0.4378	0.8083
Having money allows me to be one of the group.	0.7218	0.4789
Having money allows others to derogate me.	-0.5655	0.6803
Having money allows me to make a good impression on others.	0.7209	0.4803
Having money allows me to feel valued by others.	0.7742	0.4006
Having money damages my positive self-image.	-0.4878	0.7621
While showing to have money, I feel uncomfortable being with others.	0.3022	0.9087
Having money allows me to feel worthy.	0.7886	0.3782
Having money allows me to feel useful.	0.6937	0.5188
Having money allows me to be proud of myself.	0.7898	0.3761
Having money allows me to be satisfied with myself.	0.7431	0.4477

Note: observations 522; number of item in the scale 12; Cronbach's alpha 0.8772; loading threshold 0.3

**Table 9 - Variables description**

<b>Variables</b>	<b>Type</b>	<b>Description</b>
Willingn to Donate	Dummy	Equal to 1 if willing to donate; 0 otherwise
Donation Choice	Dummy	Equal to 1 if actually willing to donate; 0 otherwise
Donation Amount	Continous	Amount of donations in euro
Disease*	Dummy	Treatment: equal to 1 if disease; 0 otherwise
Explicit Death	Dummy	Treatment: equal to 1 if explicit death; 0 otherwise
Implicit Death	Dummy	Treatment: equal to 1 if implicit death; 0 otherwise
Ingroup	Dummy	Treatment: equal to 1 if ingroup recipients; 0 otherwise
Self-Esteem	Continous	Self-esteem score
Self-Esteem High	Dummy	Equal to 1 if high self-esteem; 0 otherwise
Giving Self-Esteem	Continous	Giving-based self-esteem score
Giving Self-Esteem High	Dummy	Equal to 1 if high giving-based self-esteem; 0 otherwise
Money Self-Esteem	Continous	Money-based self-esteem score
Money Self-Esteem High	Dummy	Equal to 1 if high money-based self-esteem; 0 otherwise
Age	Age	
Male	Dummy	Equal to 1 if male; 0 otherwise
Previous Donation	Dummy	Equal to 1 if donated before; 0 otherwise
Closeness to victims	Ordinal	Perceived closeness to campaign's recipients on 10-point scale
Vaccinated	Dummy	Equal to 1 if vaccinated; 0 otherwise
Vaccination effective	Dummy	Opinion about vaccination: equal to 1 if considered effective; 0 otherwise
Vaccination necessary	Dummy	Opinion about vaccination: equal to 1 if considered necessary; 0 otherwise
Vaccination detrimental - yes*	Dummy	Opinion about vaccination: equal to 1 if considered detrimental; 0 otherwise
Vaccination detrimental - no	Dummy	Opinion about vaccination: equal to 1 if not considered detrimental; 0 otherwise
Vaccination detrimental - not know	Dummy	Opinion about vaccination: equal to 1 if not known if detrimental; 0 otherwise
Vaccine children	Dummy	Opinion about vaccination: equal to 1 if intention to vaccinate children; 0 otherwise
Household income	Dummy	Monthly net household income in euro: dummyfied (less than or equal to 1200; between 1400 and 1800; 2000; 2500; 3000*; 4000; 5000 more than or equal to 5000)

Note: \* base group

**Table 10 – Summary statistics**

<b>Characteristics</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>	
Willing to Donate	537	0.325885	0.469141	0	1	
Donation Choice	537	0.098697	0.298532	0	1	
Donation Amount	537	0.489274	2.376714	0	40	
Disease	537	0.428305	0.495295	0	1	
Explicit Death	537	0.277467	0.448167	0	1	
Implicit Death	537	0.294227	0.45612	0	1	
Ingroup	537	0.400372	0.490431	0	1	
Self-Esteem	533	20.80847	4.419163	8	30	
Self-Esteem (dummy)	533	0.532833	0.499389	0	1	
Giving Self-Esteem	530	30.55641	8.637957	7	49	
Giving Self-Esteem (dummy)	530	0.526415	0.499773	0	1	
Money Self-Esteem	521	-2.12685	12.37734	-20	50	
Money Self-Esteem (dummy)	521	0.518234	0.500148	0	1	
Age	532	19.82707	1.552648	18	44	
Male	534	0.490637	0.500381	0	1	
Previous Donation	535	0.691589	0.46227	0	1	
Closeness to victims	420	5.588095	2.094282	1	10	
Vaccination	Vaccinated	517	0.947776	0.222695	0	1
	Vaccination effective	515	0.809709	0.392913	0	1
	Vaccination necessary	516	0.850775	0.356656	0	1
	Vaccination detrimental - yes	514	0.052529	0.223309	0	1
	Vaccination detrimental - no	514	0.702335	0.457677	0	1
	Vaccination detrimental - not known	514	0.245136	0.430587	0	1
	Vaccine children	516	0.844961	0.362293	0	1
Net (monthly) household income	Less than 1200	409	0.0978	0.297407	0	1
	Between 1400 and 1800	409	0.100245	0.300694	0	1
	2000	409	0.129584	0.336257	0	1
	2500	409	0.161369	0.368322	0	1
	3000	409	0.176039	0.38132	0	1
	4000	409	0.151589	0.359062	0	1
	5000	409	0.056235	0.230657	0	1
More than 5000	409	0.127139	0.333537	0	1	

**Table 11 – Sample composition by treatment**

<b>Treatments</b>	<i>Frequency</i>	<i>Percentage</i>	<b>Ingroup/ Outgroup</b>	<i>Frequency</i>	<i>Percentage</i>
Disease	230	42.83	Outgroup	112	52.09
			Ingroup	118	47.91
Explicit Death	149	27.75	Outgroup	183	85.12
			Ingroup	32	14.88
Implicit Death	158	29.42	Outgroup	135	62.79
			Ingroup	80	37.21

**Table 12 – Dependent variables, sample statistics by treatment**

	<b>DEPENDENT VARIABLES</b>	<b>DISEASE</b>			<b>EXPLICIT DEATH</b>			<b>IMPLICIT DEATH</b>		
		<b>Obs</b>	<b>Mean</b>	<b>St. Dev.</b>	<b>Obs</b>	<b>Mean</b>	<b>St. Dev.</b>	<b>Obs</b>	<b>Mean</b>	<b>St. Dev.</b>
<b>Outgroup</b>	WTD (dummy)	127	0.173228	0.379943	117	0.358974	0.481763	78	0.461539	0.501745
	Donation Choice (dummy)	127	0.11811	0.324017	117	0.102564	0.304694	78	0.051282	0.222
	Donation Amount	127	0.792126	3.905401	117	0.444872	2.07395	78	0.238462	1.2849
<b>Ingroup</b>	WTD (dummy)	103	0.504854	0.502421	32	0.28125	0.456803	80	0.175	0.382364
	Donation Choice (dummy)	103	0.165049	0.37304	32	0.03125	0.176777	80	0.05	0.21932
	Donation Amount	103	0.626214	1.674079	32	0.15625	0.883884	80	0.274875	1.349522

**Table 13 – Giving choices dummies: Willing to Donate and Donation Choice, frequency and percentage**

<b>TREATMENTS</b>		<b>DEPENDENT VARIABLES</b>			
		<b>WTD (dummy)</b>		<b>DONATION CHOICE</b>	
		Frequency	Percentage	Frequency	Percentage
DISEASE	Ingroup	52	49.05	17	16.04
	Outgroup	22	20.75	15	14.16
EXPLICIT DEATH	Ingroup	9	14.06	1	1.56
	Outgroup	42	65.63	12	18.75
IMPLICIT DEATH	Ingroup	14	24.14	4	6.90
	Outgroup	36	62.06	4	6.90

*Note: percentage is calculated to the number of participants in each treatment*

**Table 14 – Donation Choice composition**

<b>TREATMENTS</b>		<b>DONATION CHOICE</b>			
		<b>WTD==1 &amp; DC == 1</b>		<b>WTD==0 &amp; DC == 1</b>	
		Frequency	Percentage	Frequency	Percentage
DISEASE	Ingroup	17	16.04	0	0
	Outgroup	13	12.27	2	1.89
EXPLICIT DEATH	Ingroup	1	1.56	0	0
	Outgroup	8	12.5	4	6.25
IMPLICIT DEATH	Ingroup	4	4.44	0	0
	Outgroup	4	5.13	0	0

**Table 15 - Ingroup bias in base group (Disease), t-test**

<b>VARIABLE</b>	<b>Outgroup</b>				<b>Ingroup</b>				<b>Outgroup = Ingroup</b>	
	Obs	Mean	Std. Err.	Std. Dev.	Obs	Mean	Std. Err.	Std. Dev.	DIFFERENCE	t-test (p-value)
WTD	127	0.173228	0.033715	0.379943	103	0.504854	0.049505	0.502421	0.331626	0.0000
DONATION CHOICE	127	0.11811	0.028752	0.324017	103	0.165049	0.036757	0.37304	0.0469383	-
DONATION AMOUNT	127	0.792126	0.346548	3.905401	103	0.626214	0.164952	1.674079	-0.1659124	-

Note: this table compares the base group means of the three dependent variables along ingroup and outgroup. In the last two columns, I report the difference that measures ingroup bias and results of the t-test.

**Table 16 - Ingroup bias in base group (Disease), Wilcoxon-Mann-Whitney test**

<b>VARIABLE</b>	<b>Outgroup</b>			<b>Ingroup</b>			<b>Outgroup = Ingroup</b>	
	Obs	Rank Sum	Expected	Obs	Rank Sum	Expected	z	Prob >  z
WTD	127	12499.5	14668.5	103	14065.5	11896.5	-5.342	0.0000
DONATION CHOICE	127	14361.5	14668.5	103	12203.5	11896.5	-1.021	0.3074
DONATION AMOUNT	127	14369.5	14668.5	103	12195.5	11896.5	-0.99	0.3219

Note: this table reports the results of the Wilcoxon-Mann-Whitney test for the base group.

**Table 17 - Linear Probability model: Dep. Var. is Willing to Donate**

VARIABLES	WTD	WTD	WTD	WTD	WTD	WTD	WTD	WTD	WTD
	Ingroup	Outgroup	Ingroup	Outgroup	Ingroup	Outgroup	Ingroup	Outgroup	Outgroup
Explicit Death	-0.958** (0.440)	0.983*** (0.304)	-0.921** (0.468)	1.310*** (0.327)	-1.041** (0.481)	1.016*** (0.373)	-2.032*** (0.745)	0.966* (0.505)	
Implicit Death	-1.570*** (0.354)	1.409*** (0.326)	-1.607*** (0.384)	1.629*** (0.352)	-1.586*** (0.391)	1.304*** (0.393)	-1.153* (0.648)	1.231** (0.533)	
Self-Esteem	NO	NO	YES	YES	YES	YES	YES	YES	YES
Demographic Characteristics	NO	NO	NO	NO	YES	YES	YES	YES	YES
Previous Donation	NO	NO	NO	NO	NO	NO	YES	YES	YES
Closeness To Victims	NO	NO	NO	NO	NO	NO	YES	YES	YES
Vaccination	NO	NO	NO	NO	NO	NO	YES	YES	YES
Household Income	NO	NO	NO	NO	NO	NO	YES	YES	YES
Observations	215	322	205	309	204	305	120	187	
<i>EXPLICIT. DEATH = IMPLICIT DEATH</i>	<i>p = 0.2129</i>	<i>p = 0.1534</i>	<i>p = 0.1859</i>	<i>p = 0.3133</i>	<i>p = 0.3118</i>	<i>p = 0.3733</i>	<i>p = 0.3044</i>	<i>p = 0.5873</i>	

Note: dependent variable is willingness to donate (dummy) to charity recipients. This table shows the estimates of logistic regressions testing whether explicit and implicit death priming affect subjects' willingness to donate (dummy) to recipients either belonging to subjects' ingroup (WTD<sub>I</sub> - first column) or outgroup (WTD<sub>O</sub> - second column). In third and fourth columns, I control for the level of self-esteem, giving based and money based self-esteems, while the remaining columns add all the other controls to verify robustness of the estimates. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



**Table 18 - Ingroup bias. Dep. Var. is Willing to Donate**

<b>VARIABLES</b>	<b>WTD Ingroup</b>	<b>WTD Outgroup</b>	<b>DIFFERENCE</b>	<b>Wald Test (Prob &gt; chi2)</b>
Explicit Death	-0.958** (0.440)	0.983*** (0.304)	-1.941	0.0000
Implicit Death	-1.570*** (0.354)	1.409*** (0.326)	-2.979	0.0001
Observations	215	322		

Note: dependent variable is willingness to donate (dummy) to charity recipients. This table shows the size of the ingroup bias (third column), induced by the two mortality manipulations (Explicit Death and Implicit Death). Ingroup bias is here measured as the difference between the estimated coefficients. Results of the postestimation Wald test are displayed in the last column. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 19 – Ingroup bias and controls. Dep. Var. is Willing to Donate**

<b>VARIABLES</b>	<b>WTD Ingroup</b>	<b>WTD Outgroup</b>	<b>DIFFERENCE</b>	<b>Wald Test (Prob &gt; chi2)</b>
Explicit Death	-2.032*** (0.745)	0.966* (0.505)	-2.998	0.0004
Implicit Death	-1.153* (0.648)	1.231** (0.533)	-2.384	0.0033
Self-Esteem	YES	YES		
Demographic Characteristics	YES	YES		
Previous Donation	YES	YES		
Closeness To Victims	YES	YES		
Vaccination	YES	YES		
Household Income	YES	YES		
Observations	120	187		

Note: dependent variable is willingness to donate (dummy) to charity recipients. This table checks the robustness of the estimated ingroup bias (third column), induced by the two mortality manipulations (Explicit Death and Implicit Death) to the inclusions of controls. Ingroup bias is here measured as the difference between the estimated coefficients. Results of the postestimation Wald test are displayed in the last column. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 20 - Interaction effects (Implicit Death/Self-esteem dummies) on Willing to Donate plus demographic controls**

INTERACTIONS	VARIABLES	WTD	WTD	WTD	WTD	WTD	WTD
		Ingroup	Outgroup	Ingroup	Outgroup	Ingroup	Outgroup
	EXPLICIT DEATH	-0.986** (0.481)	0.920** (0.365)	-0.954** (0.473)	0.946** (0.368)	-0.944** (0.473)	0.927** (0.364)
<b>IMPLICIT DEATH</b>							
Control / Self-esteem High	CONTR./SE_High	-1.332*** (0.388)	-0.154 (0.319)				
Implicit Death / Self-esteem Low	ID/SE_Low	-2.147*** (0.543)	1.263** (0.495)				
Implicit Death / Self-esteem High	ID/SE_High	-2.402*** (0.546)	1.030** (0.461)				
	SEG_High	0.466 (0.347)	0.826*** (0.277)				
	SEM_High	-0.658* (0.350)	-0.195 (0.270)				
	CONTR./SE_High = ID/SE_High	<i>p</i> = <b>0.0416</b>	<i>p</i> = <b>0.0129</b>				
	ID/SE_Low = ID/SE_High	<i>p</i> = <b>0.6873</b>	<i>p</i> = <b>0.6419</b>				
Control / Giving Self-esteem High	CONTR./SEG_High			0.376 (0.384)	0.926*** (0.334)		
Implicit Death / Giving Self-esteem Low	ID/SEG_Low			-1.883*** (0.628)	1.400*** (0.502)		
Implicit Death / Giving Self-esteem High	ID/SEG_High			-1.134** (0.515)	2.000*** (0.526)		
	SE_High			-1.064*** (0.333)	-0.170 (0.267)		
	SEM_High			-0.626* (0.345)	-0.194 (0.270)		
	CONT/SEG_High = ID/SEG_High			<i>p</i> = <b>0.0035</b>	<i>p</i> = <b>0.0201</b>		
	ID/SEG_Low = ID/SEG_High			<i>p</i> = <b>0.2872</b>	<i>p</i> = <b>0.2179</b>		
Control / Money Self-esteem High	CONTR./SEM_High					-0.685* (0.391)	-0.311 (0.321)
Implicit Death / Money Self-esteem Low	ID/SEM_Low					-1.788*** (0.544)	1.040** (0.472)
Implicit Death / Money Self-esteem High	ID/SEM_High					-2.202*** (0.554)	1.114** (0.486)
	SE_High					-1.068*** (0.334)	-0.182 (0.267)
	SEG_High					0.457 (0.344)	0.826*** (0.276)
	CONT/SEM_High = ID/SEM_High					<i>p</i> = <b>0.0067</b>	<i>p</i> = <b>0.0027</b>
	ID/SEM_Low = ID/SEM_High					<i>p</i> = <b>0.5450</b>	<i>p</i> = <b>0.8789</b>
	Observations	204	305	204	305	204	305

Note: dependent variable is willingness to donate (dummy) to charity recipients. This table delivers interaction effects of Implicit Death priming and self-esteem dummies on Willing to Donate. I display interactions with high self-esteem in the upper part of the table, and with high giving and money based self-esteems in the medium and bottom parts respectively. Below each group of interactions, I report the results of the postestimation Wald test. Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Appendix A

---



UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA

DIPARTIMENTO DI SCIENZE  
ECONOMICHE E AZIENDALI  
"MARCO FANNO"

## Anonymous Questionnaire

We kindly ask you to answer anonymously to some simple and brief questions for scientific research purposes.

If you have any questions or concerns, please raise your hand. The responsible of the initiative will answer your questions individually.

Thank You again for Your cooperation.

1 - Gender:  M  F

2 - Age: \_\_\_\_\_

3 – Class:

I year TrEc (Economics)		I year BA	
I year TrEc (Economics and Management)		II year BA	
II year TrEc (Economics)		I year MEF	
II year TrEc (Economics and Management)		II year MEF	
III year TEM		I year MED	
III year ECI		II year MED	

Please indicate the year and the course you are enrolled in if different from the alternatives displayed above:

---

4a – Province of residence: \_\_\_\_\_

4b – Province of origin: \_\_\_\_\_

5 – Please, indicate which amount is closest to the net monthly income of your family (*sum up the total of income from all the members of the family*). I must remind you that this test is absolutely **anonymous** and the data given will only be used for scientific research. (Just one answer)

- |   |   |
|---|---|
| <input type="checkbox"/> Less than 800 euro | <input type="checkbox"/> 2.000 euro           |
| <input type="checkbox"/> 800 euro           | <input type="checkbox"/> 2.500 euro           |
| <input type="checkbox"/> 1000 euro          | <input type="checkbox"/> 3.000 euro           |
| <input type="checkbox"/> 1.200 euro         | <input type="checkbox"/> 4.000 euro           |
| <input type="checkbox"/> 1.400 euro         | <input type="checkbox"/> 5.000 euro           |
| <input type="checkbox"/> 1.600 euro         | <input type="checkbox"/> More than 5.000 euro |
| <input type="checkbox"/> 1.800 euro         |   |

6 – Have you ever donated before? (We mean any type of donation: money, time - volunteering, blood, other).

Yes

No

***Please, answer to the following questions (7-11) only if your reply to the previous question (6) is "Yes".***

7 – What is the nature of your donation(s)? (You are allowed to mark more than one option).

- |  |                                |
|--|--------------------------------|
| <input type="checkbox"/> Money               | <input type="checkbox"/> Blood |
| <input type="checkbox"/> Time (Volunteering) | <input type="checkbox"/> Other |

8a – When have you donated the last time?

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Few days ago             | <input type="checkbox"/> One month ago          | <input type="checkbox"/> Less than six months ago |
| <input type="checkbox"/> More than six months ago | <input type="checkbox"/> More than one year ago |   |

8b – How frequently do you use to donate?

Monthly – at least one donation a month

Occasionally – more than one donation a year without a precise frequency

Yearly – at least one donation a year

Seldom – less than one donation a year

***Please, answer to the following questions (9a-11) only if you have donated money before (you marked the option “money” in question 6).***

9a – How much have you donated (in euro) the last time? € \_\_\_\_\_

9b – What is the average amount (in euro) of your donations? € \_\_\_\_\_

10 – Have you donated to Unicef before?

Yes

No

11 – Have you donated to other organizations before?

Yes Name of the organization: \_\_\_\_\_

No

12– On a scale from 1 to 10 (where 1 is the lowest and 10 the highest values), how much do you feel close to the people in need that this campaign is meant to help?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

13a – Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

<b>STATEMENT</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
I feel that I'm a person of worth, at least on an equal plane with others				
I feel that I have a number of good qualities				
All in all, I am inclined to feel that I am a failure				
I am able to do things as well as most other people				
I feel I do not have much to be proud of				
I take a positive attitude toward myself				
On the whole, I am satisfied with myself				
I wish I could have more respect for myself				
I certainly feel useless at times				
At times I think I am no good at all				

13b – Now, in the two following tables, you are asked to indicate how strongly you agree or disagree with each statement, by marking the number corresponding to your choice on a 7-point scale, ranging between 1 (“Stronly Disagree”) and 7 (“Stronly Agree”).

STATEMENT	Strongly Agree				Strongly Disagree		
	1	2	3	4	5	6	7
Giving brings out unwanted aspects of my character	1	2	3	4	5	6	7
Giving hurts my social relationships	1	2	3	4	5	6	7
Giving allows me to be part of a group	1	2	3	4	5	6	7
Giving allows others to derogate me	1	2	3	4	5	6	7
Giving allows me to make a good impression on others	1	2	3	4	5	6	7
Giving allows me to feel valued by others	1	2	3	4	5	6	7
Giving damages my positive self-image	1	2	3	4	5	6	7
While giving, I feel uncomfortable being with others	1	2	3	4	5	6	7
Giving allows me to feel worthy	1	2	3	4	5	6	7
Giving allows me to feel useful	1	2	3	4	5	6	7
Giving allows me to be proud of myself	1	2	3	4	5	6	7
Giving allows me to be satisfied with myself	1	2	3	4	5	6	7

STATEMENT	Strongly Agree							Strongly Disagree						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Having money brings out unwanted aspects of my character	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Having money hurts my social relationships	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Having money allows me to be part of a group	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Having money allows others to derogate me	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Having money allows me to make a good impression on others	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Having money allows me to feel valued by others	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Having money damages my positive self-image	1	2	3	4	5	6	7	1	2	3	4	5	6	7
While showing to have money, I feel uncomfortable being with others	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Having money allows me to feel worthy	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Having money allows me to feel useful	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Having money allows me to be proud of myself	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Having money allows me to be satisfied with myself	1	2	3	4	5	6	7	1	2	3	4	5	6	7



***In the following questions, you will be asked to express your opinion about vaccination.***

14a – Have you been vaccinated?

Yes  I don't know - I prefer not to answer

No

14b – Do you believe that vaccination is necessary?

Yes  I don't know - I prefer not to answer

No

14c – Do you believe that vaccines are effective?

Yes  I don't know - I prefer not to answer

No

14d – Do you believe that vaccines are damaging?

Yes  I don't know - I prefer not to answer

No

14e – If you had children, would you vaccinate them?

Yes  I don't know - I prefer not to answer

No

***Please, answer to the following questions (15) only if you have decided to not donate.***

15 – Why have you decided to not contribute with a donation?

I have not enough cash

I do not believe in charity donations

I do not trust charities

I think that vaccines are detrimental to health

Other:

## Appendix B - Treatments<sup>5</sup>

---

### B1. ED-Outgroup (Explicit Death/Outgroup recipients)



# Campagna Raccolta Fondi

## *“Insieme contro la MORTE”*

Dipartimento Scienze Economiche ed Aziendali  
«Marco Fanno»  
9 Dicembre 2015



### Chi vogliamo aiutare? Perché?

- Ogni anno milioni di bambini **muiono** a causa di malattie che si possono prevenire con un semplice vaccino.
- Polio, pertosse, morbillo, difterite e tetano ogni anno sono **letali** per i bambini che vivono in paesi dove conflitti, povertà e mancanza di infrastrutture ostacolano interventi sanitari concreti.
- Questi **decessi** si concentrano prevalentemente in Yemen, Sud Sudan, Repubblica Democratica del Congo, Ciad, Angola e Nigeria.



---

<sup>5</sup> For an English version of the treatments material, please send an e-mail to: [patrizia.malaspina@studenti.unipd.it](mailto:patrizia.malaspina@studenti.unipd.it)

## Perché vaccinare?



- Nuovi vaccini sono stati introdotti e vogliamo cogliere l'occasione di distribuirli a tutti i bambini che ne hanno bisogno e che rischiano di **morire**.
- Il mondo è ad un passo dalla sconfitta definitiva della poliomelite: da più di 300.000 affezioni l'anno all'inizio degli anni '90 a solo 224 casi nel 2012.



## Perché vaccinare?



- Negli ultimi 20 anni, grazie all'impegno di UNICEF, la percentuale dei bambini vaccinati è arrivata all' 80%. Adesso salviamoli tutti!
- L'immunizzazione contro l'insorgere di **malattie letali** rappresenta la strategia di lotta contro la **morte insensata** più efficace ed efficiente non solo per evitare milioni di **decessi** ma anche per scongiurare inutili e brutali sofferenze.



## Come li salviamo dalla MORTE?



Il Tuo sostegno avvierà il percorso che porterà alla vaccinazione di un bambino.

### Come?

1. Il Tuo contributo verrà raccolto e custodito dai volontari del comitato UNICEF di Padova.
2. Terminata la raccolta, le forniture di vaccini acquistate con il Tuo aiuto saranno spedite da Copenaghen in appositi contenitori a temperatura controllata nelle aree in cui vi è ancora necessità.
3. Una volta giunti al Paese di destinazione, il viaggio continua su qualunque mezzo: barche, treni, jeep, biciclette, asini o cammelli. Per raggiungere i bambini nelle aree più remote si devono percorrere molti chilometri a piedi.
4. Al fianco delle famiglie, il personale medico volontario somministrerà i vaccini ai bambini che ne hanno ancora bisogno.

## Transparency



### Voglio essere informato!

Informazioni dettagliate riguardo

**l' esito della campagna e l' ammontare di fondi raccolti**

saranno rese disponibili dai docenti sulla

[piattaforma Moodle](#)

non appena la campagna sarà terminata.

## Come donare?

Donare non è mai stato  
così semplice!



La raccolta avverrà in due fasi.

### Fase 1.

- Oggi vi viene semplicemente richiesto di **dichiarare in forma anonima** sul foglio che vi verrà consegnato l'ammontare della **vostra donazione**. Si tratta di una donazione libera, quindi potete scegliere qualsiasi somma preferiate.

Donare è una scelta individuale, vi chiediamo dunque di non consultarvi nel formulare la vostra decisione.

- Una volta compilato, piegate il foglio e riponetelo nell'urna «Vorrei donare» che i volontari vi mostreranno.

Questo contributo non implica alcun impegno riguardo future donazioni.

## Come donare?

Donare non è mai stato  
così semplice!



### Fase 2.

- Oggi vi verrà consegnata una **busta** (che potete portare a casa), nella quale vi chiediamo di **riporre la somma che avete dichiarato** di voler donare nel foglio mostrato nella slide precedente.
- Domani, i volontari dell'**UNICEF** raccoglieranno le buste contenenti le vostre donazioni **di fronte agli edifici dove si terranno le lezioni**.





## IL SURVEY!



Oggi, in concomitanza con questa campagna, verranno raccolti dati in forma rigorosamente anonima sui soggetti che hanno preso parte a questa iniziativa.

I dati verranno utilizzati in una **ricerca scientifica**  
in collaborazione con UNICEF.

Al termine della prima fase della raccolta fondi, vi verrà consegnato un **questionario anonimo**.

Affinché i dati raccolti possano essere utilizzabili per scopi di ricerca scientifica, è importante che prestate la massima attenzione alle istruzioni e alle domande che vi verranno sottoposte e che rispondiate accuratamente ad ognuna di esse con la massima serietà.

Una volta compilato, piegate e riponete il questionario nell'apposito box.



## “Insieme contro la MORTE”




CI STIAMO IMPEGNANDO  
PER SALVARE I BAMBINI DALLA **MORTE**.

**SOSTIENICI ANCHE TU!**


ANCHE UN PICCOLO CONTRIBUTO FARA' LA DIFFERENZA.

## B2 - ED-Ingroup (Explicit Death/Ingroup recipients)<sup>6</sup>


Chi vogliamo aiutare?  
Perché?

unicef 


- Ogni anno milioni di bambini **muoiono** a causa di malattie che si possono prevenire con un semplice vaccino.
- Polio, pertosse, morbillo, difterite e tetano ogni anno sono **letali** per i bambini che vivono in paesi dove conflitti, povertà e mancanza di infrastrutture ostacolano interventi sanitari concreti.
- Questi **decessi** si concentrano prevalentemente in Yemen, Sud Sudan, Repubblica Democratica del Congo, Ciad, Angola e Nigeria.



Perché vaccinare?

unicef 

- Nuovi vaccini sono stati introdotti e vogliamo cogliere l'occasione di distribuirli a tutti i bambini che ne hanno bisogno e che rischiano di **morire**.
- Il mondo è ad un passo dalla sconfitta definitiva della poliomelite: da più di 300.000 affezioni l'anno all'inizio degli anni '90 a solo 224 casi nel 2012.



<sup>6</sup> I report only the slides that are varied to operationalize ingroup bias. Instructions are the same in all the treatments.

## Perché vaccinare?



- Negli ultimi 20 anni, grazie all'impegno di UNICEF, la percentuale dei bambini vaccinati è arrivata all' 80%. Adesso salviamoli tutti!
- L'immunizzazione contro l'insorgere di **malattie letali** rappresenta la strategia di lotta contro la **morte insensata** più efficace ed efficiente non solo per evitare milioni di **decessi** ma anche per scongiurare inutili e brutali sofferenze.



## “Insieme contro la MORTE”



CI STIAMO IMPEGNANDO  
PER SALVARE I BAMBINI DALLA **MORTE.**

**SOSTIENICI ANCHE TU!**

ANCHE UN PICCOLO CONTRIBUTO FARA' LA DIFFERENZA.



### B3 - DE-Outgroup (Disease/ Outgroup recipients)<sup>7</sup>

#### ID-Outgroup (Implicit Death/ Outgroup recipients)



## Campagna Raccolta Fondi

# “Insieme contro la MALATTIA”

Dipartimento Scienze Economiche ed Aziendali  
«Marco Fanno»  
9 Dicembre 2015



### Chi vogliamo aiutare? Perché?

- Ogni anno milioni di bambini si **ammalano** a causa di malattie che si possono prevenire con un semplice vaccino.
- Polio, pertosse, morbillo, difterite e tetano ogni anno sono **rischiose** per i bambini che vivono in paesi dove conflitti, povertà e mancanza di infrastrutture ostacolano interventi sanitari concreti.
- Queste **patologie** si concentrano prevalentemente in Yemen, Sud Sudan, Repubblica Democratica del Congo, Ciad, Angola e Nigeria.



<sup>7</sup> I report only the slides that are varied to manipulate death priming. Instructions are the same in all the treatments.

## Perché vaccinare?



- Nuovi vaccini sono stati introdotti e vogliamo cogliere l'occasione di distribuirli a tutti i bambini che ne hanno bisogno e che rischiano di **ammalarsi**.
- Il mondo è ad un passo dalla sconfitta definitiva della poliomelite: da più di 300.000 affezioni l'anno all'inizio degli anni '90 a solo 224 casi nel 2012.



## Perché vaccinare?



- Negli ultimi 20 anni, grazie all'impegno di UNICEF, la percentuale dei bambini vaccinati è arrivata all' 80%. Adesso salviamoli tutti!
- L'immunizzazione contro l'insorgere di **malattie** rappresenta la strategia di lotta contro **queste patologie** più efficace ed efficiente non solo per evitare milioni di **affezioni** ma anche per scongiurare inutili e brutali sofferenze.





## “Insieme contro la MALATTIA”



CI STIAMO IMPEGNANDO  
PER SALVARE I BAMBINI DALLA **MALATTIA**.

**SOSTIENICI ANCHE TU!**

ANCHE UN PICCOLO CONTRIBUTO FARA' LA DIFFERENZA.

### **B4 - DE-Ingroup (Disease/ Ingroup recipients)**

#### **ID-Ingroup (Implicit Death/ Ingroup recipients)**

Chi vogliamo  
aiutare?  
Perché?



- Ogni anno milioni di bambini si **ammalano** a causa di malattie che si possono prevenire con un semplice vaccino.
- Polio, pertosse, morbillo, difterite e tetano ogni anno sono **rischiose** per i bambini che vivono in paesi dove conflitti, povertà e mancanza di infrastrutture ostacolano interventi sanitari concreti.
- Queste **patologie** si concentrano prevalentemente in Yemen, Sud Sudan, Repubblica Democratica del Congo, Ciad, Angola e Nigeria.





## Perché vaccinare?



- Nuovi vaccini sono stati introdotti e vogliamo cogliere l'occasione di distribuirli a tutti i bambini che ne hanno bisogno e che rischiano di **ammalarsi**.
- Il mondo è ad un passo dalla sconfitta definitiva della poliomelite: da più di 300.000 affezioni l'anno all'inizio degli anni '90 a solo 224 casi nel 2012.



## Perché vaccinare?



- Negli ultimi 20 anni, grazie all'impegno di UNICEF, la percentuale dei bambini vaccinati è arrivata all' 80%. Adesso salviamoli tutti!
- L'immunizzazione contro l'insorgere di **malattie** rappresenta la strategia di lotta contro **queste patologie** più efficace ed efficiente non solo per evitare milioni di **affezioni** ma anche per scongiurare inutili e brutali sofferenze.





# “Insieme contro la MALATTIA”



CI STIAMO IMPEGNANDO  
PER SALVARE I BAMBINI DALLA **MALATTIA.**

**SOSTIENICI ANCHE TU!**

ANCHE UN PICCOLO CONTRIBUTO FARA' LA DIFFERENZA.