Economics of Corruption and Crime:
An Interdisciplinary Approach to Behavioral Ethics

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Dedicated to my parents Galina and Leonid Dimant

and

my beloved ones.

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Confirmation of co-authorship: *"With my signature, I confirm that Eugen Dimant has contributed at least the equivalent effort of 1/n to the paper that I have co-authored (with n denoting the number of authors on the respective paper)."*

Chapter	Project Name	Total Number of Authors	Name of Co-Author(s)	Signature of Co-Authors	Published in a Peer-Reviewed Journal[1]
1	The Nature of Corruption: An Interdisciplinary Perspective	2	Thorben Schulte		✓
2.1	The Effect of Corruption on Migration, 1985-2000	3	Tim Krieger		✓
			Daniel Meierrieks		
2.2	A Crook is a Crook … But is He Still a Crook Abroad? On the Effect of Immigration on Destination-Country Corruption	3	Tim Krieger		✓
			Margarete Redlin		
3.1	On Peer Effects: Behavioral Contagion of (Un)Ethical Behavior and the Role of Social Identity	1	-	-	
3.2	Tax Evasion Revised: Surprising Experimental Evidence on the Role of Principal Witness Regulations and Difference in Gender Attitudes	3	Johannes Buckenmaier		
			Luigi Mittone		

[1] At the time of this dissertation's submission.

INTRODUCTION

Due to its adverse nature, the study of illicit behavior has taken a center stage in current economic research. Illicit behavior can take various forms, such as corruption, fraud, and tax evasion, but they are all generally detrimental to both society and economy, and hamper our social lives. Understanding the drivers of illicit behavior and how they interrelate with institutional factors not only draws a clearer picture of how and why individuals behave in illegitimate ways, but also how they facilitate the creation and implementation of more efficient and effective policy measures. These motivations are at the heart of this dissertation.

The collection of scientific works in this dissertation build upon an interdisciplinary approach. By applying survey techniques, empirical investigations of observational data, as well as experimental methodology, the research presented here sheds light on topics related to the economics of crime and corruption. I employ the encompassing term *behavioral ethics* to stress the fact that my research gives priority to assessing the drivers and consequences of individual decision-making in (un)ethical settings. I follow Bazerman and Gino (2012, p. 85) in defining the term behavioral ethics as "the study of systematic and predictable ways in which individuals make ethical decisions and judge the ethical decisions of others when these decisions are at odds with intuition and the benefits of the broader society." I expand this perspective by enriching the discussion on decision-making within the unethical sphere, and contribute to a broader understanding of (un)ethical behavior.

A total of five papers are arranged according to their topic in three distinct chapters. The structure of this dissertation follows a *macro-to-micro* approach, which is conducive to leading a comprehensive discussion on illicit behavior. The order in which my research projects are discussed in this dissertation transitions from a high-level approach to a concise behavioral investigation at the individual level. To set the stage, I first discuss the status-quo of existing theories and empirical research on the drivers of illicit behavior with a particular focus, but not limited to, corruption, before investigating the interrelation between illicit behavior and institutional environments employing empirical techniques of observational data analyzing the bilateral interdependence between corruption and migration. I complete

the picture with a narrow microanalysis on the individual drivers of illicit behavior with a particular focus on behavioral spillovers.

In more detail, Chapter 1 deals with the general overview and discussion of the economics of corruption from an interdisciplinary perspective (Dimant & Schulte, forthcoming). Corruption, as the predominant part of organized crime, has fierce impacts on economic and societal development, with estimates suggesting the direct cost from corruption to exceed $1 trillion on a global scale (Transparency International, 2011a). As Gire (1999, p. 1) explains it, "corruption is one of the most dangerous social ills of any society. This is because corruption, like a deadly virus, attacks the vital structures that make for society's progressive functioning, thus putting its very existence into serious peril." By definition, corruption represents a hidden action distending under the surface of our daily life, rendering reliable estimates of its magnitude and pervasiveness nearly impossible. Nonetheless, and to the best of our knowledge, corruption has soaked through entire parts of society and the economy, both in subliminal and pervasive forms (cf. Rose-Ackerman & Soreide (2011)). It also has become a more publicly discussed topic due to increased media coverage, recently driven by the FIFA corruption scandals and exposed cases of performance enhancing drugs in professional sports (Dimant & Deutscher (2015)). Consequently, in order to understand the bigger picture of corruption it is important to break the underlying mechanisms down into antecedents and effects of corruption at the micro, meso, and macro level. This represents this chapter's paper, arguing that only the consideration of rational and behavioral aspects, as well as sociological, criminological, and institutional factors and their interaction paints us a comprehensive picture of why, how, and to what extent, individuals engage in illicit behavior in general and corrupt behavior in particular.

In Chapter 2, the empirical analyses of observational data shed light on the impact of corrupt institutional environments on migration decisions as well as on the reverse link that is the impact of immigration on destination country's corruption levels. In the paper by Dimant, Krieger & Meierrieks (2013) discussed in Chapter 2.1, we shed light on the role of corruption in triggering emigration flows from corruption-ridden countries. We examine the influence of corruption on migration for 111 countries between 1985 and 2000. Robust evidence indicates that corruption is among the push factors of migration, especially fueling

skilled migration. We argue that corruption tends to diminish the returns to education, which is particularly relevant to the better educated. In a second step, in the research project by Dimant, Krieger & Redlin (2015) discussed in Chapter 2.1, we capitalize on a comprehensive dataset consisting of annual immigration stocks of OECD countries from 207 countries of origin for the period 1984–2008 in order to explore different channels through which corruption might migrate. By employing a wide range of different estimation methods and econometric specifications to ensure the robustness of our results, we consistently find that while general migration has an insignificant effect on the destination country's corruption level, immigration from corruption-ridden origin countries boosts corruption in the destination country. Our findings not only provide a more profound understanding of the socio-economic implications associated with migration flows, but also bear important implications from a policy perspective.

Chapter 3 closes with two experimental studies investigating the mechanism of behavioral contagion and the role of both social identification and exposure to peer behavior in mediating behavioral spillovers, as well as tax evasion behavior within the institutional framework of a crown witness regulation. In particular, in the research project by Dimant (2015) of Chapter 3.1, light is shed on the mechanism of behavioral spillovers in the realm of (un)ethical behavior. Social interactions and the resulting peer effects loom large in both economic and social con-texts. This is particularly true for the spillover of (un)ethical behavior in explaining how behavior and norms spread across individual people, neighborhoods, or even cultures. Although we under-stand and observe the outcomes of such contagion effects, little is known about the drivers and the underlying mechanisms, especially with respect to the role of social identity with one's peers and the (un)ethicality of behavior one is exposed to. We use a variant of a give-or-take dictator game to shed light on these aspects in a con-trolled laboratory setting. Our experiment contributes to the existing literature in two ways: first, using a novel approach of inducing social identification with one's peers in the lab, our design allows us to analyze the spillover-effects of (un)ethical behavior under varied levels of social identification. Second, we study whether contagion of ethical behavior differs from contagion of unethical behavior. Our results suggest that a) unethical behav-

ior is more contagious, and b) social identification with one's peers and not the (un)ethicality of observed behavior is the main driver of behavioral contagion. Our findings are particularly important from a policy perspective both in order to foster pro-social and mitigate deviant behavior. Finally, in the research project by Mittone, Buckenmaier & Dimant (2015) of Chapter 3.2, we experimentally investigate indirect tax evasion that requires the cooperation of an intermediary. We explore the effectiveness of the introduction of a crown witness regulation as a means to facilitate tax compliance. Reactions show a significant drop in tax compliance that, surprisingly, is vastly different across gender with the effect being mainly driven by women. As a result, women decrease their tax compliance significantly reaching an even lower level than men, who in turn do not react to the institutional change.

Each project discussed in this dissertation provides a unique set of contributions to existing research. That is, Chapter 1 not only presents the first state-of-the-art discussion of corrupt behavior from an interdisciplinary perspective, but also indulges in a novel discussion of new and conflicting empirical evidence on the antecedents and effects of corruption published during the last decade. Moreover, the papers in Chapter 2 are the first of its kind to empirically investigate the interrelation between corruption and migration decisions, which has triggered a number of follow-up research studies. Finally, the experimental studies in Chapter 3 employ novel settings and approaches both to study tax evasion in an environment of strategic interaction and to induce salient and varying degrees of social identification in the lab in order to assess peer effects in (un)ethical behavior. Overall, the research projects presented here draw on unprecedented empirical data and innovative experimental techniques to contribute from both the methodological and content perspective.

CHAPTER 1: SURVEY

THE NATURE OF CORRUPTION: AN INTERDISCIPLINARY PERSPECTIVE[¶]

Eugen Dimant*, Thorben Schulte**

ABSTRACT:

In response to the many facets of corruption, many scholars have produced interdisciplinary research from both the theoretical and empirical perspective. This paper provides a comprehensive state-of-the-art survey of existing literature on corruption, utilizing these interdisciplinary insights. Specifically, we shed light on corruption research including insights from, among others, the fields of economics, psychology, and criminology. Our systematic discussion of the antecedents and effects of corruption at the micro, meso, and macro level allows us to capture the big picture of not only what drives corrupt behavior, but also its substantial ramifications.

KEYWORDS: Bribery; Corruption; Development; Interdisciplinary; Survey

JEL CLASSIFICATION: D73; O17; K42

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1.1 Introduction

Over the last decades, research on corruption—especially on the economic assessments and detrimental effects of its antecedents and detrimental effects has accelerated and corruption has become an established focal point on political agendas. Swelling media coverage, the inception of anti-corruption institutions and anti-corruption laws, and the availability of both micro and macro data has facilitated the visibility of corruption and its adverse effects. Consequently, today's increasingly sensitized society has put pressure on governmental bodies to put this topic on the agenda of politicians to find means and ways to fight the spread of corruption. Now more than ever, scholars have a better understanding of corruption's mechanism due to the availability of better data giving rise to more eclectic measures.

Corruption is considered one of the biggest threats to humanity in both developing and developed countries because it distorts economic growth (Aidt (2011), Johnson & LaFountain (2011)) lowers foreign direct investment (Habib & Zurawicki (2002), Mathur & Singh (2007), Reiter & Steensma (2010)), and decreases productivity on a firm level due to inefficient allocations of contracts (Faruq, et al. (2011), Vial & Hanoteau (2010), OECD (2015)). Corruption also impedes the general societal and economic environment because it reduces voluntary contributions to public goods (Beekman, et al., 2014), increases inequality (Justesen & Bjørnskov (2014), Christensen (2011)), facilitates emigration of highly skilled people (brain drain) (Dimant, et al., 2013), and creates inefficiencies in the sport sector (Dimant & Deutscher, 2015). Research also indicates that corruption rattles a community's public perception, triggers an atrophy of general and political trust, provides an incubator for general crime, dilutes societal norms and values, and distorts both competition and innovation (Richey (2010), Claros (2013), Dimant (2014)). Interestingly, certain forms of corruption, such as bribing a foreign official, were often viewed as legal and common practice in many countries until the late 1990s (Tanzi, 1998). These considerations not only show the economic drawbacks, but also highlight ethical implications on how society as a whole is affected by corruption.

In a recent report, the Organisation for Economic Co-operation and Development (OECD) tried to measure and describe international corruption cases that have been unveiled since

the introduction of the OECD Anti-Bribery Convention in 1999 (OECD, 2014b). Among other things, their findings indicate that forty-three percent of the total cases evaluated involved the bribing of public officials from countries ranked either high or very high in terms of human development status. More than half of the infringements were committed or at the very least known by the management level or higher. It is also found that governmental corporations—for example, corporations either owned or controlled by the state—were involved in more than one quarter of all affairs, while public officials were involved in almost another quarter. Shockingly, the total sum of money used for bribing amounted to almost eleven percent of the overall transaction volume that was connected to the analyzed infringements (OECD, 2014b). These figures indicate that corrupt behavior entails a moral component. “The common good of any society consists not only in its material possessions but in its shared ideals. When these ideals are betrayed, as they are betrayed when bribery is practiced, the common good, intangible though it be, suffers injury.” (Noonan, 1987, p. 700) Still, it is important to stress that the moral conflict of corrupt behavior is subject to the underlying environment and cannot be assessed purely from the perspective of its economic or societal harm. What is assumed to be moral and along the lines of acceptable behavior in one country or culture may be disapproved of in another (Cuervo-Cazurra, 2014). Rather, one should consider, among other things, the existing and relevant norms, and the institutional environment that is key to facilitating deviant behavior. Due to considerable heterogeneity with respect to the understanding of what corruption is, its moral reprehension, and its drivers, we deem it important to approach this topic from an interdisciplinary perspective.

One point is worth clarifying. There is an enormous amount of existing conceptual, theoretical, and empirical research on the topic of corruption. In particular, empirical research—namely, using survey methods, field and lab experiments—has accelerated over the last twenty years, allowing researchers to contrast theoretical predictions with actual occurrence of corruption. The goal of this Article is to provide a systematic discussion of existing research by shedding light on the different key concepts that explain the spread and diversity of corruption from an interdisciplinary perspective. We deem it important to use this approach and to incorporate theoretical foundations and empirical studies focusing on

explaining corrupt behavior at the micro, meso, and macro level. This reasoning results from current and past research evidence indicating that a variety of factors going beyond clear-cut rational decision-making facilitate or attenuate corrupt behavior. Rather, existing results promote the idea that social and institutional factors possess extensive explanatory power. Naturally, inherent to the interdisciplinary approach is the dichotomy of these concepts, more often than not leading to different assumptions, perspectives, and predictions—for example, rational choice versus behavioral concepts. This Article does not attempt to settle the dispute over which approach explains corrupt behavior best. Instead, it offers a comprehensive collection and discussion of existing theories and evidence explaining the antecedents and effects of corruption.

In what follows, Section 1.2 provides a brief summary of the historical development of corruption. In Section 1.3, we first discuss the facets of corruption subdivided into an "internal world" —rational choice and behavioral factors, a "meso world"—sociological and criminological determinants, and an "external world"—economic, legal, political, historical and geographical factors. Applying such an interdisciplinary strategy is essential to construct a well-rounded explanation for corrupt behavior. We conclude in Section 1.4.

1.2 History of Corruption and Corruption Research

In the past, several institutions and regulations were introduced to strengthen the international fight against corruption. However, corruption is not a new phenomenon, having its origins in ancient history. First, documents on the existence and recognition of corruption date back to Greek philosophers such as Socrates, Plato, Polybius, and Aristotle (Wallis, 2006). Additionally,

> archives recovered from the administrative center of Middle Kingdom Assyria (c 1,400 B C) refer to civil servants taking bribes, with senior officials and a close relative of the head of state implicated. There are also references to bribery in the Old Testament scriptures […] Corruption must be exposed for what it is, a form of organized crime and a serious abuse of human rights. (Evans, 1999)

Still, for a long time, corruption was mainly a research topic in the fields of political, sociological, historical and criminal law research. In the 1960s and 1970s, general approaches to assessing the mechanism of corruption created an ambiguous picture of its overall effects. Due to a lack of reliable data and methodological issues, economic research remained largely silent (Myrdal, 2011). At that time, conflicting interests between politicians and researchers were preventing corruption research from advancing. For example, trying to receive a visa for a possibly corruption-ridden country was almost impossible at that time if the trip's purpose—a corruption study—was mentioned (Nye, 1967).

On top of that, research on corruption had suffered from disagreement on a formal definition and the context dependency of an act, which may fall under the definition of corruption in one country but not in another. One of the first oft-recited definitions was coined by Nye (1967, p. 419):"Corruption is behavior which deviates from the formal duties of a public role because of private-regarding (personal, close family, private clique) pecuniary or status gains; or violates rules against the exercise of certain types of private-regarding influence." One drawback of this definition is the inherent ambiguity, because "all illegal acts are not necessarily corrupt and all corrupt acts are not necessarily illegal." (Peters & Welch, 2011, p. 155) In certain societies, particular actions may already be considered a form of corrupt misconduct, whereas in other societies these acts may well be part of their "formal duties" and "just politics." (Peters & Welch, 2011)

Starting in the late 1980s and early 1990s, sound theoretical approaches facilitated the scholarly efforts to study the mechanism of the economics of corruption. Especially in light of the economic acceleration of Asian countries at that time, research was still unsettled on whether corruption exhibits only adverse effects on societies and economics—sanding the wheels—or might create positive effects—greasing the wheels—under certain circumstances through the reduction of inefficient red tape (Dreher & Gassebner (2013), Vial & Hanoteau (2010)). Today, this argument was settled by sound research, indicating that corruption above all is detrimental to the society. These results are now broadly accepted. Through the use of more sophisticated methodological approaches and more reliable data, current research has settled on the fact that the general and long-term detrimental effects of corruption outweigh the context-specific and short-termed positive effects (Aidt (2009),

Méon & Sekkat (2005)). The broader availability of huge datasets was key for this development. For example, the PRS Group introduced the "International Country Risk Guide" in 1984 and Transparency International established the Corruption Perception Index as one of the most acknowledged measurements in 1995. In the 1990s and after the end of the Cold War, the first global anti-corruption movements occurred along with the democratization process of many developing countries. Ever since, the media has become increasingly involved in a critical assessment of corruption, drawing the public's attention to its consequences (Lambropoulou, et al., 2005).

In what follows, the mechanism, the antecedents, and the effects of corruption will be discussed from an interdisciplinary perspective on the micro, meso, and macro level.

1.3 Facets and Determinants of Corruption

The next section centers on the interdisciplinary nature of corruption research. In our attempt to blend different theories from various areas, we introduce a structural framework that allows us to discuss corruption stepwise, from what we refer to as the inner-to-outer-world approach.

For this reason, we start with the analysis of corrupt behavior in the internal world, which comprises a critical discussion of the rational choice theory and behavioral theories. Building on this, we then add an additional level of discussion at the meso level, where we shed light on both sociological and criminological factors. Ultimately, we discuss corrupt behavior from the perspective of the external world, which includes, among others, economic, legal, and political aspects. We believe that such an approach encompasses the breath of scientific discussion on the topic of corruption and does sufficient justice to the different theories and approaches that contribute to a better understanding of what shapes corrupt behavior. For reasons of convenience, we provide a graphical illustration to guide the reader through the next section's discussion of factors that explain corrupt behavior.

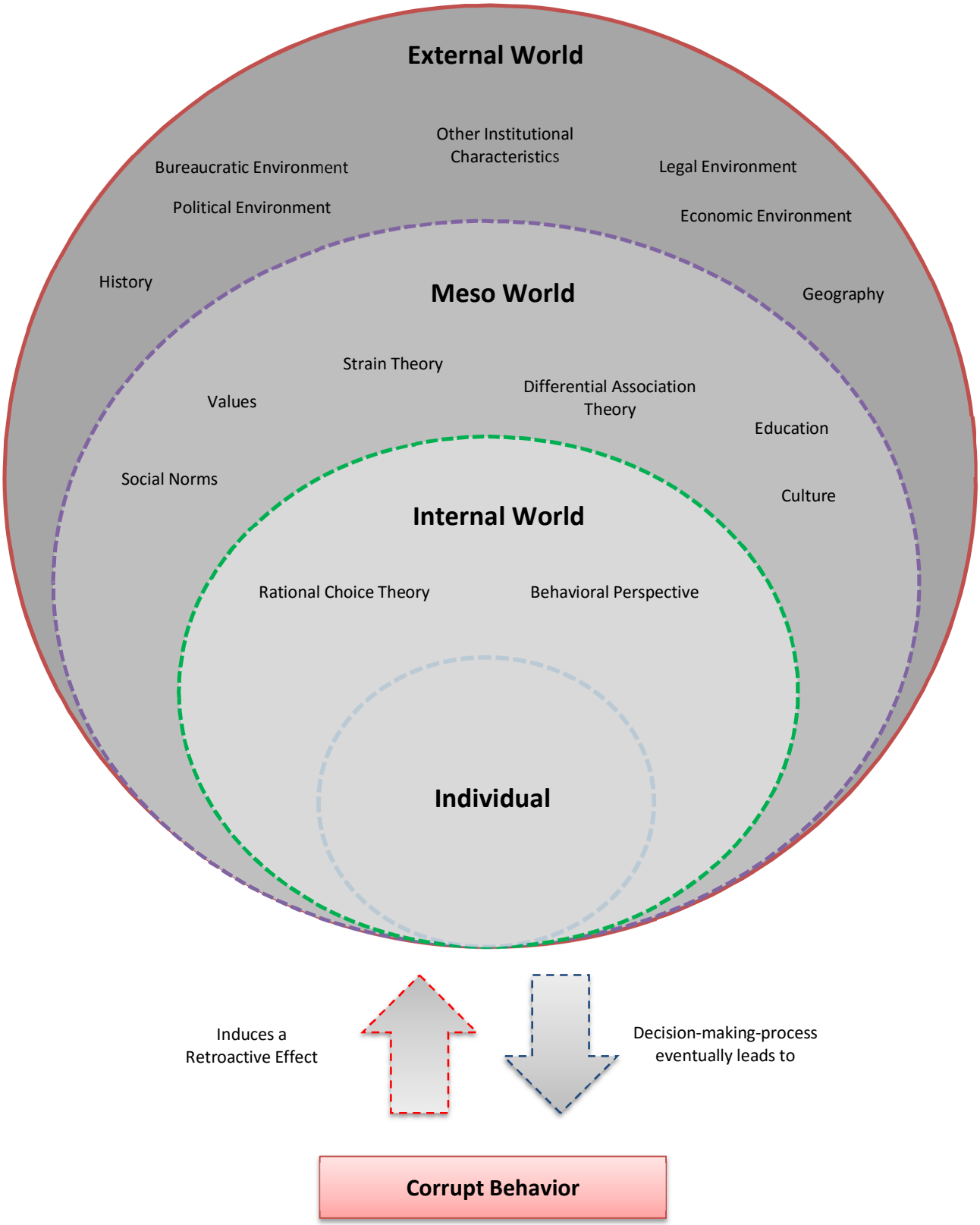

Figure 1.1: Interdisciplinary Perspective

1.3.1 Internal World – Rational Choice & Behavioral Perspective

The internal world represents a micro perspective that highlights the individual's intrinsic willingness to actively engage in acts of corruption. This aspect comprises purely rational behavior and behavior beyond this clear-cut rationale. Here, light will be shed on aspects that exclusively target the individual perspective. This represents a precise methodological difference in comparison to the aggregate levels that will be analyzed in subsequent chapters. We deem it important to include these different perspectives to allow for a well-rounded discussion of the antecedents and effects of corruption. For this purpose, we will start with a pure actor-based perspective and then gradually move towards an aggregate perspective.

Considering rational choice, this particular approach in the context of crime has its roots in the seminal contribution of Gary S. Becker, analyzing the disposition to deviant behavior based on cost-benefit calculations (Becker, 1968). Encompassing economic theories on crime causation have evolved ever since. The rational choice, whether or not to succumb to corrupt behavior, is based on a decision process in which individuals try to maximize their utility. This is done by weighing expected benefits against expected costs of deviant behavior, including opportunity costs and the risk of being caught or punished. One can use this general approach to understand a subset of criminal behavior, namely corruption, by shedding light on the decision making process of both the briber and the bribee. Although opportunity costs and risk calculation will certainly differ for each of the parties involved, the basic decision process is similar. (1) Opportunity costs due to time allocation: Whenever time is spent on criminal engagement, less time is available for legal activities. The opportunity costs therefore represent the amount of income, which is given up to attend to the alternative action. (2) Risk calculation: The consideration of the risk of being caught or punished. Certain actions are less likely to be observed and prosecuted and thus drive the individual risk assessment.

Both factors also represent viable ways to deter corrupt behavior, for example, through applying more severe punishments and increasing the probability of detection. Research indicates that both increasing the certainty and the severity of punishment are viable measures to deter criminal behavior, with the former being backed up by more, consistent,

empirical evidence than the latter (Nagin, 2013). Feess et al. report that increasing the magnitude of punishment—for example, up to a death penalty like in China—might even bring about perverse effects (Feess, et al., 2014). It is reasonable to assume that under such circumstances, judges would tend to be more careful in sentencing, since the condemnation would be associated with high costs for both the defendant and the judge given the risk of a potentially wrong decision. Consequently, irrespective of the corrupt acts detected, percentage of actual convictions might drop, rendering increased sanction detrimental or useless at the best. From a criminal's perspective, in a situation in which deviant behavior becomes more lucrative due to a *ceteris paribus* decrease in expected costs, such a leeway might induce even more deviant behavior. After all, facing both a drop in convictions and a rising estimated number of unreported cases may tempt the government to impose even harder sanctions, leading to a vicious circle (Steinrücken, 2004).

Yet, more often than not, individual behavior goes beyond clear-cut rational decision-making but is bounded in terms of to what extent decisions are thoroughly elaborated (Gigerenzer & Selten, 2002). As described before, the pure rational choice approach leaves no room for moral quarrels that may influence the calculus, although real life experience proves morals highly relevant. Yet, morals differ not only from society to society but also on an individual level and even from one situation to another—especially if factors such as emotions are considered. Essentially, a combination of all these aspects is needed to reach a well-elaborated internal view. Thus, in recent years, the behavioral approach, which enriches the rational perspective with the inclusion of psychological aspects and biases, has been incorporated into models trying to better explain deviant behavior in general and corrupt behavior in particular. It has been argued that even a rational decision-maker might end up engaging in seemingly irrational behavior that is guided by more than just a rational calculus, but rather is a function of the underlying environment. This stream of literature has extended the decision space of the so-called "homo oeconomicus" by incorporating factors such as reciprocity, emotions, social image and the like to draw a *more realistic* picture of human behavior (Barberis, 2011). Clearly, the growing body of approaches represents an addition rather than substitution of the rational choice approach.

Arguably, pure rational choice concerns are incapable of explaining the de facto extent of existing corruption. Lambsdorff argues that the rational choice theory brings about two seemingly conflicting outcomes, one with and one without existing corruption. On the one hand, one should observe corruption more frequently as it is the case since—at least in the absence of norms, values, and the like—criminal behavior is solely driven by rational calculus (Lambsdorff, 2012). On the other hand, since bribery is not a subgame perfect Nash equilibrium, its actual occurrence might already be surprising. In one-shot bribery settings, as is usually the case, reputation does not play any role, suggesting that the bribee has no incentive to reciprocate the behavior of the briber. Consequently, the briber anticipates the bribee's deviant behavior—e.g. pocketing the money without providing the respective service—and, as a result, he should not pay any bribes in the first place. Even in repetitive settings, the exchange will terminate eventually, leading to what is called an endgame effect, suggesting that the bribee will deviate from the reciprocal arrangement at some point. This entails that by using backward induction, the briber will refrain from paying bribes in the first place as well. Accounting for these seemingly conflicting outcomes, current research suggests that one's decision-making process is vastly guided by the social environment and one's peer's behavior (Evans et al. (1992), Glaeser et al. (1996)). Among other things, theoretical and experimental research suggests that the effect of behavioral contagion is mediated by the social proximity to the peers (Akerlof (1997), Dimant (2015)). A person's traits and behavior are predominantly based on social interaction (LaRossa & Reitzes, 1993); people are not born with them, but rather learned and adapted through the course of social interaction. These patterns and values can vary and develop as time moves on and they can be considered to be under constant exogenous influence. What is more, existing evidence points at the importance of social norms and values, but also the impact of reputation in repeated game environments, in explaining corrupt behavior (Gächter & Falk (2002), Milinski et al. (2002)). "Reputation is a powerful force for strengthening and enlarging moral." (Haidt, 2007, p. 998)

In sum, the many factors comprising the internal world can be seen as the essential pillars in explaining corrupt behavior. Research indicates, however, that the decision to behave in a corrupt manner is not driven solely by internal factors. Instead, it is the interplay with the

social environment that impacts or overrides the internal world. The social nature of humans promotes the consideration of peer group affiliation and reputation, deeming it unlikely that behavior in general and unethical one in particular is purely self-driven. We now turn to the discussion of meso and macro factors that add to the understanding of corrupt decision-making and build upon the internal world.

1.3.2 Meso World—Sociological & Criminological Factors

The meso world focuses on social interaction. It is plausible to assume that, beyond the intrinsic willingness, different components like typical values, rules, and norms within a given society have a strong impact on a person's decision on whether or not to act corruptly. There are many sociological factors and criminological aspects as well as theories that can influence the level of corrupt behavior.

Sociological Factors

The general culture within a given country can have a significant impact on individual decisions to engage in corrupt behavior. Husted examines the effect of different cultural aspects and describes "a cultural profile of a corrupt country as one in which there is high uncertainty avoidance, high masculinity, and high power distance." (Husted, 1999, p. 354) Other studies come to a similar conclusion. For example, Volkema and Getz (2001) analyzed power distance and uncertainty avoidance, again showing a significant positive correlation between these cultural factors and the level of corruption. Recent studies also support these results. The two dimensions of national culture (power distance and individualism) moderate the relationship between human development and corruption (Sims, et al., 2012). This is also true if norms and values are carried over from different cultures through migration. For example, Dimant et al. find some indication for such a footprint effect. In continuing to conduct business as usual, the destination countries experience deterioration in institutional quality and an increase in corruption levels in the short run. But they also find that migrants eventually assimilate to the new environment in the medium run (Dimant, et al., 2015).

Aside from the cultural aspects, research also points at the relevance of education in mediating the inclination towards corrupt behavior. Education typically intensifies in the

process of economic development within a given country and contributes to lower levels of corruption (Treisman, 2000). A study conducted in Nepal indicates that education is one of the primary determinants of corrupt behavior. Higher education is strongly correlated with the likeliness to condemn corrupt behavior and the reluctance to accept even small bribes (Truex, 2011).

Research also indicates that the composition of gender in leading positions mediates the extent of corruption (Sung & Chu (2003), Sung (2003), Sung (2012)). For example, Dollar et al. (2001) find that a greater number of women involved in parliament is typically associated with lower levels of corruption. Similar results are common in cross-country evaluations (Swamy, et al., 2001). Typically, women tend to obey society rules and are less likely to take serious risks and therefore less often commit to corruption (Esarey & Chirillo (2013), Frank et al. (2011)).

Criminological Factors

From a criminological perspective, corruption is at the center of general crime and it facilitates the pervasiveness of the crime (Husman & Walle (2010), Shelley (2014)). The criminological view on deviant behavior is interdisciplinary in itself. In particular, there is a strong interdependence between the sociological factors and criminology, because aspects like culture and education have an effect on general crime rates and therefore on the level of corruption. The incorporation of rational decision-making also represents an evident link to the internal world (Glueck & Glueck, 2014).

Sutherland and Cressey (2014) brought forward the *differential association theory*, concluding that criminal behavior is commonly learned and adopted in interaction with other people. Aspects such as social class, race and unstable homes are not only factors favoring the commitment to criminal activity but they also increase the probability that people will socialize with persons of similar character. This theory is widely supported by empirical research that focuses on social learning for both criminal and conforming behavior (Akers (2014), Cohen (2014)). At the same time, social learning is not only restricted to small neighborhoods or certain areas, but also does entail an aggregate perspective on the societal level. The *strain theory*, first established by Merton in 1938 in a time when the

most widely accepted hypothesis was that criminal behavior can be primarily attributed to biological disposition, highlights the relevance of social structures and social pressure in the occurrence of criminal behavior (Merton, 1938). Whenever individuals feel they are being treated unfairly by the society—e.g. restricted access to good schooling—, they encounter a stressful situation, which in turn taxes one's self-control (Hirschi & Gottfredson, 1990). This theory suggests that under these circumstances, people may tend to reverse the goals set by society and create their own goals conflicting with existing norms and values. They are likely to believe that the means justify the ends, which is conducive to their decision to engage in criminal activities (Cohen (2014), Messner & Rosenfeld (2014)). The basic strain theory, however, has been altered over time, eventually leading to a more generalized theory.

Individuals even in a stable personal environment—e.g. well paid and secure job—are potentially willing to put everything at risk and choose to engage in criminal behavior. Such behavior might stem from a biased self-perception. Although well-educated white-collar individuals should be able to fully take stock of the consequences of their corrupt behavior, Benson argues that such offenders often do not view themselves as criminals but rather as good employees, justifying their acts solely on the basis of trying to enforce the company's success (Benson, 2014). This theory seems to hold especially for employees in higher positions with ample responsibilities when they see the chance to, for example, secure other people's jobs by acting corruptly (Fleming & Zyglidopoulos, 2009). Such a biased self-perception might be the result of both hypocrisy and a different understanding of what is right and wrong. As research indicates, such an understanding of, for example, what is considered a bribe or a gift is context dependent, which varies substantially across countries (Millington, et al. (2005), Steidlmeier (1999)). However, aside from varying perceptions in different countries, the rationalization process is present in every society and it is a key determinant for white-collar crime and corruption in particular. The ability to rationalize unethical behavior pushes out feelings of guilt and shame, rendering corrupt behavior justifiable if there are enough good reasons (Søreide, 2014). In line with the social learning theory introduced earlier, such work environments can be deemed highly negative. If the supervisors act corruptly without any feelings of guilt, this behavior may affect the other

employees' decision-making process. Consequently, further analysis is essential with respect to the extremely high damages involved in white-collar crimes. Prosecution and quantification of such crimes turn out to be extremely tough (Lambsdorff & Schulze, 2015), and even though numerous cases with extensive damage are known, the actual ramifications remain devious. Furthermore, higher levels of corruption combined with weak institutional structures, soak through society and eventually lead to rising general crime rates, creating a hostile environment and breeding ground for even more corruption (Claros, 2013).

This article now turns to the external world by shedding light at factors at the macro level that influence the extent of corruption.

1.3.3 External World—Economic, Legal, Political, Historical and Geographical Factors

The external world includes all other elements representing extrinsic opportunities that directly or indirectly have an influence on corruption. Among others, these are economic, legal, political, historical and geographical factors.

Economic Factors

Existing research points at a broad range of economic factors relevant to the extent of corruption. For example, the overall quality of the government in a given country is a well-studied determinant. "Poor governance may affect economic performance through their impact on tax revenue, public spending, and fiscal deficit." (Tanzi, 1999, p. 10) Inefficient bureaucracy fuels corruption because it provides a fertile ground for "speed money." Such a mechanism is designed to circumvent impeding regulatory bodies, which represent the major ingredient of the greasing the wheels hypothesis described in Section 1.2. In the context of firm entry in highly regulated countries, Dreher and Gassebner (2013) analyzed more than forty countries for several years, concluding that the greasing the wheels hypothesis holds even today. The more inefficient regulations are, the longer the delays for companies being able to start their business. In consequence, such inefficiency, coupled with the risk of losing money and business, trigger their decision to make use of speed

money (Tanzi, 1998). Whenever the extent and bureaucracy and each public official's decision power are high, people may use their power for personal gain at the cost of general welfare. (Tanzi, 1998)

Research also indicates the relevance of economic and political freedom. Whenever a country inhabits characteristics such as high protectionism and other significant barriers to trade, corruption appears to breed (Ades & Di Tella, 1999), whereas countries with a prolonged history of openness to trade are typically characterized by lower levels of corruption (Treisman, 2007). Cross-country comparisons indicate that the extent of economic and political freedom is negatively correlated with corruption levels (Ali & Isse, 2003).

Along these lines, a country's economic growth as measured by the increase in the gross domestic product per capita (GDP) has been found to have a traceable impact on a country's corruption level (Ades & Di Tella (1999), Kunicová & Rose-Ackerman (2005), Treisman (2007)). For example, Bai et al. (2014) analyzed annual firm data from Vietnam and found that corruption will subside automatically after several years of extensive economic growth. Generally speaking, "corruption vanishes as countries get rich, and there is a transition from poverty to honesty ." (Gundlach & Paldam, 2008, p. 6)[1]

Legal and Political Factors

Institutions play an important role in both ensuring a sound legal environment and facilitating the companies' business. They set "the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction." (North, 1990, p. 3) Whenever an imbalance of power exists, parties are likely to abuse the system and engage in deviant behavior that is detrimental to the society. Typically, weak institutions are responsible for inefficient regulations and the loss of trust on the side of the citizens. Well-functioning institutions therefore represent important factors in the fight against corruption (Dreher, et al., 2007).

[1] For a more detailed discussion of economic factors, see Dimant (2014).

Political institutions are indispensable in the fight against corruption because they set the rules and regulations that depict the economic environment. The set of rules imposed by political institutions influence key conditions such as trade openness, competition and economic development. Here, transparency and accountability are key in moderating the public officials' inclination to engage in fraudulent behavior, which is likely to be the case under freedom of speech and democratic elections. For example, Lederman et al. find that "corruption tends to decrease systematically with democracy, parliamentary systems, democratic stability, and freedom of press." (Lederman, et al., 2005, p. 27)

Research also points to the relevance of institutional decentralization. Autonomy of states and the ability to enforce this power seems to go hand in hand with breeding corruption (Lederman, et al., 2005). In a cross-national study, Gerring and Thacker (2004) find that a centralized government system can have a significant decreasing effect on corruption. Contrary to these findings, Fisman and Gatti (2002) find a positive relationship between fiscal decentralization and corruption using indices on a cross-country level.

Historical & Geographical Factors

Existing research suggests that historical and geographical factors are highly predictive of a country's corruption level (Svensson, 2005). One distinct determinant is a country's history of colonization. For example, Acemoglu et al. found that, throughout the past five hundred years, colonization had sizable effects on the spread of corruption.

> Civilizations in Meso-America, the Andes, India, and Southeast Asia were richer than those located in North America, Australia, New Zealand, or the southern cone of Latin America. The intervention of Europe reversed this pattern. This is a first-order fact, both for understanding economic and political development over the past 500 years, and for evaluating various theories of long-run development (Acemoglu, et al., 2002).

Treisman (2000) finds support for this argument and argues that the effect of colonization is mediated by the influence of religion.

The geographical disposition appears to have a traceable effect on corruption levels as well. Research suggests that resource endowments, agricultural aspects, and production factors play an important role in overall economic development and, thus, indirectly affect the level of corruption (Bloch & Tang, 2004). Extensive resource abundance, however, might also cause perverse outcomes. Bloch and Tang (2004) point at numerous examples where resource abundance had detrimental effects on the economy, leading to declining per capita incomes in countries like Venezuela. The exploitation of large resource endowments may often lead to strong income imbalances, political corruption, and property right infringements. These factors tend to contribute to criminal activity due to more profitable rent-seeking behavior. In addition, Goel and Nelson (2010, p. 444) find support for the hypothesis that "countries with more geographically concentrated populations (Urban) are likely to have lower corruption." The authors show that in densely populated areas corruption is strongly deterred by easier detection and stronger stigmatization.

1.3.4 Interdisciplinary Perspective and Empirical Findings

Combining the factors and different views that have been elaborated throughout this paper, a deeper understanding and intuitive understanding for the figure presented at the beginning of Section 1.3 should now be established.

In this section, and throughout this Article, we shall not attempt to weigh one approach against the other. Rather, we try to provide a comprehensive view on the factors that are relevant to corrupt decision-making. Existing research indicates that corrupt behavior can be explained by an array of existing theories, stressing the importance of an interdisciplinary approach. Although we provide a rough framework, explaining the underlying mechanism of how all the interdisciplinary concepts are interrelated and build upon each other is beyond the goal of this Article. Instead, we stress the individual, and how individuals are subjected to the interplay of the different worlds. In any given context, an individual's decision to engage in corrupt behavior is subject to interior rationalization—internal world, as well as the underlying social—meso world, and institutional context—external world. With this, we conceptually unify the approaches and theory that focus on both the individual actor and the aggregate perspective.

In particular, in the internal world, decisions based on pure rational choice mechanisms, as well as the inclusion of behavioral factors, determine the individual's basic inclination to engage in corrupt behavior. At this point, we have shown that using insights from rational choice theory alone cannot sufficiently explain the actual occurrence of corruption. Although the choice whether or not to act corruptly always begins in the internal world, the other layers cannot be excluded from the decision-making process. Thus, it is key to combine this actor-based view with influences from the outside that are almost entirely empirically assessed on an aggregate level. The meso world covers the sociological and criminological factors that add another layer to the decision-making process. Factors like culture, ethical standards, and education are important determinants for deviant conduct. The external world includes economic, legal, political, historical, and geographical determinants, representing factors that individuals are subjected to, but have little power to influence on their own. It is worth noting that these three different layers are not distinct but rather interdependent, thus creating retroactive effects.

At an individual level, the rational-self reaches the decision to behave corruptly by simply weighing the expected costs against the expected benefits. In addition, the psychological assessment supports this decision because one observes peer behavior of the same kind, thus triggering behavioral conformity. The decision to engage in deviant behavior, however, might go against the norms, values, and moral virtues one was raised with, which could trigger the consideration of long-term consequences such behavior might have in terms of social welfare. Therefore, although corrupt behavior seems to be perfectly rational and justifiable from a pure self-maximization perspective, a more deliberate assessment of the consequences might lead to a different outcome. This argument is in line with previously discussed literature raising the point that the actual occurrence of corruption is in line with what one would expect based on the predictions derived by rational choice theory.

1.4 Conclusion

Research on the antecedents and effects of corruption has undergone a profound development over the last decades. Studies using theoretical, empirical, and experimental approaches have broadened our understanding of corruption, helping to develop

meaningful countermeasures. In this paper, we shed light on the interdisciplinary discussion of corruption at the micro, meso, and macro level, providing ample evidence that corrupt behavior is not only the result of an internal cost-benefit analysis, but is rather a function of the underlying social and economic environment. For this reason, a multidisciplinary approach is required to understand the complex nature of corruption.

Research indicates that corrupt behavior is driven by a multitude of different mechanisms that have their origin at both the individual and the collective level. Moreover, while the decision to engage in corrupt behavior is the result of a deliberative decision—as opposed to an impulsive one when it comes to general acts of crime—there are many conflicting mechanisms at play. Throughout this paper, we have claimed that pure rational choice theories do not sufficiently explain the occurrence, or the lack, of corruption. Using game-theoretic predictions, one would expect corruption to not exist at all or to be observed everywhere. Instead, we observe both corrupt and honest people, and empirical research also points to substantial heterogeneity across, and even within, countries. The inception of more reliable measures of corruption has stimulated a broad variety of research trying to explain the mechanisms of corruption going beyond clear-cut rational decision-making. Rather, in reaching a decision, research has emphasized the importance of bounded rationality; the inherent values and norms one person has been raised with, as well as the institutional and political environment.

In this paper, we focused on discussion of state-of-the-art literature on corruption as well as bridging the gap between different theories and approaches to the understanding of what really drives corrupt behavior beyond rational decision-making. One aspect that we highlighted throughout the different sections of our interdisciplinary approach is the relevance and influence of moral and ethical considerations on corrupt behavior. As mentioned in the limitations of the internal world, rational choice approaches neglect this aspect entirely and insufficiently explain the non-occurrence of corruption. Adding the consideration of ethical aspects allows us to draw a more balanced picture of the drivers of corruption.

Throughout this paper, we have argued that more than through simple cost-benefit heuristics, individuals are driven by moral and ethical concerns, which are shaped by, and

are independent from, the economic, legal, and political environment in which they live. The consideration of moral aspects is essential to understanding the spread of corruption at each level: micro, meso, and macro. Being more sensitized to ethical considerations, and the impact of one's own behavior on others, is likely to increase both self-awareness and control, and moderate the likelihood to engage in inopportune behavior in the first place. Arguably, ethicality is what makes humans distinct from animals and the lack thereof is likely to facilitate a vicious cycle of systemic misdemeanor.

A problem for centuries, one has to be an inveterate optimist to believe that corruption can be entirely annihilated without undermining the fact that this would not be desirable from a welfare perspective, considering the concomitant costs. At best, research on this topic and the implementation of an effective regulatory policy, suitable codes of conduct, political and bureaucratic transparency, and effective anti-corruption measures can help to mitigate the dissemination of corruption.

CHAPTER 2: EMPIRICS

2.1 THE EFFECT OF CORRUPTION ON MIGRATION, 1985-2000[¤]

Eugen Dimant*, Tim Krieger**, Daniel Meierrieks ***

ABSTRACT:

We examine the influence of corruption on migration for 111 countries between 1985 and 2000. Robust evidence indicates that corruption is among the push factors of migration, especially fueling skilled migration. We argue that corruption tends to diminish the returns to education, which is particularly relevant to the better educated.

KEYWORDS: Corruption; migration; skilled migration; push factors of migration

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2.1.1 Introduction

Previous empirical research suggests that, besides socio-economic and demographic factors (e.g., underdevelopment and demographic pressures), politico-institutional conditions (e.g., political instability) are among the push factors of international migration (cf., e.g., Hatton and Williamson (2003); Mayda (2010); Dreher et al. (2011); Docquier and Rapoport (2012)). We argue that a related important push factor, which has so far been mostly neglected in both theoretical and empirical research, is *corruption*.

Corruption is associated with a number of unfavorable outcomes. For one, corruption tends to negatively affect a country's (short-run) level of economic activity.[1] Economies plagued by high levels of corruption grow more slowly, e.g., as corruption contributes to an inefficient allocation of resources (Jain (2001); Campos et al. (2010)). For another, corruption may also worsen a country's (structural) socio-economic situation. For instance, Gupta et al. (2002) find that high levels of corruption promote income inequality and the spread of poverty. Furthermore, corruption may also lead to suboptimal patterns of social mobility when it matters more strongly to upward mobility than actual merits.

In sum, the prevalence of corruption is likely to worsen individual working and living conditions for the majority of citizens. It may therefore also matter to the calculus of a potential migrant. Individual education is a particularly important factor influencing migration decisions. Here, corruption tends to lower the returns to education, e.g., by contributing to slow economic growth and unemployment, widespread inequality and the lack of social advancement. Given the irreversibility of human capital investment, corruption may make it more attractive to migrate to recoup one's individual education investment. Here, we expect the highly skilled to be particularly responsive to the prevalence of corruption, given their high level of human capital investment and subsequent need for particularly high (i.e., cost-effective) skill premiums.[2] Based on these lines of reasoning, we hypothesize that corruption is among the push factors of migration and particularly relevant to skilled migration.

[1] Note, however, that this assessment does not rule out that corruption may actually yield positive economic effects under specific circumstances (Dreher and Gassebner, 2013).

[2] In addition to that, the increase of income inequality and poverty caused by corruption (Gupta, et al., 2002) may foster the political demand for redistribution. As the better skilled are typically the typical net payers of (progressive) income taxes, this may further fuel skilled emigration.

2.1.2 Data and Methodology

To empirically examine this hypothesis, we compile data on (skilled and average) migration, corruption and further controls for 111 countries between 1985 and 2000. The summary statistics and the operationalization of the controls are reported in Table 1.[3] Data on our dependent variables, the migration rates, are drawn from Defoort (2008) who provides estimates of the rates of skilled and average migration to six main receiving countries (Australia, Canada, France, Germany, the U.K. and the U.S.). Here, the *skilled migration rate* refers to the ratio of the number of skilled emigrants (who exhibit a post-secondary certificate) to the total number of skilled natives aged 25 or older, while the *average migration rate* is defined as the ratio of the total number of emigrants to the total number of natives aged 25 or older (Defoort, 2008).

[3] The migration data is available only for three points in time (1990, 1995 and 2000). Therefore, we use five-year averages of the explanatory variables (for the 1986-1990, 1991-1995 and 1996-2000 periods) to estimate their influence on migration.

Table 2.2.1: Summary Statistics and Data Operationalization and Sources

Variable	Observa-tions	Mean	SD	Mini-mum	Maxi-mum	Operationalization	Source
Skilled Migration	333	0.143	0.179	0.001	0.910		
Average Migration	333	0.035	0.061	0.001	0.419		
Corruption	333	2.669	1.294	0	5.983		
Per Capita Income	333	8.625	1.179	5.576	10.908	Real, PPP-adjusted per capita income, logged	(a)
Population Size	333	9.380	1.487	6.028	14.038	Population size in thousands, logged	(a)
Regime Type	333	2.169	7.072	-10	10	Revised Combined Polity Score, ranging from -10 (autocracy) to +10 (democracy	(b)
Political Instability	333	0.300	0.758	0	3.766	Number of battle deaths in civil wars (defined as a conflict with at least 25 battle deaths per year), logged+1	(c)
Youth Burden	333	0.260	0.030	0.174	0.333	Number of people between the ages of 15 and 29 as share of total population	(d)
Quality of Bureau-cracy	333	1.890	1.200	0	4	Index of institutional strength and quality of a country's bureaucracy	(e)
Trade Openness	333	4.026	0.644	0.486	5.811	Sum of exports and imports as a share of real GDP, logged	(a)
Former Colony	333	0.495	0.501	0	1	Time-invariant dummy variable (1=country has colonial links to one of the six major re-ceiving countries)	(f)
Distance	333	7.943	1.066	4.456	9.093	Time invariant variable that measures the distance between country's capital and the nearest capital of one of the six major receiving countries, logged	(f)

Notes: Source refers to (a) PENN World Tables (https://pwt.sas.upenn.edu/), (b) Polity4 Dataset (http://www.systemicpeace.org/polity/polity4.htm), (c) PRIO Battle Deaths Data (http://www.prio.no/Data/Armed-Conflict/Battle-Deaths/), (d) United Nations Population Division (http://esa.un.org/unpd/wpp/Excel-Data/population.htm), (e) ICRG (2009), (f) CEPII GeoDist Dataset (http://www.cepii.fr/CEPII/en/bdd_modele/presenta-tion.asp?id=6).

Corruption data are drawn from the *International Country Risk Guide* (PRS Group, 2008).[4]

Surveying experts, the ICRG issues a *corruption index* that we use as our main explanatory variable. Here, corruption refers to financial corruption associated with conducting business (e.g., bribes) as well as other forms of political corruption such as excessive patronage, nepotism and close ties between politics and business. Note that we rescaled the ICRG corruption index, so that higher values correspond to higher corruption levels.

To avoid detecting only spurious effects of corruption on migration, we also consider a number of *confounding controls* that may simultaneously affect corruption and migration. For instance, we control for the effect of economic development, as richer countries are both less susceptible to corruption and less likely to have high migration rates. Following the empirical literature on the determinants of corruption (Serra, 2006) and migration (Docquier & Rapoport, 2012), in our baseline specification we control for the effect of *per capita income*, *population size*, *regime type* and *political instability*. As robustness checks, we amend this model with additional controls for demographic pressure (*youth burden*), *institutional quality* (the quality of a country's bureaucracy), *trade openness* and certain country-specific traits that may affect migration costs (*colonial ties* and *distance* between sending and destination countries).[5]

Initial tests indicate the presence of autocorrelation, heteroskedasticity and cross-sectional dependence, as it is common for panel data with country-year observations. We therefore run a series of pooled OLS and fixed-effects regressions with Driscoll-Kraay standard errors that are robust to these data characteristics (Driscoll & Kraay, 1998).[6]

[4] We use the ICRG data because it is available since 1984, making a panel estimation approach to the corruption-migration nexus possible. Other corruption measures are available only for shorter time periods. Jain (Jain, 2001, p. 77) notes that the various corruption measures are usually highly correlated.

[5] Our findings are also robust to the inclusion of further controls for religious fractionalization, oil production, government size, further geographic and historic country characteristics (landlocked location, common language) and education (years of schooling).

[6] We also experimented with instrumental variable (IV) estimations, as reverse causation may be an issue. However, pooled and fixed-effects IV-estimations (where corruption is instrumented by the quality of judicial institutions and the degree of democratic participation) do not indicate that corruption is endogenous to migration. Also, Durbin-Wu-Hausman tests suggests that any endogeneity among the regressors does not bias our estimates.

2.1.3 Empirical results

The pooled OLS estimates are reported in Table 2. We find that corruption has a positive and statistically significant effect on both skilled and average migration. However, the marginal effect of corruption on skilled migration tends to be approximately three to four times higher than its effect on average migration. This finding provides first support for our hypothesis that corruption as among the push factors of migration and especially matters to the migration decisions of the highly skilled.

The fixed-effects estimates—which truly consider the panel structure of our dataset—are reported in Table 3.[7]

We find that corruption only has a positive, statistically significant and specification-robust effect on skilled migration, but has no significant impact on average migration. This result further strengthens our previous finding that the decision of the highly skilled to emigrate is strongly affected by the disincentive of corruption at home.

[7] Note that all constant influencing factors (colonial ties, distance etc.) are now subsumed under the fixed effects.

Table 2.2.2: Corruption and Migration (Pooled OLS Estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Skilled Migration (1)-(5)					Average Migration (6)-(10)				
Corruption	0.025	0.022	0.036	0.024	0.035	0.009	0.005	0.009	0.008	0.012
	(0.006)**	(0.004)**	(0.005)**	(0.006)**	(0.006)**	(0.001)***	(0.001)**	(0.001)**	(0.001)***	(0.001)***
Per Capita	-0.046	-0.043	-0.057	-0.048	-0.045	0.003	0.005	0.002	0.002	0.002
Income	(0.002)***	(0.003)***	(0.007)**	(0.003)***	(0.002)***	(0.001)**	(0.001)**	(0.002)	(0.001)	(0.001)
Population Size	-0.044	-0.044	-0.047	-0.040	-0.041	-0.014	-0.013	-0.014	-0.012	-0.013
	(0.001)***	(0.001)***	(0.002)***	(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.002)**	(0.001)**	(0.001)***
Regime Type	0.006	0.007	0.006	0.007	0.007	0.003	0.003	0.003	0.003	0.003
	(0.001)**	(0.001)**	(0.001)**	(0.001)**	(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.001)***
Political	0.002	0.002	0.007	0.005	0.004	-0.003	-0.003	-0.003	-0.002	-0.003
Instability	(0.005)	(0.005)	(0.005)	(0.005)	(0.007)	(0.003)	(0.003)	(0.002)	(0.003)	(0.004)
Youth Burden		0.389					0.403			
		(0.361)					(0.041)**			
Quality of			-0.027					-0.002		
Bureaucracy			(0.010)					(0.005)		
Trade				0.020					0.009	
Openness				(0.001)***					(0.001)***	
Former Colony					0.068					0.019
					(0.001)***					(0.001)***
Distance					-0.026					-0.010
					(0.003)**					(0.002)**
R^2	0.252	0.254	0.262	0.255	0.294	0.200	0.225	0.200	0.206	0.237
N*T	333	333	333	333	333	333	333	333	333	333

Notes: Constant not reported. Driscoll-Kraay standard errors in parentheses. **p<0.05, ***p<0.01.

Table 2.2.3: Corruption and Migration (Fixed-Effects Model Estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Skilled Migration (1)-(4)				Average Migration (5)-(8)			
Corruption	0.005	0.005	0.004	0.005	-0.003	-0.003	-0.002	-0.003
	(0.001)***	(0.001)***	(0.001)**	(0.001)**	(0.001)	(0.001)	(0.001)	(0.001)
Per Capita	-0.048	-0.043	-0.045	-0.051	0.002	-0.001	0.001	0.001
Income	(0.010)**	(0.010)**	(0.010)**	(0.008)**	(0.003)	(0.003)	(0.002)	(0.003)
Population Size	0.001	-0.001	0.002	-0.002	0.012	0.013	0.012	0.011
	(0.009)	(0.009)	(0.010)	(0.011)	(0.002)**	(0.002)**	(0.002)**	(0.002)**
Regime Type	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001
	(0.001)*	(0.001)*	(0.001)*	(0.001)*	(0.001)**	(0.001)**	(0.001)**	(0.001)**
Political	0.008	0.008	0.007	0.008	-0.002	-0.002	-0.002	-0.002
Instability	(0.001)**	(0.001)**	(0.001)**	(0.001)***	(0.001)*	(0.001)**	(0.001)*	(0.001)*
Youth Burden		0.190				-0.087		
		(0.028)**				(0.018)**		
Quality of			0.003				-0.001	
Bureaucracy			(0.001)				(0.005)	
Trade				0.006				0.003
Openness				(0.006)				(0.001)**
Within-R^2	0.174	0.182	0.176	0.176	0.145	0.145	0.132	0.130
N*T	333	333	333	333	333	333	333	333

Notes: Constant not reported. Driscoll-Kraay standard errors in parentheses. *p<0.1, **p<0.05, ***p<0.01.

Finally, note that the results for the control variables are largely in line with previous research. For instance, both the pooled OLS and fixed-effects estimates suggest that skilled migration is less common in richer countries, as previously reported in Docquier and Rapoport (2012). As another example, the positive effect of political instability on skilled migration in the fixed-effects regressions is in line with Dreher et al. (2011).

2.1.4 Conclusion

We examine the impact of corruption on migration for a panel of 111 countries between 1985 and 2000. Our empirical results indicate that corruption especially drives skilled migration, while its effect on average migration is less pronounced and not statistically robust. Our main finding is consistent with the hypothesis that corruption lowers the returns to education and consequently matters most to the calculus of (prospective) highly skilled migrants. Corruption control may therefore be an important policy tool to rein the brain drain, particularly when this brain drain is associated with predominantly poor development outcomes.

Appendix

Albania	Dom. Republic	Italy	Papua N. Guinea	Tunisia
Algeria	Ecuador	Jamaica	Paraguay	Turkey
Angola	Egypt	Japan	Peru	Uganda
Argentina	El Salvador	Jordan	Philippines	U. Arab Emirates
Australia	Ethiopia	Kenya	Poland	United Kingdom
Austria	Finland	Kuwait	Portugal	United States
Bahrain	France	Liberia	Qatar	Uruguay
Bangladesh	Gabon	Libya	Romania	Venezuela
Belgium	Gambia	Madagascar	Saudi Arabia	Vietnam
Bolivia	Germany	Malawi	Senegal	Zambia
Botswana	Ghana	Malaysia	Sierra Leone	Zimbabwe
Brazil	Greece	Mali	Singapore	
Bulgaria	Guatemala	Mexico	Somalia	
Burkina Faso	Guinea	Mongolia	South Africa	
Cameroon	Guinea-Bissau	Morocco	South Korea	
Canada	Guyana	Mozambique	Spain	
Chile	Haiti	Netherlands	Sri Lanka	
China	Honduras	New Zealand	Sudan	
Colombia	Hungary	Nicaragua	Sweden	
Congo (Republic)	India	Niger	Switzerland	
Costa Rica	Indonesia	Nigeria	Syria	
Cote d'Ivoire	Iran	Norway	Tanzania	
Cuba	Iraq	Oman	Thailand	
Cyprus	Ireland	Pakistan	Togo	
Denmark	Israel	Panama	Trinidad	

2.2 A CROOK IS A CROOK … BUT IS HE STILL A CROOK ABROAD? ON THE EFFECT OF IMMIGRATION ON DESTINATION-COUNTRY CORRUPTION[¶]

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ABSTRACT:

This paper analyzes the impact of migration on destination-country corruption levels. Capitalizing on a comprehensive dataset consisting of annual immigration stocks of OECD countries from 207 countries of origin for the period 1984–2008, we explore different channels through which corruption might migrate. We employ different estimation methods using fixed effects and Tobit regressions in order to validate our findings. Moreover, we also address the issue of endogeneity by using the Difference-Generalized Method of Moments estimator. Independent of the econometric methodology, we consistently find that while general migration has an insignificant effect on the destination country's corruption level, immigration from corruption-ridden origin countries boosts corruption in the destination country. Our findings provide a more profound understanding of the socioeconomic implications associated with migration flows.

KEYWORDS: Corruption; migration; impact of migration

JEL CLASSIFICATION: D73; F22; O15

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2.2.1 Introduction

Among the countries with the highest level of corruption (according to the International Country Risk Guide), several countries exhibit substantial numbers of emigrants. One may speculate that persistent corruption in a country makes corrupt behavior a general attitude among citizens, and emigrants from a corruption-ridden country may carry some of this attitude to their destination countries. That is, once substantial inflows of migrants from more corrupt countries into less corrupt countries are observed, will we see – sooner or later – increasing levels of corruption in the destination countries as well? Or, rather, will we see no significant (or even an opposite) effect on destination countries' levels of corruption because it is mostly honest citizens that flee their corrupted home countries? Given these contrasting views, the ultimate impact of migration flows on the destination country's corruption is not immediately obvious. It will thus be the present paper's aim to investigate the underlying effects in detail, and segregate them in distinct channels through which corruption may migrate and thus possibly exert adverse effects on the targeted society in the short and medium term. To date, this specific topic has yet not been examined in the existing literature, but in related literature, addressed in this paper.

Anecdotal evidence from several branches of organized crime exemplifies the problem under consideration. In the late nineteenth century, thousands of members of the Cosa Nostra migrated from Sicily to the United States, where they started their criminal activities. While in the beginning they resorted to petty crime, institutional shifts in US public policies allowed them to establish a powerful Mafia organization exerting various forms of criminal activities including all levels of corrupt behavior (from petty corruption to grand corruption) (Varese, 2011).

In 1980, the Mariel boatlift became infamous for Fidel Castro forcing boat owners who were allowed to bring relatives from Cuba to the United States to also carry back prisoners of Cuban jails. Consequently, many of the 125,000 refugees that landed in Florida had a criminal record (Larzelere, 1988), arguably affecting criminal and corrupt behavior in Florida. At the same time, the civil war in Lebanon in the 1980s made thousands of members of the Miri-Clan flee the country and head toward Europe. They settled mainly in larger German towns, where they soon became involved in criminal activities, allegedly including drug and arms trafficking, kidnapping and prostitution (Albrecht, 1997). Similarly, mainly driven by

contrasting attitudes and behavior patterns, Chinese immigration to Thailand and Indonesia triggered criminal activities over the last decades. In particular, the combination of severe government regulation and ethnic discrimination compelled overseas Chinese to turn to both *ad hoc* bribery and more sophisticated economic relations with government officials, precipitating a discernible acceleration of criminal behavior in the post-World War II era (Sowell, 1997).

In fact, the fear that domestic criminal activities and corruption might skyrocket due to generous immigration policies recently entered the international arena, when the G20 agreed to immigration control measures proposed by the Anti-Corruption Working Group targeting specifically corrupt immigrants and the proceeds of crime imported into the G20 countries. These measures even include the deportation of wealthy foreign nationals (De Palma, et al., 2013).

The previous examples point at two different issues which require closer inspection. First, the channels through which corruption might migrate, and second, the impact that (selective) migration has on the development of corruption in the destination country. Our paper's aim is to shed light on both these issues. However, there is a third issue, namely endogeneity, which needs to be considered. Our previous reasoning implicitly assumes that destination countries' levels of corruption change as a consequence of inflows of migrants. While this appears plausible given the presented evidence, we cannot entirely exclude the possibility that migration flows are shaped by the levels of corruption in the destination country. For instance, corrupt (honest) migrants might have a preference for living in a corrupt (non-corrupt) environment both at home and abroad. If this kind of reverse causality (or other endogeneity problems) apply, statistical inference would be misleading. Hence, we include appropriate empirical strategies in particular, a Difference-General Method of Moments (Difference-GMM) approach to exclude this possibility.

Our paper will proceed as follows: Section 2.2.2 will elaborate on the theoretical assumptions underlying the migration process and derive hypotheses on the migration–corruption nexus. Our empirical method will be explained in Section 2.2.3, while our data will be presented in Section 2.2.4. Our hypotheses will be empirically tested and discussed in Section 2.2.5. We conclude in Section 2.2.6.

2.2.2 Theoretical Considerations

There are many reasons why individuals may want to leave their home countries and move abroad. In his seminal paper, Sjaastad (1962) condenses the individual migration decision to a meaningful cost–benefit calculus. Both, economic and non-economic costs[1] and benefits[2] need to be taken into account. More specifically, we may apply the following categorization which distinguishes between *push* and *pull factors* affecting migration decisions.[3] On the one hand, better career and income prospects are typical pull factors which attract migrants to come to a certain destination country. On the other hand, unfavorable conditions at home, such as poverty or unemployment, constitute push factors which make people want to leave. However, these examples are purely economic ones. A number of recent publications have shown that politico-institutional factors (and sometimes environmental factors, cf., e.g., Gröschl (2005)) also affect potential migrants' cost–benefit matrices. Of particular relevance for our approach are papers which relate a weak institutional framework to migration flows. For instance, civil war tends to foster emigration (cf., e.g., Collier and Hoeffler (2004)) and migrants might harbor more conflictive attitudes than locals after war (Hall (2014, p. 2)).

Similarly, Dreher et al. (2011) show that people tend to leave terror-ridden countries. Cooray and Schneider (2014) and Dimant et al. (2013) explicitly consider the effect of corruption on migration, showing that a high level of corruption drives people out of the country. Interestingly, these authors also argue that skilled people are particularly prone to emigrate because terror and corruption make it difficult to recoup the often substantial investments into one's own education, and to earn an adequate return on this investment. We will return to this argument shortly.

Let us first turn to the important question why we would (or would not) expect migration to affect the level of corruption in the destination country. At first glance, there appear to be several arguments why there ought to be no such effect. Migrants tend to assimilate (at least) in economic terms – although at different speeds – in the target country (cf. Chiswick

[1] These costs include, for example, the actual moving costs as well as (psychological) costs related to giving up social relations or a devaluation of location-specific human capital.

[2] Here, we refer to, inter alia, higher incomes as well as gaining personal freedoms.

[3] Cf. Zimmermann (1996) for a detailed description of the push–pull model of migration, including a discussion of a variety of these factors.

(1978)). One may also reasonably speculate that this is true in even more general terms, for example, assimilation might occur on a wide range of individual behaviors.[4] Hence, even if immigrants stem from a highly corrupted country, once they enter the less corrupted destination country they might very well start to follow the rules, and align themselves to the existing norms of the destination country. This leads us to our first hypothesis:

Hypothesis H1: The general effect of immigration on the host country's level of corruption is insignificant.

Contrary to this view, the effect of selective migration could be traceable, thus allowing the destination countries' corruption levels to change with immigration, thereby allowing for effects in either direction. To begin, emigrants from a highly corrupted country may represent a positive selection. Selection effects have played a prominent role in the migration literature since Borjas' (1987) seminal paper. Self-selection into specific countries occurs because migrants with certain characteristics expect these traits to generate utility gains abroad.[5] In this context, Krieger et al. (2014) show that cultural closeness matters to the self-selection of migrants, suggesting that a wide range of factors, including cultural, political and institutional ones, are indicative of explaining migration flows. With respect to our model, Dimant et al. (2013) raise the important point that the reason for brain drain from a corrupted country might be that skilled workers could be outsiders to the labor market due to inherent systemic frictions. Although highly productive, these workers do not find employment because of corruption and nepotism. Jobs are given to insiders irrespective of their qualification, for example, to those who are either close to the employer, or who have sufficient funds to bribe them. Here, frustrations with existing institutions are important drivers to migrant self-selection.

What is more, when (skilled) outsiders leave a country there ought to be a high probability that they are (far) less corruptible than the average citizens of this country when nepotism

[4] Cf. Zimmermann (1996) for a detailed description of the push–pull model of migration, including a discussion of a variety of these factors.

[5] For instance, people with high individual ability may prefer to enter countries with a less equal income distribution than at home because they expect to end up with a high probability at the upper end of the more dispersed income scale due to their superior skills.

(from which they do not benefit) prevails. In fact, they might even be less corruptible than the average person in the destination country. This would imply a decreasing level of corruption after immigration took place.[6]

Finally, the behavior of the target country's population and the country's institutional setting matters. Even if immigrants are highly corrupt and remain so over time, the target country's population may simply ignore immigrants' attempts to bribe them. If then the native population is approached by immigrants for goods, services or other things which might require bribing, there is arguably no reason to expect that immigration will have a relevant effect on the level of corruption in the host country. Consequently, one could be more inclined to believe that corruption is relatively invariant against migration.

However, the previous reasoning might be challenged on several grounds. First, corrupt countries often experience large outflows of migrants. Corruption is often accompanied by a large set of unfavorable outcomes such as poverty, inequality, unemployment, a rise of the shadow economy, adverse effects on economic growth, abolishment of social values and norms and the like (cf. Tanzi (1998); for a comprehensive overview, cf. Dimant (2014)). These negative conditions typically constitute push factors of migration, not only for a small positive selection of honest people but also to the corruptible average individual. Our anecdotal evidence points in this direction.

Second, the assimilation assumption might be difficult to justify if persistent cultural and social beliefs prevail. Corruption in a country might be the outcome of the (historical) development of institutions, policies and markets. If, in the evolution of this institutional setting, corrupt behavior has become a cultural norm and belief, it will be internal to the individual. When individuals migrate, their beliefs and values can be expected to move with them, although their external (corrupt) environment remains behind (cf. Alesina et al. (2013)). This argument is in line with a wide range of scholarly work. Capitalizing on a unique dataset that includes the parking behavior of United Nations officials in Manhattan, Fisman and Miguel (2007) find that corruption levels in the diplomats' home countries are strongly related to their parking violations in Manhattan. Their results indicate that inherent norms related to

[6] Clark et al. (2014) find that a higher stock of migrants coming from non-OECD countries leads to an improvement of institutional quality in a set of 110 countries. Zhang (2014) finds that, over time, migration leads to a decrease in property crime rates in Canada.

corruption are deeply entrenched within the people's mindset. Bilodeau (2014) finds that the immigrants' relationship with their destination country's politics is substantially affected by the political environment in their home country, thus sustainably imprinting their personal attitudes. Along these lines, Helliwell (2014) also find support for the footprint effect of trust levels, which is of high relevance in the corruption context (cf. Bjørnskov (2011); Rothstein and Eek (2009)). Their results suggest that migrants from low-trust environments carry over their trust-attitudes to their destination countries in a much more pronounced way than migrants from high trust environments, indicating an asymmetric interrelation between migration and stickiness of norms (see also Uslaner (2008)). Consequently, value assimilation becomes unlikely in the short run, and corrupt behavior remains persistent.

Third, as Varese (2011) notes, successful criminal behavior in a new and unknown environment does not only require a criminal mind, but also an opportunity. It might take some time after entering the destination country to comprehensively adapt to the new environment, and to find ways and means for successful corruption. If immigrants show persistent corruption attitudes, the full effect of immigrants' corrupt behavior may become visible in the target country only after some period of time. This leads us to our next hypothesis.

Hypothesis H2: The effect on the destination country's level of corruption, related to immigration from a more corrupt sending country to a less corrupt destination country, is positive. However, it might take some time before the effect becomes noticeable.

In the following section, we will test our hypotheses to investigate which effects dominate. Beforehand, a caveat is in order. Endogeneity is a widely acknowledged issue in empirical corruption research.[7] As is generally true for empirical panel data research, a correlation exposes a general coherence rather than rendering a clear causal relationship. In our case, corruption could potentially be both the antecedent and the effect of other factors. As already indicated above, Cooray and Schneider (2014) and Dimant et al. (2013) show reverse causality between migration and corruption, finding that excessive corruption decisively impacts migration flows. Hence, immigration might very well leave a corrupt footprint in the

[7] For example, the literature indicates that the relationship between corruption and economic growth also holds in the reverse direction (cf. Dreher and Gassebner (2013); supporting the 'greasing- the-wheels' hypothesis, and Méon and Sekkat (2005), supporting the 'sanding-the-wheels' hypothesis).

destination country because of (self-) selection effects. If, for instance, an honest outsider decides to leave a corrupt country it is unlikely that he/she will (voluntarily) choose an equally corrupt destination. That is, the level of corruption in the destination country might be relevant in shaping migration flows. Evidently, it is important to control for endogeneity as the results might potentially suffer from a reverse-causality bias. Our approach of how to address this problem will be presented in the following section.

2.2.3 Empirical Analysis

The Empirical Model

Based on the previous theoretical considerations, the discussion in this and the following section aims at testing the hypotheses developed in Section 2.2.2. Our starting point is a panel model of the form

$$corruption_{it} = \alpha + \phi\, migration_{it-q} + \beta\, X'_{it-1} + \eta_i + \varepsilon_{it}$$

where $corruption_{it}$ is the level of corruption in country *i* and year *t*, $migration_{it-q}$ is the total migration stock with a time lag *q*, X'_{it-1} is a conditioning set of lagged control variables and the disturbance term is composed of the individual effect η_i and the stochastic disturbance ε_{it} which is assumed to be generated by a white noise process. This specification allows testing the general effect of migration on corruption according to hypothesis H1.

Since we assume the migration variable to have a time-shift effect on corruption, we let the independent variable of interest enter the model with a time lag q, which may take values from one to five if, for example, the maximum lag is five years. This lag structure allows us to differentiate between immediate and delayed effects. Additionally, lagging the independent variable of interest dampens the problem of a possible endogenous relationship between corruption and migration by eliminating the correlation between the explanatory variables and the error term. We report the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) to allow for a comparison of the model fit of the alternative lag

selections.[8] Assuming control variables also do not have an immediate effect in the same period, all other controls enter the model with a lag of *t-1*. We provide results for fixed-effects panel regressions that allow us to account for country-specific effects.

Furthermore, we explore the effect of immigration from highly corrupt countries on the corruption level of the target countries according to hypothesis H2. This is tested by regressing the total migration stock from countries that exhibit a corruption level which is higher than the total average over all 207 countries of migration origin on the corruption level of the destination country, so that we can test if a higher migration stock from more than proportionally corrupt countries drives the corruption level in the destination country.

Dealing with Potential Endogeneity

We account for potential endogeneity by applying a Difference-GMM estimation in order to exclude results that might be driven by the underlying econometric approach, and thus do not allow for statistically reliable inference. The dynamic GMM approach developed by Arellano and Bond (1991) appears as an appropriate approach, as it allows calculating consistent and efficient estimates by using lagged levels dated in period *t-2* and earlier as instruments. The corresponding moment condition can be checked using the Sargan statistic that tests the validity of the instruments.

In following Arellano and Bond (1991), we provide results for Difference-GMM estimations. In general, the results are in line with the estimations presented before. An alternative estimation proposed by Arellano and Bover (1995) and Blundell and Bond (1998) is the System-GMM approach, which performs well with highly persistent data under mild assumptions. However, there is an important point to be made about using System-GMM. Given that System-GMM uses more instruments than the Difference-GMM, it may not be appropriate to use System-GMM with a dataset that consists of a small number of countries. In this case, this method is likely to exhibit a finite sample bias as the number of instruments increases exponentially with the number of periods used. As argued by Roodman (2009), such an overfitting of endogenous variables is likely to lead to false positive results. In addition, the assumption of lagged control variables being exogenous to the error term is non-trivial. For this

[8] Plümper et al. (2005) illustrate that in fixed-effects models the lag structure of the independent variable has a large impact on the coefficient and the level of significance. They argue that there is no generally accepted indicator for the determination of the length of the lag, however, there are several candidates like the t-statistic, the R2, the AIC and the BIC that facilitate the choice.

reason, we resort to the Difference-GMM approach, as the ratio of countries and time periods used in our panel is well balanced, thus ruling out a potential small sample bias (cf. Alonso-Borrego and Arellano (1999)).[9]

2.2.4 Data

Dependent Variable

We use the cross-national corruption rating from the International Country Risk Guide (ICRG) (PRS Group, 2008). It relies on the subjective assessment of country experts typically operating within international non-governmental organizations. As a component of the political rights index, it is concerned with actual or potential corruption in the form of excessive patronage, nepotism, job reservations, 'favor-for-favors', secret party funding and suspiciously close ties between politics and business.[10] Originally, the value of the index ranges from 0 to 6, with 0 indicating a high level of corruption and 6 representing a low level. We transpose the scale to simplify the interpretation of the results so that higher values of the index indicate a higher extent of corruption. The main advantage of this index is that it is available annually for a large sample of countries beginning in the early 1980s, and so enables us to analyze the corruption–migration nexus within a panel framework.[11] The summary statistics can be found in Table S1.

Main Independent Variable of Interest

Our main independent variable is immigration (*migration*). We use the OECD International Migration Database which provides annual series on migration flows and stocks into OECD countries from 207 countries of origin for the period 1975–2011 (OECD, 2014a). The major advantage of this dataset is that it provides bilateral data and so allows distinguishing between countries of destination and countries of origin, allowing us not only to analyze the general effect of migration on corruption but also to group source countries according to

[9] To check the robustness of the model specification, we also run all regressions using the System-GMM. The results support our main findings. However, the rule of thumb – to keep the number of instruments less than or equal to the number of groups – cannot be met. Even if only the second lag is used as an instrument for the System-GMM the number of instruments exceeds the number of countries. The results are available on request.

[10] http://www.prsgroup.com/ICRG_Methodology.aspx.

[11] Other common corruption measures like the Corruption Perceptions Index (CPI) constructed by Transparency International or the Control of Corruption Rating published by the World Bank are available only from 1995 and 1996, respectively. Svensson (2005) and Treisman (2007) show that all three measures are highly correlated.

their level of corruption. We weigh migration by the respective destination country's population in thousands in order to account for the inherent population size heterogeneity across the OECD countries. Since different countries use different definitions of immigration[12] and different sources for their migration statistics, the OECD database offers both data on immigrants by nationality and on immigrants by country of birth.

Especially in the case of the migration stock variable, the differences in the definition play an important role and must be considered. The 'country of birth' approach takes into account the foreign-born population, for example, the first generation of immigrants, including immigrants that have obtained citizenship. The 'nationality' approach includes second and higher generations of foreigners, but does not cover naturalized citizens. Thus, the nature of the countries' legislation on citizenship and naturalization plays a role (Pedersen et al. (2008)). We use the immigrants stock by 'nationality' variable for three reasons. First, this variable is available for more country-time observations than the immigration stock by 'country of birth', thus allowing for more meaningful estimations. Second, we act on the assumption that naturalized citizens should be put on an equal footing with the domestic population as it is reasonable to assume that the naturalized citizens' magnitude of assimilation is well advanced. Third (and closely connected to the previous argument), our hypothesis H2 takes the assimilation process into consideration assuming that the full effect of immigration on destination country corruption occurs only after some time. The 'nationality' approach takes up this time dimension more naturally.

Control Variables

To avoid spurious relationships between the dependent variable and the independent variable of interest, we employ a set of control variables commonly identified as potential determinants of corruption. In our baseline specification we control, first, for the impact of *economic development* measured by (logged) real per capita income (*GDP p.c.*) extracted from the Penn World Table (PWT) (Heston, et al., 2012). It is a commonly used variable to explain corruption. The theoretical argument stresses that economic development fosters

[12] Countries like Australia, Canada, the Netherlands, New Zealand, Poland, the Slovak Republic and the United States define an 'immigrant' by country of origin or country of birth, while some countries like Austria, the Czech Republic, Denmark, Finland, Greece, Iceland, Italy, Norway and Sweden define an immigrant by citizenship and finally some countries like Belgium, France, Hungary, Germany, Japan, Luxembourg, Portugal, Spain, Switzerland and the United Kingdom rely on self-reported nationality (Pedersen, et al., 2008).

higher institutional quality, which in turn will provide fewer breeding grounds for corruption via implementation of more sophisticated anticorruption measures. A higher chance of identification and punishment of corruption will increase the expected costs, and crowd out incentives to engage in deviant behavior (cf. Serra (2006)). Along these lines, several empirical studies find a robust negative correlation between economic development and perceived corruption, suggesting that poorer countries exhibit higher corruption rates (cf. La Porta et al. (1999); Serra (2006); Treisman (2007)). However, panel studies based on fixed-effect estimation by Braun and Di Tella (2004) find that an increase in a country's wealth measured by GDP per capita also increases corruption. A potential explanation for a positive nexus between growth and corruption is provided by Kindleberger (2000). He argues that moral standards vanish in times of economic booms due to a more pronounced manifestation of greed, eventually undermining the individual's disposition to obey the law. Overall, we follow the empirically settled mainstream argument and expect that more developed countries (in terms of GDP per capita) experience lower rates of corruption.

We also account for the effect of *population size* (PWT) on corruption. From the theoretical perspective, Knack and Azfar (2003) suggest that larger polities may benefit from economies of scale in establishing political and administrative structures, so that a large country size might be negatively correlated with corruption. On the other hand, small countries may benefit from higher manageability, and more efficiency and transparency in administrative management, leading to a positive correlation between population size and corruption. Empirical evidence shows mixed results. For one, Knack and Azfar (2003) show that there is indeed no clear relationship between country size and corruption and that existing results suffer from selection bias. On the other hand, a cross-country study by Tavares (2003) shows a negative impact of population on corruption, while Root (1999) finds that a larger population is significantly associated with more corruption indicating that smaller countries are less corrupt than larger countries. We follow the majority of existing evidence and assume that population size and extent of corruption go hand in hand, due to a higher number of potential bribers and bribees and issues of effective monitoring, which are likely to be more extensive with a growing population size.

Ali and Isse (2003) argue that a large government sector (*government size*) may create opportunities for corruption. The larger the size and scope of the bureaucracy, the more likely

it is to find corrupt behavior. On the contrary, Goel and Nelson (2010) indicate that government size might be inversely related to a country's corruption level. Not a large public sector *per se* determines the magnitude of corrupt activity, but larger governments might in fact devote a higher share of public spending to operative law enforcement aimed at deterring deviant behavior (cf. Fisman and Gatti (2002); Goel and Nelson (2010)).[13] Although not explicitly tested for a subset of OECD countries, we follow the majority of existing empirical evidence and expect a large government sector to have a negative impact on a country's corruption level. The variable is measured by government expenditure divided by GDP and extracted form the World Development Indicators (WorldBank, 2013).

Furthermore, we control for *democracy* measured by the Polity2 index (Polity IV Project, 2012), which is found to be highly relevant in existing theoretical and empirical research on corruption. In general, both strands of research indicate that more democratic countries tend to be less corrupt (e.g., Braun and Di Tella (2004); Knack and Azfar (2003); Kunicová and Rose-Ackerman (2005); Shen and Williamson (2005)). From a theoretical perspective, Shen and Williamson (2005) contend that states with democratic governments are likely to have more sophisticated policies and legal institutions that are more likely to be independent of the elites' impairment. Seldadyo and de Haan (2006) argue that political liberty imposes transparency and provides checks and balances within the political system and so tends to reduce corruption. Kunicová and Rose-Ackerman (2005) suggest that electoral rules and political structures can influence the level of corruption. Political participation, political competition and constraints on the chief executive make it easier to monitor the political system and limit political corruption.[14] Overall, since both theory and empirics resonate with each other, we would expect a negative impact of democracy on corruption.

In addition, existing research acknowledges the important link between *economic freedom* (ICRG) and corruption. From a theoretical perspective, one can argue that, especially in modern economies, many restrictions on economic freedom– in particular restrictions of

[13] However, it is worth noting that parts of the existing literature also point at a different relationship between government sector and corruption. Corrupt governments may impose detrimental effects on public goods delivery, weaken the tax morale and the bureaucratic quality whose functional interaction, ceteris paribus, likely leads to a smaller government sector (cf. Frey and Torgler (2007); Hall and Jones (1999); Johnson et al. (1997); Tanzi (2013)).

[14] Treisman (2007) indicates that the relationship between democracy and corruption might be more complex, suggesting that democratization increases corruption in the short run and reduces it as democracy deepens. However, the composition of our data does not allow us to examine long-run effects of controls such as democratization. Thus, we resort to a short-run examination of the control's impact on corruption.

capital and financial markets – provide opportunities for corruption (cf. Graeff and Mehlkop (2003)). This notion is strongly supported by the empirical literature. Goel and Nelson (2005) find a strong negative relationship between economic freedom and corruption, where the relationship depends on a country's level of development. Paldam (2002) presents similar results suggesting that countries with high regulation and little economic freedom have a larger potential for rent seeking, resulting in higher levels of corruption. Supportive results of a negative relationship between economic freedom and corruption are also found by Ali and Isse (2003), and Kunicová and Rose-Ackerman (2005). We expect that more economic freedom and fewer restrictions imposed on trade are inversely correlated with a country's corruption level. We measure economic freedom by the investment profile variable of the ICRG, arguing that a high investment risk accompanies lower economic freedom.[15]

Finally, *religion* may also matter for explaining corruption. Religion is believed to play a decisive role in affecting corruption levels through its inherent heterogeneity in putting emphasis on moral values, honesty and being in thrall to authority. Consequently, religious structures that are more hierarchical are believed to be more conducive to the inception and development of corrupt structures (Paldam, 2001). Empirical research finds that countries with a predominantly protestant population tend to have lower corruption levels, while more hierarchically structured religions (such as Catholicism, Eastern Orthodoxy and Islam) tend to increase corruption (La Porta, et al., 1999). We follow Blomberg and Hess (2008) in using religious tensions as a control in order to get an impression whether a dominant role of a specific religious group, and the suppression of religious freedom, has an effect on the level of corruption. The argument is that a dominant religion in a country creates differential access to power, leading to a situation in which less powerful religious groups resort to corruption for leveling the political and economic landscape.

A set of variables does not enter our baseline model, in particular economic growth, trade openness, internal and external conflicts and regime stability. Rather, they are used to assess the robustness of our findings. The first of these variables is *economic growth* (PWT) (in addition to the level of development). Ali and Isse (2003) argue that if countries with lower corruption levels grew faster, this positive experience ought to give way to a stricter fight

[15] As an alternative, we also employed the 'Economic Freedom' index provided by the Fraser Institute (Gwartney & Lawson, 2008). The results (based on a significantly smaller dataset) support our main findings and are available on request.

against corruption in the future. That is, economic growth should be negatively correlated with future corruption. However, the empirical evidence on this argument is mixed. While Leite and Weidmann (1999) find that GDP growth has a dampening effect on country level corruption, Berdiev et al. (2013) find the opposite effect. However, for the subset of OECD countries (in which we are interested in) their results remain insignificant. Furthermore, other studies find no significant effect at all (cf. Ali and Isse (2003); Brunetti et al. (1997); Mauro (1995)). Consequently, due to the focus on the same subset of countries, we expect our results to be in line with Berdiev et al. (2013) for their subset of OECD countries and expect no significant effect in either direction of GDP growth on corruption levels.

We furthermore assess the impact of *trade openness* – measured by exports and imports as a share of GDP (PWT) – as an indicator of competition.[16] Leite and Weidmann (1999) suggest that openness to foreign trade, which is equivalent to a relatively strong economic competition, is a primary factor for experiencing relatively low levels of corruption. This argument is backed up by empirical research. Sandholtz and Koetzle (2000) find that economic integration decreases corruption activity, albeit not directly.[17] In particular, the existing research sheds light on the interrelation between openness of financial markets and corruption levels. Although not entirely congruent, for the most part the existing literature points at the idea that restrictions bring about individual effort to bypass regulations with the use of deviant behavior, such as bribing public officials (cf. Dreher and Siemers (2009); Edwards (1999)). We thus expect an inverse relationship between trade openness and corruption, which is along the lines of the previous discussion on the impact of economic freedom on corruption.

We also account for a potential effect of *internal and external conflicts* (ICRG) on corruption. Conflicts – in terms of domestic and transnational terrorism or civil war – may have a destabilizing effect on the economy which is what we expect to show up in our analysis. For instance, Dreher et al. (2010) and Meierrieks and Gries (2013) show that terrorism affects the

[16] Alternatively, we proxy trade openness by the ratio of import to GDP (Herzfeld & Weiss, 2003). Here, a low import share implies high import restrictions. Consequently, the presence of such restrictions offers an opportunity to bribe (Seldadyo & De Haan, 2006).

[17] However, Knack and Azfar (2003) argue that trade share and import share of GDP are strongly related to country size. Smaller countries tend to have a higher trade share, so not controlling for population the coefficient on openness is likely to reflect selection bias.

economy negatively and contributes to political instability. This in turn may create a breeding ground and may also provide opportunities for corruption.

Regardless of the regime *type, regime stability* (Polity IV Project, 2012) is another political variable that may affect corruption. As suggested by Treisman (2007), it may take decades for democratic institutions to translate into low perceived corruption so that not the current regime type but the regime stability affects the corruption level. This is supported by an extreme-bounds analysis by Serra (2006), who provides evidence that actual democracy is weakly interrelated with corruption, whereas political stability measured by uninterrupted democracy results in reducing corruption. It is reasonable to assume that the political vacuums inherent to unstable regimes enable fraudsters to more easily find means to precipitate successful acts of corruption. Consequently, and in compliance with the previously lead discussion on the interrelation between democracy and corruption, we expect countries with stable regimes to be less prone to corruption.

2.2.5 Empirical Results

In this section, we report our empirical results using different econometric approaches to ensure robustness and to account for possible endogeneity issues. Table 1 presents results for the baseline model with an alternative lag length for both fixed effects (FE) and Difference-GMM estimations, while Tobit results are generally presented in the supporting information.[18]

[18] It should be noted that the results of the GMM estimates differ from those of the FE and the Tobit estimates in some cases. This has at least two reasons. For one, the Difference-GMM includes the lag of the dependent variable as an additional regressor, resulting in a reduction in the number of observations of about 10%. For another, based on the rule of thumb, which declares the number of instruments to be smaller than the number of cross sections, only one lag is used for instrumentation. However, in this case the GMM estimator is not necessarily efficient since it does not make use of all available moment restrictions.

Table 2.1.1: Migration and Corruption - Fixed Effects and GMM Baseline Regression

corruption	Fixed Effects					GMM				
	(1.1)	(1.2)	(1.3)	(1.4)	(1.5)	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)
corruption $_{t-1}$						0.4985***	0.4491**	0.3917	0.3147	0.3484
						(0.1652)	(0.2237)	(0.2425)	(0.2147)	(0.2145)
migration $_{t-1}$	0.0005					0.0003				
	(0.0039)					(0.0047)				
migration $_{t-2}$		0.0002					-0.0017			
		(0.0043)					(0.0051)			
migration $_{t-3}$			0.0019					-0.0047		
			(0.0047)					(0.0085)		
migration $_{t-4}$				0.0033					0.0122	
				(0.0046)					(0.0078)	
migration $_{t-5}$					0.0043					0.0059
					(0.0048)					(0.0042)
GDP p.c. $_{t-1}$	1.8796***	1.7139**	1.4869*	1.4467**	1.6121***	-0.0311	0.0215	0.0422	-0.5728	0.0948
	(0.5646)	(0.6567)	(0.7289)	(0.6060)	(0.5222)	(0.4961)	(0.5336)	(0.8027)	(0.7398)	(0.4358)
population $_{t-1}$	-0.0000	-0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	-0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
gov size $_{t-1}$	0.0770**	0.0972***	0.1169***	0.1363***	0.1316***	-0.0050	-0.0087	-0.0058	-0.0180	0.0039
	(0.0345)	(0.0345)	(0.0291)	(0.0259)	(0.0258)	(0.0306)	(0.0352)	(0.0347)	(0.0328)	(0.0264)
democracy $_{t-1}$	-0.1664***	-0.0913*	0.0875	0.1434	0.1997	-0.0081	0.0124	-0.0034	-0.0390	-0.0245
	(0.0300)	(0.0470)	(0.1487)	(0.1536)	(0.1603)	(0.0267)	(0.0703)	(0.0728)	(0.0654)	(0.0604)

Table 2.1.1: Continued from Previous Page

econ freedom $_{t-1}$	0.0592*	0.0648*	0.0674*	0.0639**	0.0463**	0.0620***	0.0525***	0.0606***	0.0580***	0.0435***
	(0.0307)	(0.0343)	(0.0348)	(0.0291)	(0.0217)	(0.0235)	(0.0202)	(0.0178)	(0.0167)	(0.0145)
religious tension$_{t-1}$	0.2412	0.2159	0.2188	0.1842	0.1606	-0.0581	-0.0744	-0.0470	-0.0805	-0.0780
	(0.1431)	(0.1353)	(0.1351)	(0.1290)	(0.1176)	(0.0742)	(0.0786)	(0.1054)	(0.0850)	(0.0660)
VIF	1.55	1.56	1.58	1.59	1.61					
Adjusted R^2	0.383	0.368	0.397	0.438	0.486					
AIC	669.3707	632.4003	550.0034	467.6052	392.3704					
BIC	697.9622	660.6486	577.8022	494.9997	419.3358					
Sargan (p-value)						0.5958	0.7639	0.7944	0.6773	0.6785
AR (2) (p-value)						0.1857	0.2882	0.4189	0.5372	0.5605
Instruments						31	30	29	28	27
Observations	439	418	392	370	348	406	385	363	341	319

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; robust standard errors in parentheses; GMM results based on the two-step Difference estimator, second lag of the dependent variable used as GMM-style instrument; AR (2) refers to the Arelano Bond test for autoregressive correlation (order 2); Sargan refers to the Sargan test of over identification restrictions; migration stock is weighted by population.

For the FE model, AIC and BIC indicate that a higher lag length selection leads to a better model fit. To account for possible heteroskedasticity, standard errors are Huber/White-corrected (Huber (1967); White (1980)). To rule out the problem of multicollinearity, we present the mean VIF statistics of the corresponding regression, according to which our estimations do not suffer from this problem. In addition, to verify GMM consistency, we have to ensure the validity of the instruments. We use the Sargan test of overidentifying restrictions to test the validity of the instrumental variables, and consider the test of second-order serial correlation of the error term suggested by Arellano and Bond (1991). Throughout all model specifications, both tests do not indicate problems with the instruments' validity.

Our results suggest that general migration has no consistent impact on corruption that would survive and hold across our different econometric models. This supports hypothesis H1. Specifically, both the FE and Difference-GMM estimations do not indicate any significant impact of general migration on corruption in the short or medium term.[19]

With respect to our control variables, we find that corruption is more likely in more developed (in terms of GDP per capita) countries, that have a high level of economic freedom and a large government, which finds support in existing empirical work (cf. Ali and Isse (2003); Braun and Di Tella (2004)). Our findings concerning the impact of economic freedom on corruption are somewhat more surprising. More economic freedom seems to propel a country's corruption level, which is not in line with existing mainstream research. Rather, this result is supportive of the hypothesis that economic freedom deals with a country's link to the global markets, and that this link could be beneficial for illegal actors, for example, in terms of an exploitation of economic rents (as argued by, inter alia, Graeff and Mehlkop (2003); Tornell and Lane (1999)). Such a disparity might partly be attributed to the circumstance that prior to our examination, to the best of our knowledge, no such comprehensive analysis existed

[19] It is important to note that although the lagged structure of the migration stock allows investigating a delayed effect, it should nevertheless be considered a short-term effect. A truly long-run effect (in the sense of a steady-state equilibrium outcome) might exhibit a different effect. Although the analysis focuses on the short-term perspective, we also run models which are able to capture long-run effects as a robustness check. The results from Dynamic Ordinary Least Square (DOLS) and Error-Correction Models (ECM) which we used to investigate a long-term relationship between migration and corruption are, however, ambiguous. While DOLS does not find a long-run relationship, the results of ECM support a cointegrated relationship between migration and corruption. The results are presented in Table S5. A full-fledged investigation of these findings is, however, beyond the scope of the present paper and is therefore left to future research.

for the impact of economic freedom on a subset of OECD countries' corruption level. For these countries with their particularly well-developed institutional settings, the interdependency between economic freedom and corruption levels might very well deviate from what has been found on a global scale. The impact of economic freedom on corruption levels proves to be robust in terms of the coefficients' magnitude, the effect's direction, the significance levels across different econometric models and the use of the Economic Freedom index provided by the Fraser Institute as an alternative measure (see footnote 18). Along these lines, we do not find such robustness across different specifications for the impact of GDP p.c. and government size on corruption levels.

As for the remaining controls, neither religion nor population size exerts a significant impact on corruption. As suggested by Paldam (2001), an existing misbalance of religious groups is generally conducive to the spread of corruption in a given country. However, this seems not to be true for the subset of OECD countries. Provided that OECD countries dispose of a higher institutional quality and a more comprehensive protection of (religious) interests as compared to the global average, OECD countries could be less prone to corruption driven by a religious imbalance.

Although the general picture is the same and supports our main hypothesis H1 when applying the Difference-GMM approach, the results are far more conservative with respect to the controls' impact on corruption levels. Here, only economic freedom shows up significantly. The direction and magnitude of the economic freedom's impact on host countries' corruption levels are similar to what is indicated by the FE regressions. This strengthens the validity of the result that a higher degree of economic freedom facilitates corruption in OECD countries.

In order to check the robustness of our findings, we add further controls (trade openness, internal and external conflicts) to our baseline model and use alternative measures for development by using GDP growth as well as regime stability. The results are presented in Table 2 and again confirm our previous finding that the general stock of immigration in a country has no effect on its corruption level.[20] Only few of the alternative controls have significant

[20] Due to space restrictions, we present only the results of the first and fifth lag of the immigration stock, yet, similar to the results of the baseline specification, the second, third and fourth lags are insignificant, too. The same applies to all the tables where we do not provide the intermediate lags, too.

signs. Specifically, the FE estimations suggest that larger governments, less restrictions on trade and more stable regimes, boost the country's corruption levels. The latter speaks to the idea that stable regimes become increasingly more prone for corrupt behaviour over time, while regime changes bring about new structures, thus inducing both uncertainty and the deterioration of existing corrupt structures. This finding is also in line with Mancur Olson's (1984) concept of institutional sclerosis, indicating that stable regimes are more prone to corruption due to cheaper lobbying and bribing (Berggren, et al., 2012). However, these effects are not consistently detectable when applying the Difference-GMM approach.

A further control is GDP growth. The estimations yield no significant impact of GDP growth on corruption which is in line with the results of Ali and Isse (2003), Berdiev et al. (2013), Brunetti et al. (1997) and Mauro (1995). Considering trade openness, we can again identify a positive and significant effect on corruption, indicating that a high trade share increases the probability of corruption. This result supports the argument that the rents created by trade endowments induce opportunities for rents-related corruption (Tornell & Lane, 1999).

When applying the Difference-GMM approach, both the internal conflict risk and the external conflict level have a weaker significant impact, although the effects go in opposite directions. The results suggest that, in the medium run, inner country turmoil and social unrests might successfully trigger the implementation of more sophisticated institutional structures that reduce opportunities for corruption, while the destabilizing effect of transnational conflicts – for example, transnational terrorism – on the economy may indeed create opportunities (due to growing intelligence and military services which often operate outside public control). However, these effects are only weakly significant and should not be overinterpreted, especially given that they do not remain consistently significant across different econometric methods.

Table 2.1.2: Migration and Corruption - Fixed Effects Baseline Regression with Alternative Controls

corruption	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
migration $_{t-1}$	0.0079***	0.0007	-0.0004	-0.0003				
	(0.0028)	(0.0035)	(0.0037)	(0.0025)				
migration $_{t-5}$					0.0093**	0.0018	0.0040	0.0009
					(0.0034)	(0.0048)	(0.0046)	(0.0034)
GDP p.c. $_{t-1}$			1.8293***	-0.1325			1.5394***	0.7642
			(0.5131)	(0.9277)			(0.4985)	(0.6353)
population $_{t-1}$	0.0000	0.0000	-0.0000	-0.0000	0.0001*	0.0001*	0.0001	0.0001
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0000)	(0.0000)
gov size $_{t-1}$	0.0737*	0.0840**	0.0644**	0.0347	0.1063***	0.1171***	0.1243***	0.1074***
	(0.0407)	(0.0369)	(0.0302)	(0.0320)	(0.0323)	(0.0289)	(0.0255)	(0.0295)
democracy $_{t-1}$	-0.0377	-0.0930**	-0.1348***		0.2731	0.2163	0.2266	
	(0.0426)	(0.0352)	(0.0322)		(0.2143)	(0.1758)	(0.1678)	
econ freedom $_{t-1}$	0.1217***	0.0544**	0.0520**	0.0413	0.0983***	0.0585**	0.0454**	0.0164
	(0.0253)	(0.0242)	(0.0234)	(0.0277)	(0.0248)	(0.0214)	(0.0216)	(0.0222)
religious tension $_{t-1}$	0.2275	0.2090	0.2473*	0.1951	0.1667	0.1379	0.1698	0.0954
	(0.1676)	(0.1589)	(0.1337)	(0.1505)	(0.1240)	(0.1305)	(0.1124)	(0.1205)
GDP p.c. growth $_{t-1}$	0.6949				-0.2731			
	(1.4672)				(1.1339)			
trade openness $_{t-1}$		0.0156***				0.0119***		
		(0.0035)				(0.0038)		
internal conflict $_{t-1}$			-0.0850				-0.0605	
			(0.0667)				(0.0641)	
external conflict $_{t-1}$			0.1203				0.0724	
			(0.0966)				(0.0821)	
regime stability $_{t-1}$				0.0613**				0.0433**
				(0.0234)				(0.0208)

Table 2.1.2: Continued from Previous Page

VIF	1.28	1.98	1.77	1.58	1.34	2.19	1.91	1.58
Adjusted R^2	0.310	0.379	0.396	0.411	0.443	0.483	0.489	0.493
AIC	696.9321	672.1169	661.6321	648.9388	420.2725	394.3588	392.0972	387.4652
BIC	725.3623	700.7084	698.3926	677.5303	447.2379	421.3242	426.7670	414.4306
Observations	429	439	439	439	348	348	348	348

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; robust standard errors in parentheses; migration stock is weighted by population.

Finally, the Difference-GMM estimations yield a significant and positive effect of regime stability, indicating that, in the short run, countries that are wealthier and possess a more stable regime structure are more prone to corruption. While the overall direction is the same, the effect's magnitude is more conservative than the coefficients derived from the FE approach and only shows up significantly in the short run. We present the Difference-GMM results in Table 3.[21]

After we could not identify a consistent and significant effect of general immigration on corruption supporting H1, we now turn to the question raised in hypothesis H2, whether corruption migrates and how long it may take to infiltrate the destination country. More specifically, we explore whether immigrants from highly corrupt countries carry over their behavior, so that immigration from countries with a level of corruption that is higher than the average leads to an increase in corruption in the destination country. The results of this exercise are shown in Table 4. Again, we present the FE and Difference-GMM estimations jointly. The results are based on a calculation of the total average of corruption levels over all countries for each year from which we then derive the most corrupt countries at the top 50% level.[22]

Overall, the results indicate that immigration from highly corrupt countries boosts the corruption level in the host country, thus supporting our hypothesis H2. According to the FE estimation, we find a significant and positive effect of selected migration on host countries' corruption levels. The coefficient rises to a value of 0.0099 (for a lag of three periods), which means that an increase in the migration stock of one hundred migrants per one thousand citizens affects corruption significantly, increasing the corruption value by 0.99 points (out of 7). This is a raise of 14.1% of the maximum scale. As it has previously been the case, the results of the Difference-GMM estimations are more conservative, thus representing a lower bound result with a raise of up to 4.4% of the maximum scale for the same increase in the migrants-to-citizens ratio. Conversely, the results of the alternative Tobit regressions point to an upper bound result, indicating a raise of up to 18.1% of the maximum scale. In general,

[21] We also calculate a Tobit version of the regressions with and without alternative control variables. The results are in line with the FE estimation and are presented in Table S3.

[22] Our findings do not change when we consider migration from even more corrupt countries at the top 40% (30%, 20% and 10%) level.

the Difference-GMM results are more conservative and turn out to be significant less often compared to the FE and Tobit estimations. We trace this back to the limited amount of cross sections, which is a problem inherent to our focus on OECD countries.[23] Future research might potentially overcome this drawback by extending the research scope beyond OECD countries.

Noticeably, while we initially observe an escalating effect of selective migration on corruption levels, the results are indicative of an assimilation process over time.

[23] Further possible explanations were offered in the beginning of this section.

Table 2.1.3: Migration and Corruption - Difference-GMM Regression with Alternative Controls

corruption	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
corruption $_{t-1}$	0.4531***	0.4341***	0.4909***	0.5372**	0.3699*	0.3327*	0.3743*	0.6012***
	(0.1466)	(0.1587)	(0.1740)	(0.2237)	(0.1919)	(0.1975)	(0.2000)	(0.0921)
migration $_{t-1}$	0.0006	-0.0026	-0.0006	-0.0040				
	(0.0038)	(0.0061)	(0.0047)	(0.0056)				
migration $_{t-5}$					0.0075	0.0050	0.0064*	0.0030
					(0.0053)	(0.0037)	(0.0038)	(0.0032)
GDP p.c. $_{t-1}$			-0.0115	-1.0297***			-0.1208	-0.9525
			(0.5432)	(0.3747)			(0.2843)	(0.7889)
population $_{t-1}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
gov size $_{t-1}$	-0.0115	0.0006	-0.0102	-0.0189	-0.0096	0.0087	0.0042	-0.0257
	(0.0337)	(0.0288)	(0.0328)	(0.0337)	(0.0259)	(0.0288)	(0.0260)	(0.0278)
democracy $_{t-1}$	-0.0131	-0.0182	0.0068		0.0207	-0.0259	0.0672	
	(0.0251)	(0.0237)	(0.0313)		(0.0950)	(0.1338)	(0.0821)	
econ freedom $_{t-1}$	0.0669***	0.0604**	0.0567**	0.0406**	0.0464***	0.0382***	0.0423***	0.0192
	(0.0254)	(0.0242)	(0.0222)	(0.0162)	(0.0127)	(0.0131)	(0.0154)	(0.0137)
religious tension $_{t-1}$	0.0418	0.0520	0.0792	0.0707	0.0674	0.0735	0.0555	0.1102*
	(0.0861)	(0.0740)	(0.0865)	(0.0913)	(0.0583)	(0.0612)	(0.0708)	(0.0609)
GDP p.c. growth	-0.5576				-0.7175			
	(0.8686)				(0.7638)			
trade openness $_{t-1}$		0.0033				0.0021		
		(0.0043)				(0.0030)		
internal conflict $_{t-1}$			-0.0129				-0.0896*	
			(0.0380)				(0.0458)	
external conflict $_{t-1}$			0.0311				0.0822*	
			(0.0384)				(0.0430)	
regime stability $_{t-1}$				0.0457**				0.0397
				(0.0201)				(0.0250)

Table 2.1.3: Continued from Previous Page

Sargan (p-Value)	0.5787	0.6018	0.7435	0.6894	0.7741	0.7274	0.7305	0.7374
AR (2) (p-value)	0.2176	0.2107	0.2153	0.1494	0.5403	0.5610	0.6099	0.4782
Instruments	30	31	33	31	27	27	29	27
Observations	396	406	406	406	319	319	319	319

Note: * p < 0.10, ** p < 0.05, *** p < 0.01; robust standard errors in parentheses; GMM results based on the two-step Difference-GMM estimator, second lag of the dependent variable used as GMM-style instrument; AR (2) refers to the Arelano Bond test for autoregressive correlation (order 2); Sargan refers to the Sargan test of over identification restrictions; migration stock is weighted by population.

Table 2.1.4: Migration from Corrupt Countries and Corruption - Fixed Effects and GMM Regression

corruption	Fixed Effects					GMM				
	(1.1)	(1.2)	(1.3)	(1.4)	(1.5)	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)
corruption $_{t-1}$						0.5278***	0.4694**	0.5085***	0.3542**	0.3792*
						(0.1875)	(0.1974)	(0.1926)	(0.1716)	(0.2219)
migration $_{t-1}$	0.0087**					-0.0016				
	(0.0037)					(0.0014)				
migration $_{t-2}$		0.0095***					0.0026*			
		(0.0033)					(0.0014)			
migration $_{t-3}$			0.0099***					0.0031**		
			(0.0030)					(0.0015)		
migration $_{t-4}$				0.0073***					-0.0004	
				(0.0023)					(0.0008)	
migration $_{t-5}$					0.0040*					-0.0007
					(0.0020)					(0.0011)
GDP p.c. $_{t-1}$	1.0742*	1.0156	1.0565	1.2442**	1.6372***	-0.3686	-0.3201	-0.4154	-0.1656	0.1622
	(0.5622)	(0.5998)	(0.6270)	(0.5403)	(0.4360)	(0.5195)	(0.3661)	(0.4664)	(0.3887)	(0.5569)
population $_{t-1}$	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
gov size $_{t-1}$	0.0522	0.0734**	0.0855***	0.0997***	0.0989***	-0.0109	-0.0078	-0.0171	-0.0013	0.0050
	(0.0388)	(0.0338)	(0.0290)	(0.0273)	(0.0250)	(0.0332)	(0.0265)	(0.0353)	(0.0272)	(0.0358)
democracy $_{t-1}$	-0.1738***	-0.1251**	0.0682	0.1052	0.1565	0.0332	0.0210	-0.0095	0.0446	-0.0003
	(0.0295)	(0.0512)	(0.1657)	(0.1667)	(0.1573)	(0.0887)	(0.2159)	(0.1567)	(0.1538)	(0.1068)
econ freedom $_{t-1}$	0.0741**	0.0721**	0.0672*	0.0616*	0.0425*	0.0505**	0.0382*	0.0410**	0.0393**	0.0433**
	(0.0327)	(0.0348)	(0.0363)	(0.0313)	(0.0229)	(0.0212)	(0.0230)	(0.0160)	(0.0171)	(0.0192)
religious tension$_{t-1}$	0.2573*	0.2462*	0.2584*	0.2035	0.1564	-0.0273	-0.0234	-0.0104	-0.0405	-0.0564
	(0.1401)	(0.1341)	(0.1303)	(0.1209)	(0.1077)	(0.0807)	(0.0752)	(0.0795)	(0.0418)	(0.0480)

Table 2.1.4: Continued from Previous Page

VIF	1.24	1.26	1.27	1.26	1.27					
Adjusted R^2	0.382	0.381	0.423	0.459	0.494					
AIC	625.1091	579.3207	501.4671	432.3486	367.1703					
BIC	653.2051	607.0477	528.7663	459.2535	393.6571					
Sargan (p-value)						0.7940	0.9690	0.8070	0.8624	0.6690
AR (2) (p-value)						0.3989	0.3811	0.6287	0.6532	0.8664
Instruments						31	30	29	28	27
Observations	409	388	365	345	325	379	358	338	318	298

Note: * p < 0.10, ** p < 0.05, *** p < 0.01; robust standard errors in parentheses; GMM results based on the two-step Difference-GMM estimator, second lag of the dependent variable used as GMM-style instrument; AR (2) refers to the Arelano Bond test for autoregressive correlation (order 2); Sargan refers to the Sargan test of over identification restrictions; migration stock is weighted by population.

These observations are in line with the previously discussed arguments presented by Chiswick (1978), which are supportive of the idea that the migrants' assimilation happens at different speeds.[24] Moreover, the results of the control variables are broadly in line with our previous findings presented in Tables 1 and 2.

2.2.6 Conclusion

In this paper, we shed light on the impact of migration on corruption in the destination country. Capitalizing on a comprehensive dataset consisting of annual series on migration flows and stocks into OECD countries from 207 sending countries for the period 1984–2008, we explored different channels through which corruption might migrate. Initially, the implications might go into various directions as different effects are in place at the same time. On one side, the existing literature suggests that migration could be the result of a positive selection. For example, highly skilled people might leave their home countries as they expect their individual living conditions to improve. On the contrary, however, poor socioeconomic conditions typically constitute push factors of migration, not only for a small positive selection of honest people but also for the corruptible average individual.

Independent of the econometric methodology applied, we consistently find that (i) general migration has an insignificant effect on the destination country's corruption level, and (ii) that immigration from corruption-ridden countries boosts corruption in the destination country. This holds even after controlling for potential endogeneity by means of a Difference-GMM estimation.

Hence, the fear by international legislators (as expressed in recent agreements by the G20 group) that immigration may cause a problematic inflow of corruption appears justified. Policy-makers will, therefore, have to take precautions to avoid this problem. However, it is not immediately obvious what the optimal response will be. One possibility could be to restrict immigration by only selecting immigrants originating from non-corrupt countries. Alternatively, very careful checks *ad personam* could be conducted. The downside of this pol-

[24] The results of the Tobit regression are presented in Table S4 in the online appendix. The results are coherent and survive when using the alternative set of control variables.

icy is that the remaining inflow of migrants could be rather small, which might not be optimal, given that most OECD countries face a severe ageing problem and are in need of immigration to keep their social security systems sustainable. An arguably better strategy could be to immunize the domestic population against a corrupt attitude brought into the country by some immigrants. This would be in line with Varese's (2011) argument which we may rephrase as follows: successful corruption needs both a corrupt mind and an opportunity.

CHAPTER 3: EXPERIMENTS

3.1 ON PEER EFFECTS: BEHAVIORAL CONTAGION OF (UN)ETHICAL BEHAVIOR AND THE ROLE OF SOCIAL IDENTITY

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ABSTRACT:

Social interactions and the resulting peer effects loom large in both economic and social contexts. This is particularly true for the spillover of (un)ethical behavior in explaining how behavior and norms spread across individual people, neighborhoods, or even cultures. Although we understand and observe the outcomes of such contagion effects, little is known about the drivers and the underlying mechanisms, especially with respect to the role of social identity with one's peers and the (un)ethicality of behavior one is exposed to. We use a variant of a give-or-take dictator game to shed light on these aspects in a controlled laboratory setting. Our experiment contributes to the existing literature in two ways: first, using a novel approach of inducing social identification with one's peers in the lab, our design allows us to analyze the spillover-effects of (un)ethical behavior under varied levels of social identification. Second, we study whether contagion of ethical behavior differs from contagion of unethical behavior. Our results suggest that a) unethical behavior is more contagious, and b) social identification with one's peers and not the (un)ethicality of observed behavior is the main driver of behavioral contagion. Our findings are particularly important from a policy perspective both in order to foster pro-social and mitigate deviant behavior.

KEYWORDS: Conformity, Contagion, Peer Effects, Social Identity, Unethical Behavior

JEL: D03; D73; D81

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3.1.1 Introduction

Individuals do not co-exist in pure isolation but interact within social contexts, or as the eminent Elliot Aronson (2011) emphasizes it in his book's title: individuals are *social animals*. Despite the long tradition in anthropology and sociology, economists have been rather negligent of the relevance of norms, values, and social influence of peers on one's behavior for a long time. Fortunately, over the last two decades there has been a push in the economic discipline to expand our understanding of what comprises a more sophisticated individual decision maker by accounting for the individual's identity, morals, and other-regarding concerns (cf. Rabin (1993), Fehr & Schmidt (1999), Akerlof & Kranton (2000), Bolton & Ockenfels (2000), Charness & Rabin (2002), Bénabou & Tirole (2011)). These approaches have enriched our understanding by regarding social and economic decisions as a function of the respective social and economic environment and the relevance of one's peers' behavior.

Recently, both economists and psychologists have started engaging in a promising dialogue on behavioral ethics and the drivers of (un)ethical behavior by bringing together classical and behavioral approaches (for a recent review see Irlenbusch & Villeval (2015)). A standard economic argument is the assumption of fixed preferences, translating into one's conforming behavior being the result of social conventions or norms. Conversely, psychologists, sociologists, and recently some economists, among others, have challenged this fundamental assumption, suggesting that behavioral adaptation is the result of converging preferences and fluid tastes. Bernheim & Exley (2015) refer to the former as *belief mechanisms*, and to the latter as *preference mechanisms*. Along these lines, scholars in economics and psychology have attempted to shed light on the mechanism of peer effects using both lab and field experiments (for an overview see Houser et al. (2012) and Lahno & Serra-Garcia (2015)). Exemplarily, peers are found to significantly influence individual judgment (Asch, 1951) and risk taking behavior such as credit decisions (Banerjee, et al., 2013), stock market participation (Shiller, 1984), investment decisions (Scharfstein & Stein, 1990), and littering behavior (Cialdini, et al., 1990). Peer effects are also at play in education (Sacerdote, 2001) and productivity at work (Falk & Ichino (2006), Mas & Moretti (2009), and the seminal Moving-to-Opportunity literature, cf. Case & Katz (1991), Katz, Kling & Liebman (2001), Kling, Ludwig & Katz (2005), Kling, Liebman & Katz (2007), and Chetty, Hendren & Katz (2015)).

Studying behavioral spillovers and the adaptation of observed peer behavior particularly in the domain of (un)ethical behavior (we will call it *behavioral contagion* or *behavioral adaptation*) looms large due to its economic and social significance. Much like emotional contagion, the underlying idea of behavioral contagion depicts a form of social influence that leads to the emulation of behavior one has been exposed to (see Wheeler (1966) for a discussion and differentiation from other frequently used terms to describe such a phenomenon like conformity and imitation). It comes natural to analyze situations in which individuals can simultaneously engage in either ethical or unethical behavior. However, most existing studies have rather focused on analyzing ethical and unethical behavior in isolation. Economic studies have highlighted peer-effects in pro-social behavior (Frey & Meier (2004), Gächter et al. (2013)), voluntary cooperation (Thöni & Gächter, 2015), as well as within the unethical domain, such as the use of performance enhancing drugs (Gould & Kaplan, 2011), and even dishonesty (Innes & Mitra, 2013). In sum, there exists ample evidence that peer effects are a phenomenon across different contexts, social environments, and cultural groups and individuals adjust own behavior to resemble one's peers.

However, scholars across various fields are still disunited on whether the methods used qualify to observe clean peer effects, or whether our observations are an artifact of potential confounds. Exemplarily, a stream of literature points at methodological problems in soundly measuring such effects, especially outside the controlled laboratory environment (for a critical discussion see Manski (1993) & (2000) and Angrist (2014)). Our work adds to this literature by broadening our understanding of how peer effects and the resulting behavioral contagion play out within the spheres of both ethical and unethical behavior simultaneously. Using a novel design that allows us to study different types of behavior and behavioral spillovers simultaneously is one of the ways we add to the existing literature. Beyond that, we use a novel approach to induce varying levels of social identity in the lab to study behavioral contagion in different social settings. We will return to this shortly.

Our goal is to contribute to this debate by shedding light on two aspects: first, does social identification to one's peers facilitate the spread of (un)ethical behavior? Second, is the magnitude of behavioral contagion dependent on the (un)ethicality of the behavior and if so, which behavior is more contagious? By answering these questions, we contribute to the growing economic literature on the role of identity and social context on behavior in general

(cf. Hoffman, McCabe & Smith (1996), Bohnet & Frey (1999), Akerlof & Cranton (2000), Charness & Gneezy (2008)) and spillovers resulting from peer effects in particular (i.e. see the previously mentioned seminal Moving-to-Opportunity literature). However, in our study we analyze lower-bound peer effects because adaptive behavior remains unobservable by one's peers and thus carries no signaling value. Because such a setting sets us apart from what is typically meant by the term *conformity*, we use the more encompassing term *behavioral adaptation* (for a discussion of the mechanism and empirical literature on conformity see Bernheim (1994) and Bikhchandani, Hirshleifer & Welch (1998)).

Embedded in a controlled lab experiment, our approach to measuring peer effects is a variation and extension of a dictator game as introduced by List (2007) and used by Bardsley (2008). We capitalize on a one-shot dictator game in which participants are given the opportunity to give to or take money away from the charity before and after learning peer behavior. That is, the extend the one-shot setting by introducing a revision option to account for behavioral contagion (see Thöni & Gächter (2015) for a related approach). We deal with the noted reflection problem (Manski, 1993) by introducing a novel design, which we will discuss in more detail in the design section of our paper (see chapter 6). In short, our approach centers on two key design elements: first, only those who *actively observe* another participant's behavior can react and revise initial behavior. Second, behavior of those who *are observed* is held fixed and cannot be changed afterwards, which is public knowledge. Such an approach allows us not only to study general peer effects in an unbiased way, but also to shed light on the relevance of factors such as the social identity to one's peers and the (un)ethicality of observed behavior in driving behavioral changes. Such an experimental set-up allows us to contribute to existing research on peer effects in multiple ways and thus open a venue for future research.

Being aware of the naturally occurring difficulty in studying social identity in an artificial but controlled laboratory setting without introducing potential confounds, we capitalize on a novel approach to mimic and gradually vary social identity in an artificial laboratory setting. In particular, we construct a list of personal statements taken from a major American dating website to categorize participants according to overlaps in preferences and interests (for a discussion, see Hitsch, Hortaçsu & Ariely (2010)).

[1] This approach allows us to create a measure of social proximity and use this as an exogenously varying matching device to study peer effects in the lab and to combine the best of both worlds: for one, the controlled laboratory setting mitigates the previously discussed arising difficulties when studying peer effects in the field. For another, our novel measure of social proximity allows us to mimic social affection that is normally absent in the laboratory setting due to its intended nature of anonymity. Our results indicate the validity of this proximity measure as the observed peer effect (i.e. the magnitude of the behavioral reaction) is aligned with the degree of measured social proximity.

Our study extends the existing literature on peer effects in a number of ways. We do not only provide a clean approach to test *whether* peer effects exist in the context of both ethical and unethical behavior; we also deliver sound evidence on *how* such peer effects depend on the social identification with their peers. We achieve this by contributing from both the content and the methodological perspective.

From a content perspective, our work focuses on making a substantial contribution to better understand drivers of behavioral adaptation in the domain of both ethical and unethical behavior. In social dilemmas and cooperative settings, existing theoretical and experimental literature points out that giving and taking are indeed different concepts that trigger different behavior (cf. Cox et al. (2008), Gächter et al. (2015)). Essentially, we put these findings to a test in a setting of individual decision-making under peer influence in which no strategic interaction between individuals exists. That is, we try to answer whether the unethicality of observed behavior or social identification to one's peers is a stronger predictor of behavioral contagion. While different streams of research suggest the relevance of both channels (see discussion in the next chapters), we are the first, to the best of our knowledge, to evaluate both channels in terms of their impact on behavioral contagion. From a methodological perspective, our contribution in this paper is to introduce an approach that does not only allow us to directly mimic social proximity in the lab, but also to vary its degree. If

[1] We use these questions to generate a composite matching score with other participants and randomly vary the information set across treatments given to matched pairs of participants. The exact matching mechanism and the treatment variations will be explained in more detail in chapter 6.

successful, such an approach opens the venue for a broad range of more refined future research examining the role of social proximity in cooperation, reciprocity, and punishment behavior.

So far, the economic literature in particular has been fairly silent on answering three naturally arising questions with respect to peer effects that we will attempt to answer in this paper.

Question 1: *Is there a systematic difference of behavioral contagion with respect to unethical behavior (e.g. taking away) as compared to ethical behavior (e.g. donating)?*

It is reasonable to assume that behavioral contagion is a function of the observed behavior's nature. One obvious reason is the costs involved: good behavior implies bearing costs in order to improve the well-being of others, while bad behavior often implies improving one's own well-being in one way or the other at the expense of a third party. A number of seminal empirical contributions examining neighborhood effects indicate that the adaptation of behavior is asymmetric and depends on whether one has been exposed to good or bad influences and to what extent (cf. Kling, Ludwig & Katz (2005)). While existing studies have typically resorted to explaining behavioral contagion in one direction, that is either ethical or unethical, our experimental design allows us to compare the contagion of both behavioral domains directly. To our knowledge, this is the first controlled approach to directly and simultaneously compare peer effects and behavioral spillovers across these two domains.

Question 2: *To what extent is behavioral contagion in either direction (i.e. of moral and immoral behavior) mediated by the social proximity to the peers?*

Following the existing literature on social identity, it is reasonable to assume that observing behavior of people who are socially closer or similar depicts a more salient signal in terms of what is socially accepted or an existing norm. However, the exact interaction between social proximity and the contagion of (un)ethical behavior remains unclear. In addition, good and bad behavior differs in terms of the information set available to the individual. While good behavior might entail some ambiguity with respect to what is 'appropriate' within a given context, bad behavior might be less ambiguous: the nature of bad or unethical behavior implies the overstepping of (social) boundaries or infringing laws. Consequently, the wiggle-room for self-justification is narrower in the latter case.

Question 3: *What is the stronger driver of behavioral contagion – social proximity or the (un)ethicality of observed behavior?*

Two quite distinct streams of literature exist that examine the role of either social proximity or exposed behavior within the framework of peer effects: one on the relevance of social identification, and one on behavioral observation. In this research, we attempt at unifying both lines of research by using an experimental design that encompasses both aspects. We will return to this aspect in more detail in the next chapters.

In anticipating the results, we find that the magnitude of spillover-effects is a function of social identification that is asymmetrically biased towards the contagion of unethical behavior. Overall, our results suggest that within a given peer context it is more likely to observe behavioral contagion in the form of unethical than ethical behavior. Across different specifications, we find that social proximity to the peers is more relevant to the crowding-out than to the crowding-in of ethical behavior, while the observation of (un)ethical behavior alone is insufficient to trigger any particular behavioral change. Thus, the mere observation of behavior alone is insufficient for the existence of peer effects in the (un)ethical sphere, but is rather contingent on the social identification to one's peers. The interaction between social identification and type of observed behavior adds to the understanding of peer effects and yields relevant policy recommendations.

In summary, it can be stated that our experimental work is along the lines and an extension of the seminal Moving-to-Opportunity (MTO) field studies that examine neighborhood effects and assimilation of behavior (see discussion in chapter 3.1.3). To the best of our knowledge, our paper is the first experimental examination of behavioral spillovers as a function of varied levels of social identity and the (un)ethicality of observed behavior, which in combination with the methodological novelty depicts our principal contribution.

The paper is structured as follows: chapter 3.1.2 provides a more detailed thematic background and the course of our investigation, whereas we deal with the conceptual framework of behavioral contagion and its existing relevant literature in more detail in chapter 3.1.3. In chapter 3.1.4, we will discuss the drivers of behavioral adaptation and some of the more relevant concepts from the fields of economics and (social) psychology. We will introduce a simple theoretical model in chapter 3.1.5 before turning to our experimental analysis in

chapter 3.1.6. We close with a concise discussion on potential policy recommendations in chapter 3.1.7 and a conclusion and an outlook in chapter 3.1.8.

3.1.2 Background and Course of Investigation

A basic principle of classical economic theory suggests that individuals form rational expectations based on available information and act on them accordingly. However, even the great John Maynard Keynes (1936) expressed his concern about the rationality of individuals to realize efficient investment decisions in the long run already 80 years ago. Instead, Keynes expected individuals to follow the herd, thus stressing the importance of peers for many economic decisions. Since then, a contrasting strain of literature emerged that accounts for the relevance of behavioral traits on the individual decision-making process. Understanding the underlying mechanism of peer effects is key to comprehending its impact on economic decisions and outcomes. For the bigger part, existing research on peer effects mainly resorts to field experiments or purely observational studies that are generally inferior to controlled lab experiments in terms of, among others, a clean identification of the relevant channels, endogeneity, and reflection problems (see Manski (2000), Falk & Fischbacher (2002)). Only recently, there has been a push to study peer effects in the lab, allowing us to gain a deeper and often a more reliable understanding of the underlying mechanism Angrist (2014).

Social interactions in general and the potentially resulting peer effects in particular play an instrumental role from both the societal and economic perspective. Existing literature indicates that standard economic forces alone cannot encompass many of the outcomes that we observe in real life. Examples are, among others, the escalation of crime rates or the massive surge in female labor participation rates in World War II (cf. Mulligan (1998), Levitt (1999). See also recent findings on paternity leave by Dahl, Løken & Mogstad (2014)). Instead, social interactions are found to offer explanations helpful to understanding the causes of rapid shifts in economic fundamentals. Such ripple effects are likely the result of social interactions, thus raising the awareness about the importance of understanding the underlying mechanism of peer effects (Glaeser & Scheinkman, 2004).

Although explicit research on peer effects and the resulting behavioral spillovers (in the literature sometimes referred to as behavioral or social contagion) has its origins in the late

19th century, the underlying concept has been observed long before.[2] Reportedly, an abstruse-seeming stream of suicides happened after reading Goethe's *The Sorrows of the Young Werther* two hundred years ago. "My friends […] thought that they must transform poetry into reality, imitate a novel like this in real life and, in any case, shoot themselves; and what occurred at first among a few took place later among the general public […]" (Goethe, quoted in Rose (1929, p. 29)). The widespread imitation of this behavior gave rise to fear among the population and governments, ultimately leading to a ban of the book in Italy, Leipzig, and Copenhagen (Phillips, 1974). The outbreak of the Tanganyika laughter epidemic of 1962 in Uganda is another infamous example of behavioral contagion. There, a mass hysteria infected almost 100 pupils with contagious laughter, forcing several schools to close down for days (Rankin & Philip, 1963).

Initially, the concept of social contagion has been introduced in the form of a social phenomenon – as opposed to a biological one – explaining why and how certain forms of behavior soak through society (for early work see Baldwin (1894), Tarde (1903)). Since the 1950s, empirical research on this topic has been on the rise with evidence suggesting that the mere exposure to and contact with individuals or culture is sufficient to trigger behavioral contagion. Conditional on a sufficiently salient trigger, behavioral contagion leads to behavioral adaptation towards observed behavior. In this paper, we aim at expanding the existing knowledge on the drivers of saliency, in particular with a focus on both the ethicality of the observed behavior and the degree of social distance or proximity with the observed individual. A long tradition in social science highlights the importance of social identity in understanding individual behavior within the framework of social interactions (cf. Bogardus (1928)). A salient state of social identity is found to trigger favoritism towards those of stronger social kinship.

The term social identity is eclectic and several of its facets have been studied in existing economic research. While the term encompasses a broad range of conceptual elements,

[2] Research on behavioral contagion is fragmented and different disciplines have introduced own notions and definitions referring to the same or closely related concept. Existing research interchangeably uses different terms to describe such situations, among others: conformity, behavioral contagion, imitation, or behavioral adaptation. Due to its more generic nature and the context of our research, we will mainly resort to the term behavioral contagion or behavioral adaptation. For the sake of comprehensibility, we will abstain from clearly defining and delimiting those concepts for now.

from shared preferences and experiences to shared cultural and religious beliefs, in this paper we follow the primal understanding of this term as introduced by Tajfel and Turner (1979). More precise, we refer to the existence of social identity if a person derives self-esteem from belonging to the peer group and has a preference for exhibiting similar behavioral patterns (for a similar approach, see Chen & Li (2009)). Using this definition in combination with a simple implementation of social identity, as applied in our experiment via the observation of preference similarity, is conducive to both deriving lower bound results for the role of social identity in facilitating (un)ethical behavior and easier reproducibility of our results. This line of research is important from a policy perspective in generating effective measures to trigger both more pro-social and less anti-social behavior, consequently reducing the otherwise resulting economic and social inefficiencies.

With notable exceptions, existing research has been struggling to overcome a number of challenges to study clean peer effects in the lab, especially in contexts where social identity plays a mediating role. Among these, inducing or at least proxying the natural occurring variation of social identity has proven to be difficult. Following the tradition of the minimal-group paradigm (Tajfel & Turner, 1986), psychological research has introduced a number of ways to proxy social identity in the lab, such as having participants interact with participants that were assigned the same color avatar (Tajfel, 1982), a similar name (Pelham, et al., 2005), same birthday (Cialdini & DeNichols, 1989), or imagined closeness (Gunia, et al., 2009). So far, it has proven to be challenging to study peer effects under controlled settings in general, let alone within a more sophisticated social environment such as varied levels of social identity. Existing economic research has resorted to using a dual approach, studying peer effects in the lab and in the field, with both approaches having their limitations. Applying a novel methodological approach to induce varying levels of social identity in the lab allows us to combine the best features of both worlds to study peer effects beyond what had been possible so far.

To our knowledge, the first economic contribution examining this question in a controlled setting by varying social identity among individuals is the study by Bohnet & Frey (1999).[3] They used a rough proxy for social distance by varying the degrees of identification and found evidence that social distance is decisive in predicting the extent of other regarding behavior in a dictator game setting.[4] Other examples of economic approaches that bridge anonymity and induce social identity, among others, vary the wording of the experimental instructions (Hoffman, et al., 1996), use face-to-face interaction (Bohnet & Frey, 1999) or show pictures to one party only (Eckel & Petrie, 2011), reveal names (Charness & Gneezy, 2008), reveal preferences such as those for paintings (Chen & Li, 2009), or recruit friends and family members (Brandts & Solà, 2010). Such studies typically yield the robust finding that stronger social identity triggers favoritism. Two natural problems arise with the concepts used in economics so far. Firstly, using face-to-face communication or allowing participants to interact with friends or family members introduces serious biases and crowds-out the revelation of true preferences (Roth, 1995). Secondly, and more relevant to the point of our experiment, the degree of social identification measured in the lab by these concepts can hardly be varied and is rather binary. Our approach of using dating-website questions as a matching device allows us to induce and exogenously vary different levels of social proximity in the lab in order to study their role in the spillover of (un)ethical behavior.

It is this paper's aim to shed light on three questions stated above and to contribute to a better understanding of the general mechanism of peer-effects. For this reason, we propose a novel approach to proxy different levels of social proximity among peers in a laboratory setting. Such an approach allows us to exogenously vary social characteristics and study their role in behavioral contagion. We mimic social proximity by the use of questions taken from a major American dating website to capture individual preferences and interests and use the matching scores of overlapping answers among lab participants as an exogenous

[3] Although motivated by a previous study of Hoffman, McCabe & Smith (1996), the work of Bohnet & Frey (1999) is the first to directly vary (a proxy for) social distance among peers. Instead, Hoffman, McCabe & Smith (1996) varied the language used in the distributed instructions, arguing that "subjects bring their ongoing repeated game experience and reputations from the world into the laboratory, and […] dictator instructions […] may imply that the objective is to share the money with someone, who, though anonymous, is socially relatively near to the decision maker" (Hoffman, et al., 1996, p. 655).

[4] Research usually refers to this concept as social identity, which encompasses both social distance and its inverse, social proximity. Throughout this paper, we will mainly refer to social proximity. Another approach to mimic social proximity used in economic and psychological experiments has been to ask participants to bring along their friends or relatives and study their interaction in a controlled environment. Among other things, we will discuss potential drawbacks of these and related approaches in chapter 3.1.5 in more detail.

matching device across treatments. This allows us to study decision-making going beyond simple ingroup - outgroup comparisons. Rather, our approach provides us with an extensive array of possibilities to match participants according to their shared similarities. To the best of our knowledge, we are the first to use such an approach. Thus, we not only complement existing field studies, but also broaden the scope and utilization of lab experiments in explaining behavior and behavioral changes in peer settings, especially within the unethical domain.

For this purpose, we extend the currently existing approaches by a social component that sufficiently considers the relevance of social distance and proximity to one's peers in affecting behavioral decisions. This attempt will be at the heart of this paper, leading to a proposed theoretical extension of Akerlof's (1997) and Glaeser & Scheinkman's (2004) seminal work on social interaction, social distance, and conformity, where the extent of social distance is a function of geographic location. We, however, emphasize the role of social distance as a function of an actual overlap in personality based on e.g. personality traits or interests.

Another substantial contribution of our research is the direct comparison of behavioral contagion of ethical and unethical behavior. In general, existing research has focused on shedding light separately on behavioral spillovers of either ethical behavior (cf. Thöni & Gächter (2015)) or unethical behavior (cf. Gino et al. (2009)). Considering the differing settings and games used in existing experiments to study behavioral contagion, current research does not help to understand whether and to which extent behavioral contagion in either direction differs from each other. Instead, experiments that add to the understanding of the potentially different mechanisms should place participants in a uniform environment and allow for the spillover of ethical and unethical behavior.

Our experimental set-up allows us to study these questions. Participants play a one-shot dictator game in which they decide how much money to donate to or take away from a charity, which resembles a variation of a dictator game implemented by List (2007) and Bardsley (2008)). Here, the (un)ethicality of (taking away) donating money to the charity is stressed by explaining the consequences of their behavior clearly to the participants. That is, all the money that is (taken away) donated to the charity will (not) be given forward to the charity, thus individual behavior will (harm) benefit the charity. Hence, participants face a riskless

but in terms of its (un)ethicality precisely defined situation in which they have to decide whether or not to personally benefit at the expense of a charity of their choice. After reaching their initial decision, participants are given the opportunity to learn about other participants' initial decisions followed by the option to revise their own initial decision.

Several economic and psychological theories are able to explain behavioral contagion even under full anonymity and without observability of one's own initial and potential revision decision, as implemented in our experiment. Among these are concepts relating to *social decisions and social distance* (Akerlof (1997), Glaeser & Scheinkman (2004)), *imitation of preferences* (Sliwka, 2007), *social learning* (Bandura, 1971), *norms* (Cialdini et al. (1990) and Bicchieri (2006)), *self-expansion* (Aron & Aron, 1986) or even guilt (Kandel & Lazear, 1992). Many of these concepts are not strictly distinct, in both their assumptions and predictions. Thus, in this paper we will not attempt to resolve which approach explains behavioral contagion best but rather focus on shedding light on the drivers of behavioral contagion and its interrelation with the social identity dimension and the extent of (un)ethicality of observed behavior.

3.1.3 The Conceptual Framework of Behavioral Adaptation

3.1.3.1 The Mechanism of Social Interaction and Challenges of Measuring its Effects

A growing body of literature suggests that social interactions are principal not only to humans, e.g. in making social or economic decisions, but also to animals, e.g. in finding the right strategy or place to maximize one's hunting success (Laland, 2002). Evidently, social interactions trigger different reactions and outcomes, which are referred to as social effects. Different streams of literature refer to such interactions in different ways: bandwagons, conformity, epidemics, herd behavior, imitation, neighborhood effects, peer influences, social learning, or social norms (see Hyman (1942), Merton (1957), Granovetter (1979), Jones (1984), Manski (2000)). In addition, Pingle & Day (1996) subsume these and other types of

behavior, including following an authority, habit, thoughtless impulse, and hunch, as *economizing behavior*. Some call it simply peer effects.[5] Although these notions refer to different mechanisms, their outcome is often (but not always) similar; that is, the individual's adaptation to observed behavior. However, some mechanisms encompass stronger interaction with the peers than others do (e.g. the peer's ability to observe my reaction and exact change in behavior) and involve more or less deliberation.[6]

As we will discuss in this chapter in more detail, existing research indicates that the existence and persistence of social effects are context specific and may even lead to, among others, higher consumption of alcohol and drugs, cheating, and smoking. The same is also found to be true for pro-social and cooperative behavior. Thus, before turning to the specific effects of social interaction, we shall make the effort to understand the underlying mechanisms first.

The concept of social interaction lies at the heart of social psychology and sociology, for example in order to explain the formation of tastes (Weber, 1978). The importance of social interaction in explaining social phenomena has a long tradition and is often ascribed to Sutherland's Differential Association Theory (Sutherland, 1939). Akerlof (1997) stresses the view that the theory of social interaction is key to understanding why individuals do not succumb to isolated and purely self-maximizing decision-making. Instead, this concept gives rise to conceive an individual as someone who constantly interrelates with the underlying social environment and produces and deals with the resulting externalities. A principle consequence of extending the rational model based on Becker's early work by such a social dimension is that the type of the resulting individual is more sophisticated and resembles more closely to the intuition of sociologists than the classical economists.

[5] Often, the term "peer effects" is used to refer to all of these mechanisms without specifying the exact channel through which behavioral adaptation arises. Although it is important to shed light on the different channels through which social interaction potentially transitions into behavioral adaptation, the focus of this study lies in understanding the role of exogenous factors such as social proximity that have the potential to influence the intensity of behavioral adaptation. We shall not attempt to settle the argument of which approach explains the mechanism of our experiment best. Instead, we will discuss some of the more prominent concepts and mechanisms in the fields of economics and social psychology that resemble the mechanism of behavioral adaptation the way it is implemented in our experiment in chapter 3.1.4. For our purpose, however, we will assume peer effects to be in play whenever an individual $\boldsymbol{i's}$ behavior changes after having been exposed to behavior of individual $\boldsymbol{j}$, irrespective of the direction of the behavioral change. In turn, however, we assume behavioral contagion to be in place whenever individual $\boldsymbol{i's}$ behavior changes in the direction of individual $\boldsymbol{j}$ behavior.

[6] It is worth noting that it is far beyond this paper's scope to shed light on all of these concepts. Instead, we will pick out and discuss those concepts of which we believe are of bigger importance to what we analyze within our experiment.

Manski (1993) distinguishes between two types of social interactions.[7] One is endogenous interaction in the form of, for example, information exchange among criminals or social norms. The behavior of the relevant peer group mediates the likelihood that the individual will engage in the same kind of behavior. In addition, exogenous interaction emphasizes that the propensity of an individual to behave in a certain way is also mediated by exogenous characteristics of the group such as their attitude toward crime or social and economic status.[8]

In social interactions, externalities abound. The key mechanism of social interaction implies that one's personal net benefit is a function of the behavior exhibited by one's relevant social group or contact person (Glaeser & Scheinkman, 2004).[9] Inherent to such interactions are strategic complementarities in the form of circular cascades where "even if changes in fundamentals create only a small change in the level of activity for each individual, each individual's small change will then raise the benefits for everyone else pursuing the activity" (Glaeser & Scheinkman, 2004, p. 84). In principle, small changes in fundamentals may cause large shifts in outcomes, which are sometimes referred to as the *butterfly effect*, a term hailing from the chaos theory (Lorenz, 1963).

Social interactions are also highly relevant in understanding the spread of criminal behavior. Social interaction plays a decisive role in the formation of gangs and the recruitment of young criminals (see Reiss (1988) and Jankowski (1991)). This is particularly true for the criminals' decision to engage in illicit behavior jointly (Reiss (1980)). "Social interactions seem to create a sense of invulnerability and a willingness to violate social norms and take

[7] Glaeser & Scheinkman (2004) provide a more distinct categorization of the mechanisms that generate social interaction: physical, learning, stigma, and taste-related interactions. For the purpose of this experiment, we will extend this categorization in order to better capture the mechanism of behavioral changes we are interested in. We will discuss these points in more detail in chapter 3.1.6.

[8] While these two aspects represent interactions that are shaped by the underlying social environment, Manski (1993) also introduces correlated effects that explain similar behavior as the result of facing similar institutional environments (see also Manski (2000)). This third aspect is not considered any further since correlated effects are not social effects and are thus neither created by social interactions nor create social multipliers (see Glaeser, Sacerdote & Scheinkman (1996), (2003)). Using a novel approach in our experiment, a clean variation of both endogenous and exogenous interaction allows us to draw causal inferences that are more precise than what has previously been possible. We will return to this important point in our design section of chapter 3.1.6.

[9] The term 'relevant social group or contact person' is vague in existing research. A social group or contact person is self-reported and defined from one's individual point of view and refers to one or more individuals whose behavior either has a direct or indirect impact on one's well-being, e.g. through resource externalities or other-regarding preferences. While it is important to understand the different channels through which behavioral spillovers occur, the focus of our study is to shed light on the drivers instead. See chapter 3.1.4 for a discussion.

risks, as long as one is in the company of like-minded individuals" (Glaeser, et al., 1996, p. 511). Social interaction also strongly affects stigmatization, which is important from an evolutionary perspective. As the number of criminals rise, illicit behavior becomes more common and thus potentially more accepted; and as criminality converges towards 'normality', the (social) rents of illicit behavior increase due to increased attractiveness, social acceptability and a crowding-out of legal activities where earnings from legal activities are stolen by criminals (see Rasmussen (1996) and Murphy, Shleifer & Vishny (1993)).

Researchers face substantial difficulties measuring social interactions and its resulting effects in a clean way. In a real-world instance, assigning changes in individual conformity to distinct mechanisms are subject to identification problems (Angrist, 2014). As argued before, this problem arises because individual behavior is affected by both endogenous (e.g. the group's behavior) and exogenous effects (e.g. group characteristics) and, in addition, uniform behavior can be the result of similar unobserved characteristics (Manski, 1993). Previous empirical research involved regressing a person's actions on the action of his peers. However, Manski (1993) points at three fundamental problems concerning this methodology: first, drawing causal inference is difficult when endogeneity is a problem, in particular when the individual's and its peer's behavior is interactive and influences each other circularly. Second, omitted variables increase the likelihood of spurious correlations between actions. Third, in reality, sorting and self-selection into particular neighborhoods renders it difficult to understand what actually drives behavior. Arguably, empirical research in particular faces these challenges because one only observes the behavior of individuals who self-selected themselves into, for example, moving to a better neighborhood, but not of those who decided to turn down the opportunity (Glaeser & Scheinkman, 2004).[10]

Of particular interest to our research are social interactions leading to the spread of unethical behavior. Existing research points to a strong presence of positive covariates across individuals' decision to engage in criminal behavior. In particular, Glaeser, Sacerdote &

[10] Prominent examples and forceful ways of addressing these issues include, among others, the work of Case & Katz (1991), Katz, Kling & Liebman (2001), Angrist & Lang (2004), Kling, Ludwig & Katz (2005), Kling, Liebman & Katz (2007), Ludwig & Kling (2007), Damm & Dustmann (2014), and Chetty, Hendren & Katz (2015). We will discuss these and other empirical contributions examining peer effects and behavioral adaptation in the field in more detail in this chapter.

Scheinkman (1996) state that only covariance across criminal decisions of individuals explains existing variance in crime rates, which is far beyond any theoretical prediction of crime rates.

In order to mitigate any term-related confusion on the side of the interested reader, we are in need of a term that allows us to capture a particular type of behavior that resembles a subset of social interaction and its resulting social effects. More specifically, we are not interested in the drivers of all kinds of behavioral changes resulting from observation, but only in behavioral changes that lead to a convergence of behavior. We are thus proposing the impartial term *behavioral adaptation* to capture such behavior.[11]

The term behavioral adaptation refers only to a subset of social interaction because social interaction may lead to all kinds of social effects where the resulting behavior may or may not converge towards what has been observed. In its basic form, the existence of social effects does not tell us much about the specific behavioral reaction, if any, that follows from this exposure. In principle, the result of social interaction could lead to either behavioral alienation or adaptation. For the purpose of this study, we will focus on the latter. In turn, behavioral adaptation refers to those situations only in which the resulting behavior is coherent to the behavior one has been exposed to. Our study sheds light on the key drivers triggering an individual's response to become more like others, in one way or another.[12]

Existing macro- and micro-level data inadequately catches the underlying mechanisms and the causal relationships relevant to our project. That is, answering the questions of how behavioral adaptation varies with different levels of social proximity and whether this interplay is different for adaptation towards ethical versus unethical behavior. As has been argued by Angrist (2014), with rare exceptions like Kling et al.'s (2007) Moving-to-Opportunity research, most field studies on peer-effects suffer in one way or the other from endogeneity,

[11] Behavioral adaptation has also been studied in the field of evolutionary game theory as well as in the theory of learning in games (see Selten (1978), Roth & Erev (1995), Schlag (1998), and Apesteguia, Huck & Oechssler (2007), to only name a few). However, it is beyond the scope of this paper to touch upon all streams of literature that have shed light on the general process of behavioral adaptation. Instead, we focus on the studies most relevant to our experiment and extend our apologies to colleagues whose research remains unnamed in this paper.

[12] Studying the drivers of behavioral alienation is a potential venue for future research, as this line of research has yet to catch attention from economists. Akerlof (1997) refers to this behavior as the result of status-seeking efforts. Beyond this, however, behavioral alienation can be the result of e.g. one's desire to not be identified with a particular social group.

self-selection and confounds resulting from confusing the relevant subjects with the peers.[13] This renders it difficult to disentangle causation from simple correlation. For these reasons, Manski (2000) and Angrist (2014) emphasize the importance of controlled laboratory experiments that are able to reduce potential confounds to a much stronger degree, which is what we attempt to do here.

3.1.3.2 Why Understanding Behavioral Adaptation Matters

Social interaction and more so the resulting social effects tell us a lot about the underlying mechanisms affecting social and economic outcomes. As argued by Akerlof (1997, p. 1006), "social interaction theory explains why social decisions – such as the demand for education, the practice of discrimination, the decision to marry, divorce, and bear children, and the decision whether or not to commit crimes – are not simple choices based primarily on individual considerations." Along these lines, behavioral changes are subject to spillover-effects induced by observing a particular kind of behavior.

Arguably, economic literature neglected the relevance of spillover-effects on individual behavior for a long time and it is only recently that economists have begun incorporating motives beyond the neoclassical economic theory's assumption of own-payoff maximizing egoists (Akerlof, 1997).[14] It seems reasonable to assume that individual behavior is impacted by other people's behavior, their preferences, their sentiments and the like. As prominently stated by Fehr & Fischbacher (2005, p. 167), "if people believe that cheating on taxes, corruption and abuses of the welfare state are wide-spread, they themselves are more likely to cheat on taxes, take bribes or abuse welfare state institutions." Consequently, social interaction shapes one's own understanding of the world and behavior surrounding us.

Social interactions and its resulting effects are key in driving behavioral changes. In reality, we constantly make use of learning from and adapting to observed behavior. The rating systems of, among others, Amazon, eBay, and IMDB use the principle of social learning by having introduced a publicly accessible valuation system to spread the word of good and bad products and services. Instead of resorting to time consuming and potentially harmful trial-

[13] For a rich and critical discussion on challenges relating to identifying and measuring social interactions, and avenues for future research, see Blume, Brock, Durlauf & Ioannides (2010).

[14] For early seminal contributions on the economics of altruism and egoism, see Becker (1976) and Becker (1981).

and-error behavior, learning from others' experience is a survival strategy that facilitates (social) Darwinism and the stability of cultural cohesion (Laland, 2002). Evidently, social interactions lead to social effects that are likely to trigger a type kind of behavior that we are particularly interested in: behavioral adaptation.

Social effects are expected to be in place whenever events on an aggregate level interact with events on the individual level (Manski, 2000). Since the seminal contribution of Shelling (1973), a great amount of theoretical and empirical work highlighted the relevance of social effects in various contexts (cf. Evans, Oates & Schwab (1992), Glaeser, Sacerdote & Scheinkman (1996), Arcidiacono & Nicolson (2005), and Mas & Moretti (2009)). Such effects were also found to affect the individual's inclination to reciprocate behavior positively, consequently suggesting that social effects are of concern in trust relations (cf. Mittone & Ploner (2011)).

In the fields of psychology, economics and sociology there exists a long tradition emphasizing the impact of peers on individual behavior. Research efforts gave rise to a more extensive investigation of peer effects on behavior such as group norms (Sherif, 1936), bandwagon effects (Asch, 1951), conformity and social influence (Kelman, 1958), obedience to authority (Milgram, 1974), social dilemmas (Dawes, 1980), social norms (Elster, 1989), social networks (Wasserman & Faust, 1994), tax morale (Frey, 1997), moral identity (Akerlof & Kranton, 2000) and social capital (Putnam, 2000).

In sum, understanding why and how behavioral adaptation matters and how this is shaped by social interactions and its resulting social effects not only helps to understand the world around us but also facilitates the inception of policy measures that are more promising and target-aimed. Glaeser & Scheinkman (2004, p. 90) put it this way: "…if one person's level of education increases his neighbor's education through dissemination of learning, then it makes sense to subsidize education. There is a socially desirable spillover that should be subsidized. However, different policy implications appear if one person's level of education increases his neighbor's education for signaling reasons – namely, as one person gets more education the other person must also get more education or be thought inferior. In that case, there is a socially undesirable spillover that should not be subsidized."

3.1.3.3 What We Know: On Peers, Behavioral Adaptation, and Neighborhood Effects

Because the ability to induce salient social identity in an artificial lab setting is instrumental to the study of the posed interaction between social proximity and behavioral contagion, existing research has focused on field rather than lab experiments. However, Angrist (2014) argues that many field studies on peer-effects potentially suffer from endogeneity, self-selection, and confounds resulting from confusing the relevant subjects with their peers. Correlations might arise without any causation simply indicating a spurious relationship. Angrist (2014) points out that these challenges make it extremely difficult to disentangle correlation from causation and he thus calls for a controlled approach in the lab where relevant characteristics can be varied exogenously. In addition to problems arising from correlated unobservables and endogenous group membership, Manski (1993) also prominently coined the term "reflection problem", which results from the challenge of clearly disentangling the mutual influence peers exhibit on each other's behavior. Such a cyclical relationship between observed and actual behavior poses a huge challenge for studying peer effects in the field (Manski, 2000). Beyond identification issues, it has proven difficult to define appropriate peer groups and link them reliably to one another in the field.

This chapter is devoted to provide a state-of-the-art overview of existing research that has convincingly provided results on peer effects. We approach the discussion of existing research on behavioral adaptation by subdividing the literature based on its methodological approach, that is: evidence from the field or from the lab.[15] Although behavioral adaptation can be the result of various mechanisms, the economic literature (and especially its experimental subset) has put emphasis on studying peer effects, which is accepted as a term more broadly including the different mechanisms that we discussed previously. While this discussion is by far not exhaustive, we will concentrate mainly on experimental studies focusing

[15] Beyond question, previous research on peer effects not using experiments but rather observational data has been utterly important to today's research. However, for reasons discussed by Manski (1993) mentioned earlier, our literature discussion focuses on controlled field or lab experiments. For a discussion of empirical studies on peer effects, see Angrist (2014).

on the relevance of peer effects in driving one's behavior that are most relevant to our study.[16]

Evidence from the Field

A comprehensive line of research suggests that peers decisively affect individual behavior. Several field experiments have investigated the change of individual contribution levels in response to the observation of other people's contribution decisions (cf. Frey & Meier (2004), Laundry et al. (2006), Croson & Shang (2008), Shang & Croson (2008)). However, Zafar (2011) argues that those results can be explained by at least two mechanisms working simultaneously: the individual's drive to conform to an underlying social norm or as a response to updated beliefs concerning the charity's quality.

For this reason, existing literature attempts to tackle the topic of behavioral spillovers from various angles to better understand the channels at work. For example, Ploner (2013) investigates whether peer's behavior affects intertemporal consumption choices at a university's cafeteria. He finds positive evidence for the existence of peer effects on individual decision-making. Mas & Moretti (2009) argue that peers substantially affect a worker's productivity levels positively (see also Azmet & Ichiberri (2010)). Bandiera & Rasul (2006) find that the farmers in Northern Mozambique condition their decision to adopt a new crop on the choices of their family and friends. Interestingly, they find an inverse-U shaped relationship suggesting that the observed social effects are positive if their social network contains few adopters and negative if a certain threshold is overstepped. The study of Sacerdote (2001) highlights that among college roommates, peers have an impact on grade point averages and the willingness to join fraternities. Ichino & Maggi (2000) find empirical evidence for shirking behavior within organizations, in particular for the case of a large Italian bank. They find a close relationship between an individual's absenteeism with the rate of absenteeism of co-workers. Cialdini et al. (1990) and Mas & Moretti (2009) show that the observation of another person's behavior leads to less littering in public places and higher productivity.

[16] In this chapter, we will introduce and discuss different concepts from the fields of economics and (social) psychology that offer more distinct explanations to how and why (or why not) behavioral adaptation is driven beyond the encompassing term peer effects.

Along the lines of a more delinquent context, Wilson & Kelling (1982) have outlined the interdependence of disorder and criminality within a society, introducing the terminology of the 'Broken Windows Theorem'. Here, a broken window can function as a signal transmitting the understanding that social norms exist and tolerate fraudulent behavior. Social preferences and contextual information decisively affect one's understanding about what is seemingly appropriate in a given social context, thus shedding light on individual behavior from a comprehensive perspective (see Beckenkamp et al. (2014) for an experimental analysis). Another example for peer effects in the unethical domain is discussed by Gould & Kaplan (2011). Here, the authors examined peer effects for the use of performance enhancing drugs for baseball players.

An extensive line of controlled experiment-in-the-field research focusing on neighborhood effects has been triggered by the seminal papers of Case & Katz (1991) in which they found evidence for criminal behavioral contagion both within families and neighborhoods in the Boston area. Ever since, multiple research projects have examined the short- and long-run effects of the Moving-to-Opportunity (MTO) project in which families are eligible to participate in a lottery for vouchers that would potentially help them to move to a better and safer neighborhood. Since 1994, this project has been in place in five cities: Baltimore, Boston, Chicago, Los Angeles, and New York City. Along these lines, Katz, Kling & Liebman (2001) examined the short-run effects of the MTO project on the well-being of the families who were offered a voucher. Their findings indicate a substantial improvement of well-being along different dimensions, including increased safety, and improved health conditions both mentally and physically. Surprisingly, especially young men were susceptible to the neighborhood change, while the young women's disobedience remained invariant.

With the ability to capitalize on a more extensive continuity of data, the studies by Kling, Ludwig & Katz (2005) and Kling, Liebman & Katz (2007) support previous results of an asymmetric assimilation process across gender. In terms of criminal behavior, Kling, Ludwig & Katz (2005) find a strong gender effect. In terms of reduced arrests for violent crimes, men react positively to improved living conditions, at least in the short-run. In the long-run, however, these effects vanish. Opposite to what would have been expected from moving to a better neighborhood, males' general problem behavior and property crime arrest soar irrespectively. Conversely, females' criminal behavior decreases. The findings of Kling, Liebman

& Katz (2007) indicate that although neither adult's economic self-sufficiency nor physical health conditions benefited from the MTO program, the mental health improvements for both adults and the female youth were substantial. What is more, the beneficial effects on education, risky behavior, and physical health that were found on the side of females were fully offset by the negative effects on the side of males, thus yielding limited contentment of the MTO initiative based on its overall impact. In a very recent study on the MTO program, Chetty, Hendren & Katz (2015) find strong evidence for positive income effects for children who were young (age 13 or younger) when their parents moved. Surprisingly, the same effects are either non-existent or even negative in the long-run for children who were older than 13 when they moved. The findings indicate that the marginal gains from the MTO program decrease with the children's age, possibly due to disruption effects and social alienation. Although such findings are in line with literature suggesting that the duration of exposure of children to better environments is predictive of the treatment effect's magnitude, the results dampen the overall expedience of the MTO program (for a discussion see Chetty, Hendren & Katz (2015)).

Capitalizing on a different but comprehensive dataset that includes the assignment of refugee immigrants to Denmark from 1986 to 1998, Damm & Dustmann (2014) find that the share of convicted young people in the neighborhood significantly increases both the probability for a male's convictions later in life and the total number of convicted crimes that were executed by men. Their findings suggest that the spillover-effects of neighborhood crime are distinctively linked through the channel of social interaction, which is, however, only true for youth criminal behavior. Because the assignment of the refugee immigrants in their sample was quasi-random, this paper draws on a spatial allocation experiment that does not involve dealing with issues such as endogenous neighborhood selection and thus strengthens the validity of their findings. Bursztyn et al. (2014) used a high-stakes field experiment in Brazil to study different mechanisms of peer effects. In particular, their design allowed them to disentangle two typically confounded channels of social influence in the context of financial decisions, which are social learning (learning from the peer's choice) and social utility (derived utility from the peer possessing the same asset) (see Bursztyn et al. (2014) for a comprehensive literature review). In terms of economic and statistical significance,

their findings indicate that social influence is transmitted through both channels and point in the same direction.

Some studies, however, find little evidence for neighborhood or peer effects. In a highly regarded study, Evans, Oates & Schwab (1992) show that after controlling for selection bias, any measurable peer effect on teenage pregnancy and school dropout rates disappear. While being careful in not claiming that no peer effects exist at all, they rather point critically to methodological issues measuring peer effects in a clean way. Angrist & Lang (2004) use data from the Metropolitan Council for Opportunity (Metco) desegregation program in which mostly black students are sent to more affluent suburbs. Their findings indicate that there are little, if at all, positive spillovers on students. Similarly, Burke & Sass (2013) find little evidence of classroom peer effects on student achievement for Florida public school students. Likewise, Ludwig & Kling (2007) find little evidence for the contagion of crime hypothesis using MTO data. Instead, their findings indicate that crime rates are merely driven by neighborhood racial segregation.

In conclusion, the existence of peer effects is up for scholarly debate, which is mainly driven by methodological challenges and data problems. However, in following Angrist (2014), the previously discussed MTO program yields the most promising setting to study clean peer effects in the field. Previous research that utilized MTO data yields, among other things, strong gender asymmetries in terms of the evolution of criminal behavior. The authors suggest that these findings can be attributed to differences in which males and females respond to their environment and its influences. Ultimately, this leads to differences in magnitude and speed at which (illicit) behavior is picked up.

Evidence from the Lab

In what follows, we shall not attempt to provide an exhausting overview of the comprehensive literature dealing with peer effects in general. Instead, we will focus on a range of influential studies using lab experiments to shed light on mechanisms relating to behavioral spillovers that are more in line with our paper's focus. Later in the paper, we will refer to these studies in more detail where necessary.

Over the last decade, a comprehensive stream of literature studying spillover-effects and behavioral adaptation in the lab has emerged that complement the ongoing important work

in the field. As discussed previously, the methodological shift was strongly driven by challenges relating to identifying these effects in a clean way using observational data. Several researchers claim that although the most recent generation of studies measuring such effects with observational data has succeeded to make important steps towards tacking the challenges outlined before, controlled lab experiments are still the gold standard in reducing noise and potential confounds (Angrist, 2014). “However, even if the setting offers an almost perfect opportunity to identify peer effects in many of these studies, the impossibility of controlling for all local or personal confounding factors and for endogenous sorting makes the identification strategy not fully convincing" (Falk & Ichino, 2006, p. 40).

Early laboratory research studying peer effects and social identification jointly has been pioneered by Hoffman, McCabe & Smith (1996) and Bohnet & Frey (1999). These studies made use of variation in the instruction’s wording or enhanced face-to-face communication to study the role of social identification in giving decision, equivocally finding support for its relevance (see also Charness & Gneezy (2008)). We will return to these studies in more detail in chapter 3.1.5.

Other studies have looked into peer effects in productivity decisions. In a highly regarded study, Falk & Ichino (2006) found robust evidence for the existence of peer effects in a productivity task. Their results indicate that low-productivity workers are particularly susceptible to peer effects, which results in an over-proportional raise in productivity. Following the work of Mas & Moretti (2009), subsequent studies tried to disentangle the naturally occurring channels of simultaneously observing peers and being observed by peers. For the most part, these studies found the latter channel to be more effective than the former in boosting productivity (cf. Georganas, Tonin & Vlassopolous (2013); for exceptions see Veldhuizen, Oosterbeek & Sonnemans (2014)).

Along the lines of studying behavior in the workplace, Gächter et al. (2012) set up an experiment that investigates reciprocal behavior under observability of other people’s actions. They find that the individual’s extent to comply with norms of reciprocity is significantly driven by both pay and effort comparison information. Zafar (2011) experimentally examines charitable giving in a social context. He finds that by systematically revealing information, both the learning about descriptive norms (through observing what others do) and the image-related concerns (through revealing own behavior to the reference group) drive

individual contribution levels. In a more delinquent context, Falk & Fischbacher (2002) investigate peer effects in the form of conditional stealing behavior. In particular, they investigate whether an individual's inclination to steal is dependent on other peer's stealing behavior. Their main findings suggest that, on the aggregate level, people make stealing decisions conditional on the behavior of their peers.

In economics, a limited number experimental research has also pointed at the contagion of both selfish behavior and dishonesty. Bicchieriy and Xiao (2009) study a dictator game with varying information on other participant's selfish or fair behavior, finding that fairness in actions is contagious. More to the point of our research, Innes & Mitra (2013) use a variant of Gneezy's (2005) deception game to study whether dishonesty breeds dishonesty. Their findings suggest that the beliefs about other's dishonesty is indeed contagious, potentially driven by the wiggle-room created by such social cues and thus representing a justification device for one's personal dishonest behavior.

3.1.4 Drivers of Behavioral Contagion: An Interdisciplinary Perspective

Prior to delving into the subject in more detail, some effort will be made to disentangle many of those existing concepts explaining why and under which circumstances people demonstrate a change in behavior as a function of their peer's behavior. In both economics and psychology, several concepts have been developed over the past few decades referring to similar and often the same reasoning to change one's own behavior.[17] The complexity of the *self* and the dependency of one's own behavior on what one observes of peers has received a lot of scholarly attention (cf. Baumeister (1987), Kahneman & Tversky (2009)). It is thus important to shed light on the underlying concepts driving behavioral adaptation. In this context, we will differentiate between concepts that originated in the (I) economic literature and in the (II) literature of (social) psychology. The economic concepts include (I.1) social decisions and social distance (Akerlof (1997), Glaeser & Scheinkman (2004)), (I.2) image related concerns (Bernheim, 1994), (I.3) taste for conformity (Bernheim, 1994), and (I.4) imitation (Alós-Ferrer & Schlag (2009), Sliwka (2007)). In addition, we also discuss some (social)

[17] See discussion in chapter 3.1.3.

psychological concepts including (II.1) social learning (Bandura (1971)), (II.2) norms (Cialdini et al. (1990), Bicchieri (2006)), and (II.3) psychological closeness and vicarious dishonesty (Aron & Aron (1986), Goldstein & Cialdini (2007)).

One point is worth clarifying. In this paper, we shall not attempt to settle the argument which scholarly approach explains behavior best. Rather, for our purpose, we will use the previously defined unifying terms *behavioral adaptation* or *behavioral contagion* throughout the paper in order to refer to one person's decision to change initial behavior as a function of observed behavior from at least one other person. Using this umbrella term will allow us to focus on what is relevant without getting lost in conceptual debates. We deem it important to help understand the role social proximity plays in the change of behavior and to what extent proximity mediates the spillover of ethical and unethical behavior.

It will be the next sub-chapters' aim to dissect the different approaches in more detail and to explain the reasons why this is the case. At times, the predictions and the empirical outcomes are identical, but the underlying forces causing such outcomes are diverse. In what follows, we will discuss the different theories outlined above and their implications with respect to changes in behavior. At the end of this chapter, we will relate these theories to our experiment and provide a systematic breakdown with respect to the fit of each particular theory to explain behavior in our design.[18]

3.1.4.1 Concepts in Economics

Social Decisions and Social Distance

Seminal contributions by Akerlof (1997) and Glaeser & Scheinkman (2004) were among the first to provide an economic framework highlighting the relevance of social distance in affecting social interaction and behavioral adaptation. Beyond rationalizing one's own behavior in an isolated environment, research indicates that behavior is a function of both pure own-maximizing and other-regarding concerns.

[18] It is worth noting, however, that our discussion here will be purely descriptively. We will contrast the explanatory power of these concepts within the frame of our experiment in chapter 3.1.6.

For a while, traditional economics has neglected such interdependence and rather put emphasis on individualism. In reality, however, decisions are rarely brought about in total isolation, but are rather the result of an interplay with one's (social) environment. Arguably, individuals care about both status concerns (in absolute and relative comparisons) and other's well-being (Fehr & Schmidt (1999), Bolton & Ockenfels (2000), Charness & Rabin (2002)). Because social interactions typically render externalities with the potential of slowing down conversion towards socially (un-)desirable equilibria, it is important to understand the underlying mechanism.

In his attempt to explain the connection between social interaction and behavioral adaptation (conformity, in particular), Akerlof (1997) made use of the Newtonian theory of gravity. Akerlof's approach centers on explaining conformist behavior as a function of distance in the social space. Such difference in one's social space is characterized by the difference in behavior between oneself and a person or group of relevance. For his purpose, Akerlof applies the concepts of a gravity model allowing him to argue that conformity leads to benefits (e.g. higher individual utility or gains from trade) that are negatively correlated with distance in social space.[19] Akerlof puts a reduced form concept forward in which one's utility declines as the individual's behavior deviates from the behavior of others. Assuming the existence of representative agents, his model predictions yield a set of equilibria in which the ultimate behavior of all individuals is the same, thus clearly characterizing the behavior of every party.[20]

[19] Because geographic location is one determinant of social interaction, this approach is a generalization of what sociologists have coined "social geography", which has been inspired by Krugman's (1991) work on economic geography.
[20] Although *ex-post* behavior is uniform across individuals in equilibrium, such an approach still models conformism because of the *ex-ante* desire to be and behave like others. Akerlof also proposes an extension with individual heterogeneity that allows for the formation of social sub-groups with own norms and values. The extension models a mechanism in which (randomly distributed) past social location for each individual is inherited. In combination with static expectations about "the positions to be occupied by others in social space […] such a model can portray stable groups in low level equilibrium traps because individual's incentives to choose x to conform with those whose inherited social locations are close may overwhelm their incentives to choose x for intrinsic reasons" (Akerlof, 1997, p. 1010). In our experiment, we will study this mechanism by holding the other's behavior fixed and thus allowing for deliberate behavioral adaptation free of unstable, higher-order, or even nonexistent beliefs about the other person's next move. We will return to this argument in our design section.

Ultimately, in order to maximize one's intrinsic utility, the individual will converge towards the observed behavior and thus reduces the existing social distance.[21] With reduced distance, social interactions become more favorable through facilitation of e.g. mutually beneficial trade.

Image Related Concerns

In understanding individual behavior, one fundamental question arises: "How much of what we do is the result of our genetic code (nature); and how much of it is a function of our environment, including the actions of those around us and our own past actions (nurture)?" (Cabral, 2005, p. 15). The threat of reputation loss and being punished in the case of wrongdoing is an integral component of individual decision making in general. By weighing costs against benefits, the impact of possible reputation loss might deter individuals to engage in illicit behavior of any kind.

Individuals are striving for social inclusion and recognition. They want to belong to one or more social groups and engage in social interaction. Striving for social identity is an inherent characteristic, thus decisively driving the individual's yearning for maintaining an adequate reputation. In this sense, losing face as the result of deviant behavior may serve as an avoidance, as this might result in exclusion from the group (cf. Bernheim (1994)). Along these lines, Akerlof (1980) argues that the deviation from social standards might lead to loss of social reputation and consequently to ostracism. However, it is worth noting that *deviant behavior* not necessarily implies bad behavior per se, but has to be understood as a deviation from the underlying social norm in either direction. Reputation can also work as a means to preserve a coherent self-image that allows keeping an internal consistency (cf. Baumeister (1998)). The concept of the self has multiple facets and impact behavior in different ways, as level of self-regard and self-esteem, the extent and content of self-identity as well as the structure of the self-concept exhibit motivational implications (cf. Wells

[21] A point not made clear in this approach is whether such desire to conform is also dependent on the signaling value of one's behavioral adaptation. The model argues that the desire to conform and reduce social distance is entirely driven by intrinsic concerns. However, the inability to signal conformity to one's peers runs counter to the initial concept of conformism (introduced by, for example, Ash (1958) and Bernheim (1994). Thus, this concept rather resembles the ideas of imitation of preferences (Sliwka, 2007) or self-expansion (Aron & Aron, 1986) that will be addressed in the next subchapters.

(1978)). By that, people try to avoid a negative update of their self-image through their actions, which otherwise would result in an internal conflict. Such a mechanism possesses the power to prevent individuals from engaging in delinquent behavior in the first place. This mechanism is more distinct when the group is salient, consequently giving rise to more extensive alignment with the group's behavior. What is more, own actions could also be subject to social signaling, which highlights the perception of oneself by others and thus potentially triggering conform behavior (cf. Grossman (2010)). It is important to clearly distinguish between these two motives and mechanisms when analyzing one's individual drivers for conform behavior.[22]

However, for image related concerns to be effective, a setting of repeated interactions has to be in place. In a one-shot setting, the threat of a reputation loss is negligible as the players won't face each other for a second time. If recurring interaction is not taking place, any deviant behavior can neither be traced back to the individual nor will be colored negatively with regard to future collaboration. Existing research supports this perspective. For example, there is comprehensive experimental literature pointing to the fact that contributions and compliance with underlying norms rise in multiple-shot interactions. In particular, this is true when transparency (e.g. ability to observe other participants' contribution decisions) or punishment (e.g. for non-compliance with social norms) is possible (cf. Andreoni (1995), Fehr & Gächter (2000), Cameron et al. (2009), Chaudhuri (2011)). Consequently, in order for reputation to be effective (even in absence of a punishment-mechanism), a setting of repeated interaction has to be in place and actions have to be observable to other people.

Taste for Conformity

Research and observations of real life situations indicate that underlying social factors decisively influence individual behavior. Motivation for a particular behavior is driven by the inherent desire to be valued and to win prestige, esteem, popularity, and acceptance (Ellingsen & Johannesson, 2008). Arguably, both the introversive coherence and outward appreciation matters and can be achieved through conformity in behavior. The basic idea here is that any infinitesimal deviation from effective norms might be punished by the social

[22] These aspects will be taken into consideration in the experimental design. We will return to this point later.

group (Bernheim (1994); see also Akerlof (1980) and Tirole (1996) for related work on the role of reputation in individual decision making and behavioral alignment).

In his seminal contribution, Bernheim (1994) formalized the concept of taste conformity. He argues that the individual's preference for status is in line with psychological, evolutionary, and behavioral considerations. In particular, natural selection favors concerns for status as this goes hand in hand with greater opportunities for reproduction. From a behavioral point of view, such concerns act as a reinforcing device to form preferences for higher esteem because esteemed individuals are more likely to receive better treatment.

Although partly representing a departure from the traditional formulation of preferences, this approach does not necessarily require the abandonment of consistent, self-interested optimization processes. By assuming that status depends on "public perceptions about an individual's preferences over actions […] esteem is determined by expectations about future actions and that tastes and proclivities are the best predictors of future actions" (Bernheim, 1994, p. 843).

Unsurprisingly, research indicates that people share similar preferences and opinions within the same group, which can arguably be both the antecedent and the effect of social interaction and norm alignment.[23] Aligning with existing norms is a way to signal one's (wishful) belonging to a certain social group. As argued by Hogg & Tindale (2002), enacting in-group-prototypical behavior is a way to validate one's own group membership, not only to the social group but also to themselves. By that, aligned behavior might function as a signal to both the external (e.g. the peers) and the internal world (e.g. themselves) in order to solidify the sense of belonging. If the individual cares about status, one has to set the right signals to the peers in order to create esteem. This esteem will be provided in case the individual behaves in a way that is expected from him.

In this vein, Bernheim (1994, p. 844) derives the following proposition, highlighting the decision process leading to behavioral adaptation:

> *"When popularity is sufficiently important relative to intrinsic utility (defined as the utility derived directly from consumption), many individuals conform to a single,*

[23] Manski (1993) refers to this as the previously mentioned reflection problem, rendering it extremely difficult to study clean peer-effects in the field. We will return to this point shortly in the experiment's design section of chapter 3.1.6.

homogeneous standard of behavior, despite heterogeneous underlying preferences. They are willing to suppress their individuality and conform to the social norm because they recognize that even small departures from the norm will seriously impair their popularity."

Arguably, the extent at which people are willing to align with their peer's behavior is driven by the degree of social identification to the social group. Social identity theory provides helpful guidance to distinguish between different magnitudes of personal identification with the peer's behavior (cf. Tajfel & Turner (1979), Tajfel (1982)). According to this approach, people categorize themselves and other persons into different social groups. Membership in a group is defined as the social identity and individuals strive to enhance their position and self-esteem through actions. These actions encompass the alignment with existing group norms. "[…] the social identity analysis of categorization processes suggests that group cohesion or solidarity is not only attraction among group members, but also attitudinal and behavioral consensus, ethnocentrism, in-group favoritism and intergroup differentiation, and so forth – the entire range of effects of categorization-based depersonalization" (Hogg & Tindale, 2002, p. 65). A comprehensive stream of literature suggests that such identification is driven by in-group-out-group concerns, finding that in-group favoritism is found across different contexts and social settings (cf. Tajfel (1982), Hoffman, McCabe & Smith (1996), Bohnet & Frey (1999), Eckel & Petrie (2011), Charness & Gneezy (2008)). From this one can derive the assumption that the stronger the desire to be part of the in-group, the stronger one's intrinsic willingness to comply with prevalent rules and engage in conformity by adapting social norms. Such a desire is driven by, for example, the inherent relevance of the social image component (cf. Andreoni & Bernheim (2009)). The stronger the social identity with a reference group, the stronger the effect of social comparison on individual conformity. Overall, taste for conformity is a function of existing social identity and the extent of social comparison to one's reference group. Deviating from the group's behavior (even in extreme cases where the group behavior is clearly wrong, cf. Asch (1958)) and thus being perceived as different might create discomfort in form of substantial disutility.

Imitation

In this subchapter, we will discuss two streams of literature suggesting that behavioral adaptation is the result of either pure behavioral imitation (e.g. due to observing behavior that leads to a superior outcome) or the adjustment of preferences (e.g. contingent on the behavior of the peers). With no claim to completeness, this chapter's focus will lie on the selected sample of contributions discussing the topics of behavioral imitation and adjustment of preference as a mechanism for behavioral adaptation.

Pure Behavioral Imitation

Imitation is a common behavioral trait of both animals and humans (Laland, 2002). While it is likely that imitation is driven by evolutionary and cultural facets, its pervasiveness can only be explained if it sufficiently often leads to a desirable outcome. Imitation has a number of desirable features because it allows one, among other things, to *free ride on superior information* (in the spirit of social learning, but see also Sinclair (1990)), to *save mental resources* (in the spirit of bounded rationality, but see also Conlisk (1980)), or as a means *to be regarded similar to others* (in the spirit of the social esteem argument, but see also Cho & Kreps (1987)).

Along these lines, Alós-Ferrer & Schlag (2009) abstract from the standard Bayesian belief-based approach and introduce the concept of imitation as a belief-free behavioral rule. The authors make the case that imitation is triggered by the observation of a superior outcome. In face of different imitation concepts, the degree of sophistication involved in assessing the extent of the observed agent's better performance clearly dominates a simple 'follow whoever performs better than me' rule. The reason behind this argumentation is that "the reluctance to switch when the observed choices are only slightly better than the own might not be due to switching costs, but rather to the fact that the payoff-sensitivity of the imitation rule allows the population to learn the best option" (Alos-Ferrer & Schlag, 2009, p. 273). In essence, this approach highlights the idea that behavioral adaptation can be triggered by behavioral imitation that results from observing (sufficiently) superior outcomes.

Adjustment of Preferences

Another strain of literature models behavioral adaptation in a way that is hard to swallow by traditional economists: preferences are not stable per se but are subject to interrelations

with the encompassing ecological system (cf. Sliwka (2007)). In his work, Sliwka (2007) introduced a third group of agents (in addition to agents of the homo oeconomicus type and agents with other-regarding preferences, cf. Fehr & Schmidt (1999), Bolton & Ockenfels (2000)), namely the 'conformists'. Here, such conformists are stochastic learners and exert behavioral adaptation through imitation of preferences.

Such conformists find themselves in a situation of uncertainty concerning the appropriate and acknowledged behavior by the social group. By such definition, a conformist will then be inclined to adapt his own behavior if he believes that this particular behavior is represented, meaning sufficiently supported and performed, by other agents. Observing certain behavior induces learning about other peoples' preferences, which in turn potentially triggers behavioral adaptation on the side of the agent.

Arguably, a conformist of the Sliwka-type is an agent who is driven by moral convictions and, although being mindful of social norms, will only be guided by them if he believes that a sufficiently large subset of the relevant social group will behave in the same way. He will also suffer remorse only if such feelings of guilt are sufficiently represented within the social group (also see Kandel & Lazear (1992)).

While classical economists might find the idea of contingent preferences hard to swallow, the recent years' literature has steadily evolved modeling social preferences beyond what has typically been assumed to be the case for fully rational agents. This approach is backed up by a variety of findings indicating that individual taste is not invariant but merely subject to social influence (Salganik, et al., 2006), which is in line with existing psychological literature on the pertinence of social influence (cf. Sherif (1937), Ash (1952), and Cialdini & Goldstein (2004)).

3.1.4.2 Concepts in (Social) Psychology

Social Learning Theory

Individuals constantly send signals through their behavior. These signals soak through different channels and as such not only reveal personal preferences but also transmit information about the current state-of-the-world (Anderson & Holt, 1997). Observed behavior is constantly evaluated by the environment (i.e. the peers), triggering an action that is fre-

quently referred to as *social learning*. Potentially, this allows other individuals to infer relevant information with respect to *accepted* or *correct* behavior (cf. Banerjee (1992), Ellison & Fudenberg (1993), Bikhchandani et al. (1998), Bikchandani & Sharma (2000), Chari & Kehoe (2004)). Broadly speaking, this particular strain of literature suggests that behavioral adaptation can be subdivided into two fundamental mechanisms, one of which is *social learning* and the other, *social utility* (Bursztyn, et al., 2014)).

Along these lines, Bandura's (1986) Theory of Social Learning emphasizes that behavior is the result of what has been learned through the observation of others rather than through trial-and-error. In particular, social learning is referred to in situations where individuals infer from a third party's behavior, such as buying decision, that the product must be of high quality. This in turn initiates own buying decisions. With respect to financial markets, herding behavior based on social learning assumes that conscious actions, such as buying decisions of an asset, transmit a positive signal about the product's value to the observer, thus increasing the probability that this action will be imitated. Under social learning, individuals constantly engage in a form of Bayesian-updating and adjust their understanding of the world.[24] The current trend of *social trading* notices this development, which utilizes the power of swarm intelligence to carry out investment decisions on the stock market (cf. Neumann et al. (2013)). By following the crowd, these people anticipate some existing information asymmetry and assume that the ones who act are the ones who are better-informed (cf. Conlisk (1980), Bernheim (1994)).

In sum, Bandura's approach stresses the idea that individual behavior is driven by informational motives and that we learn from direct experience, interaction, and observation. Consequently, social interaction allows individuals to learn and adapt established behavior.

Norms

By nature, humans are social creatures who use norms as guidance to learn what should and should not be done. The social context shapes the understanding and perception of existing norms, which in turn substantially affect individual behavior. Along these lines, the

[24] Conversely, *social utility* implies that "one's utility from possessing an asset (or product) depends directly on the possession of that asset (or product) by another individual." (Bursztyn, et al., 2014, p. 2). Although of particular relevance for explaining behavioral traits on, among others, financial markets, this approach will not be investigated further.

contributions by Cialdini et al. (1990) and Bicchieri (2006) have fueled our understanding of norms in general and their role in shaping social interactions.

We start by noting that research is disunited on what exactly is meant by a social norm. In addition, Postlewaite (2011) argues that economists have often been reluctant to incorporate social aspects such as norms into their analysis, especially if the results lead to a deviation from the standard neoclassical predictions. This, in turn, triggers even more fragmentation within and among the fields of research. For our purpose, we define norms as "the result of shared notions of appropriate behavior and the willingness of individuals to reward appropriate behavior and punish inappropriate behavior. […] As long as the rewards and punishments are sufficiently large, norms can stabilize a vast range of different behaviors" (Boyd & Richerson, 2001, p. 283). *Appropriate behavior* is believed to be represented by a social norm if "the behavior differs from that of other groups in similar environments" (Postlewaite, 2011, p. 32). From the perspective of game theory, Binmore (1998) adds that social life is an infinite game with norms representing equilibria that are in line with the folk theorem where both types of individuals are punished, norm violators and those who fail to punish them.[25] From this, we can conclude that social norms sustain because individuals have, among others, "a desire to coordinate, [a] fear of being sanctioned, [and want to] signal membership in the group, or simply follow the lead of others" (Young, 2015, p. 359).

In their seminal work, Cialdini et al. (1990) separate two types of norms that drive individual behavior. On the one hand, the *descriptive norms* induce an understanding of what is (supposedly) *normal* and thus mirrors the status-quo. Observing other people's behavior triggers a decisional shortcut as one relies on what seems to be sensible based on observed behavior. Conversely, the *injunctive norm* mirrors an individual's beliefs about how someone (supposedly) *ought* to behave. This norm is socially loaded and highlights what is morally approved or disapproved. This said, "rather than simply informing one's actions, these norms enjoin it through the promise of social sanctions. Because what is approved is often

[25] Boyd & Richerson (2001) provide a theoretical model explaining the mechanism of norm adaptation under the existence of occasional learning and inherent conformism. For an extended evolutionary perspective see McAdams (1997), Bowles & Gintis (2004), and Richerson & Boyd (1998). However, the question of why individuals choose to enforce norms remains open. We follow Boyd & Richerson (2001, p. 283) and assume "that the problem of why people choose to enforce norms has somehow been resolved […] over the long history of human evolution."

what is typically done, it is easy to confuse these two meanings of norms." (Cialdini, et al., 1990, p. 1015).

In addition, Bicchieri (2006) introduces the notion of conditional preferences (preferences that are conditional on social expectations) and unconditional preferences (preferences that are purely inherent to the individual, like self- and other-regarding preferences). In terms of individual norm compliance, Bicchieri argues that expectations are the main drivers. Here, the individual's inclination to obey norms is driven by both social beliefs, which are represented by normative and empirical expectations, as well as by non-social beliefs, such as factual and personal normative beliefs. Social beliefs are represented by two sets of expectations. For one, *normative expectations* describe second order beliefs about what others think should be done. For another, *empirical expectations* represent what one expects others will do. As elaborated in Bicchieri & Xiao (2009), such expectation can be grounded on past observations of conformity or its consequences. Individual conformity is thus conditional on both belief sets. In turn, non-social beliefs are represented by *factual beliefs* (that is, beliefs about the actual consequences of behavior) and *personal normative beliefs* (that is, what one personally thinks should be done). "A social norm then is a collective practice sustained by empirical and normative expectations and by preferences conditional on both these expectations" (Bicchieri, et al., 2014, p. 4).

Norms play an important role in everyday life and are decisive in establishing and sustaining social interactions. They determine the way we perceive the world and make sense out of it. The existence of norms provides an explanation to why and when behavior is contagious since individuals often follow and subordinate to the prohibition, indulgence, or encouragement of (un)ethical norms without much deliberation or putting it into question (Boyd & Richerson, 2001). In addition, Boyd & Richerson (2001) suggest that the saliency of norms depends on its source (e.g. on whom one interacts with), thus suggesting that norm obedience is likely to be a function of culture in general and social proximity in particular. This sometimes leads to the perverse outcome of antisocial punishment, in which social behavior is punished because it does not correspond to the society's norms (e.g. Herrmann, Thöni & Gächter (2008)).

Psychological Closeness and Vicarious Dishonesty

In social psychology, there is a comprehensive stream of literature introducing concepts of psychological closeness and vicarious dishonesty. These concepts serve the purpose of explaining the mechanism of behavioral adaptation in various contexts. A brief discussion of the more prominent approaches follows.

The self-expansion theory as proposed by Aron & Aron (1986) and extended by Aron et al. (1992) argues that the underlying mechanism of close relationships is defined by the inclusion of others in the self. In particular, the broadening of one's self is likely to occur if we are (or at least feel) close to the other person. Existing research highlights a number of factors that influence one's feelings of attachment towards other persons. Among these, sharing a common group membership (Tajfel, 1982), a similar name (Pelham, et al., 2005), the same birthday (Cialdini & DeNichols, 1989), or even imagining closeness (Goldstein & Cialdini, 2007) are found to trigger self-expansion and thus matter for conformity to selfish or unfaithful behavior (Gino & Galinsky, 2012). Hence, individuals take the perspective of others, afford them "self" status, and are likely to adopt other people's behavior when social closeness is imagined (Galinsky, et al., 2005). Along these lines, Goldstein and Cialdini (2007) argue that when closeness is imagined, individuals make inferences about the other person's attributes based on observed behavior and reflect upon them just as if they would have engaged in the very same behavior themselves.

As psychological closeness blurs the gap between self and others, such vicarious self-perception processes facilitate mimicry and render behavioral adaptation more likely the stronger the feelings of attachment are. In this vein, Gino and Galinsky (2012) argue and find experimental support that psychological closeness to an unethically acting person creates distance from one's own moral compass, thus increasing the likelihood of conformity towards unethical behavior.[26]

[26] More concepts emphasizing the degree of social distance between individuals as a driving factor of behavioral adaptation are discussed in more detail in chapter 3.1.5.

3.1.5 The Role of Social Identity and Observed (Un)Ethicality in Behavioral Contagion

3.1.5.1 Conceptual Introduction

Beyond Becker's (1968) seminal work on the rational criminal, recent work within the field of economics started implementing factors such as identity and culture into an individual's decision framework (Akerlof & Kranton, 2000). While this stream of literature does not necessarily yield hypotheses contradicting those generated by the rational crime economics literature, the inclusion of identity, morals, and reputation allows one to draw a more comprehensive picture of individual decision-making (Bénabou & Tirole, 2011).

In fact, existing research points to the relevance of social identity in determining social interaction such as the degree of trust and reciprocity (Leider, et al., 2009). Psychologists have devoted decades of research efforts to the study of group identity, which is closely related to the concept of social identity. Group identity is a function of social identity and is driven by one's identification with a social group. Sufficient identification triggers an in-group bias, indicating a preference for one's identified in-group along different dimensions (see also Gino, Ayal & Ariely (2009)).[27] Exemplarily, Chen & Li (2009) use painting preferences as a social identity and a matching device to study charitable giving, envy, punishment, and social concerns. Some research has also investigated the role of social identity for cooperation (Eckel & Grossman, 2005) and equilibrium selection (Chen & Chen, 2011).

Beyond the concepts explaining general behavioral adaptation that we have already discussed in chapter 3.1.3, some theories predict that social identity affects the magnitude of behavioral adaptation. Exemplarily, McLeod et al. (1966) introduced the concept of the *attraction effect*, arguing that conformity is mediated by the level of social identification between two people or a group. The *self-expansion theory* highlights that the people's sense of the *self* can be broadened in order to include others and even more so if we feel close to them. In consequence, the person's self-bias (e.g. egoism) includes not only himself but also extends to others (Aron & Aron, 1986). Within the framework of the *vicarious self-perception theory*, observing the behavior of people that *are closer* from a social identity perspective

[27] See Chen & Li (2009) for a comprehensive review of related literature.

may induce a carry-over effect of behavior (Goldstein & Cialdini, 2007), whereas the *perspective-taking theory* assumes that the *imagined* social closeness is already sufficient to facilitate behavioral adaptation (Galinsky, et al., 2005).

As has been discussed previously, psychological research has introduced a number of ways to proxy social identity in the lab. Due to methodological differences, existing economic research has resorted primarily to using rough proxies to introduce social identification in one form or another. Exemplarily, this has been achieved by varying the wording of the experimental instructions (Hoffman, et al., 1996), using face-to-face interaction (Bohnet & Frey, 1999) or showing pictures (Eckel & Petrie, 2011), revealing names (Charness & Gneezy, 2008), revealing preferences such as those for paintings (Chen & Li, 2009), and recruiting friends and family members (Brandts & Solà, 2010). In line with most psychological research, these studies find that social identity triggers in-group favoritism.

However, two natural problems arise with these approaches to introduce social identification in the lab: firstly, the introduction of potential biases caused by face-to-face communication within the lab or letting participants interact with their kin (Roth, 1995). Exemplarily, it has been shown that individuals discriminate using social cues such as looks or skin color (Eckel & Petrie, 2011). Additional research has investigated other-regarding behavior as a function of social distance. Using the dictator game setting, Bohnet & Frey (1999) find that other-regarding behavior is more pronounced under stronger identification. They incepted stronger identification by the use of identification prior to the dictator game. Again, their approach is only a rough proxy for social proximity and does not control for potential biases stemming from, among others, unobserved attraction effects. Secondly, and more along the lines of our experiment, applying these methods to introduce social identification does not usually allow for a variation of social proximity beyond a simple binary outcome of no social identification versus some social identification. In our experiment, we propose a method that allows us to naturally vary the degree of social identification in the lab without having to deal with the issues raised above. We will return to this in our design section.

Overall, it may be stated that different streams of existing research point at the significance of social identity in explaining the magnitude of behavioral adaptation thus making it worthwhile to examine this topic in more detail.

The ethicality of observed behavior might also be decisive to the magnitude of behavioral adaptation. As we will argue throughout this paper and will be explained more formally in this chapter, we expect that observations of unethical behavior render behavioral adaptation more likely and more extensive as compared to observations of ethical behavior. Existing empirical literature on the slippery-slope effect (cf. Gino & Bazerman (2009), Welsh et al. (2015)) as well as on the "broken windows effect" (cf. Beckenkamp et al. (2014), Lefebvre, Pestieau, Riedl & Villeval (2015)) support this point of view.[28] Arguably, the magnitude of behavioral adaptation is asymmetric in one direction or another, indicating that the likelihoods for adapting behavior are different when observing ethical or unethical behavior. Below, we will provide some theoretical arguments for this claim before turning to a more formal approach.

Individuals engage in ethical and unethical behavior for all sorts of reasons and sometimes turn evil extremely quickly under particular circumstances (see the infamous Milgram experiment (Milgram, 1963) and Zimbardo's Stanford prison experiment (Zimbardo, 1971)). Different perspectives are helpful in understanding one's rationalization to engage in (un)ethical behavior, such as self-rationalization, obedience to norms, or active signaling to one's peers.

Individuals tend to rationalize their behavior with themselves while trying to avoid cognitive strain stemming from, among others, negative self-image updating (cf. Wells (1978), Baumeister (1998)). Here, individuals do not want to think of themselves as a bad person and thus tend to engage in self-deception and moral rationalization and create positive disillusions that sustain a positive self-image (cf. Taylor (1989), Mazar, Amir & Ariely (2008)). "Self-deception allows one to behave self-interestedly while, at the same time, falsely believing that one's moral principles were upheld. The end result of this internal con game is that the ethical aspects of the decision "fade" into the background, the moral implications obscured" (Tenbrunsel & Messick, 2004, p. 223). Arguably, by avoiding thinking of immoral acts as such, mental processes leading to a denial of facts facilitate a person's inclination towards unethical behavior.

[28] Although not explicitly along the lines of (un)ethical behavior, a similar argument can be made based on the findings within the extensive literature on conditional cooperation and punishment (see Chaudhuri (2010) for a selective review).

From the perspective of norm theory, the exposition of unethical behavior comes with a relatively higher risk of being condemned by and excluded from the social group (Bicchieri, 2006). The degree to which one can behave unethically (if at all) among one's social peers is typically grounded in uncertainty. Consequently, a person's decision to engage in either ethical or unethical behavior is not only simple cost-gain maximization under risk but also involves accounting for the inherent uncertainty. The uncertainty involves, among others, the deviation from what is deemed appropriate within the social group, reputation loss, and the potential exclusion from the group. From a psychological perspective, engaging in unethical behavior involves higher costs, as one has to forcefully convince oneself that gaining personally at the expense of harming others is acceptable. Processes leading up to this reasoning involve, among others, self-deception, justification, and hypocrisy. Typically, only the acting individual profits from unethical behavior in (non-) monetary terms, such as stealing money, while another person is losing out. In turn, however, normally both individuals gain from ethical behavior such as donating money: the receiving individual gains in monetary terms and the acting individual, while losing out in monetary terms, is (over-)compensated from a behavioral perspective by either the positive feelings of warm glow of giving and altruism (Becker (1974), Andreoni (1989) & (1990)) or social pressure (Akerlof & Kranton, 2000). Plausibly, to convince oneself to behave unethically involves more (psychological) effort than to behave ethically.

From a signaling perspective, observing someone who is socially closer to oneself as compared to observing a stranger sends a more salient form of social learning about appropriate (or at least tolerated) behavior within the social group. This assumption is also along the lines of Schelling's (1968) prominently stated "the more we know, the more we care" and a number of experimental results in various settings (see Eckel & Grossman (1996), Bohnet & Frey (1999), Charness & Gneezy (2008), and Gino & Gallinsky (2012)). The resulting resolution of uncertainty allows the individual to overrule their own concerns about the inappropriateness of unethical behavior. This stream of literature suggests that observing unethical behavior might trigger stronger contagion as compared to observing ethical behavior. For these and more reasons, we expect behavioral adaptation to be asymmetrically biased towards unethical behavior.

3.1.5.2 Theoretical Model

We extend the model introduced by Akerlof (1997) and expand the underlying concepts in a way that is conducive to understanding the role of social identity and the (un)ethicality of observed behavior in behavioral contagion.[29] Previous work put emphasis on modeling social interactions and behavioral adaptation as a function of distance in the social space, e.g. resulting from distance in behavior and geographic location to one's peers. We, however, shed light on the relevance of social distance and proximity resulting from *overlapping and common interests and preferences* in driving behavioral adaptation. Intuitively, one could reasonably assume that the behavior of one's family and friends exhibits a more salient signal and thus is taken more strongly into consideration than observing random strangers. What is more, we follow the previous discussion and assume additionally an asymmetry in behavioral contagion depending on the ethicality of the observed behavior. This is a substantial extension to Akerlof (1997), where an asymmetric adaptation in behavior cannot be illustrated.

The purpose of this section is to outline a simple reduced-form model that allows one to draw predictions about individual contribution decisions in the various contexts that are reflected by the experimental design. These predictions can then be tested empirically. The principal goal of this exercise is to show how behavioral contagion is mediated by social identity and the (un)ethicality of observed behavior and how these factors affect the *adaptation gap*, that is the difference between one's own and observed behavior, after contagion has taken place. We will introduce the symmetric model first before turning to the extension.

Symmetric Contagion

Prior to introducing the formal model, we begin with the intuition of what the model should capture. The underlying idea is that individual behavior is a function of the peer's actions

[29] In particular, we focus on Akerlof's (1997) quadratic utility version of the conformity model as this generates unique equilibria from which we can derive testable hypotheses for our experiment, which we also deem to be more in line with the general story of this paper. While Akerlof's general model puts more emphasis on one's own decisions, the quadratic utility model has an a priori assumption that puts one's own and peer behavior on an equal footing with respect to how behavior affects individual utility. Assuming that individuals are on a continuum between extremely selfish and extremely altruistic, the quadratic utility approach is conclusive. It should be noted that this assumption is not crucial to our model's predictions as we mainly focus on the relevance of two factors, i.e. social identity and the (un)ethicality of observed behavior, in affecting one's own decisions. Thus, the equal-weight assumption is not decisive in predicting the direction in which individual behavior changes as a function of those two factors.

and thus encompasses more than one's self-referentiality. In a situation of social interaction, an individual is expected to face a trade-off, weighing one's own preferences against the peer's revealed preferences. To stay in Manski's (1993) terms, social interaction and the understanding that one's own actions are reflected by the peers and thus have an impact on other (closely related) people shapes the individual's willingness to engage in behavioral adaptation. The magnitude to which one is willing to revise one's own initial behavior and adapt is first and foremost a function of the social proximity to the peer. "As a consequence, the impact of my choices on my interactions with other members of my social network may be the primary determinant of my decision, with the ordinary determinants of choice the direct additions and subtractions from utility due to the choice) of only secondary importance" (Akerlof, 1997, pp. 1006-1007). It is thus reasonable to assume that the individual's utility is subject to a relative evaluation of one's own behavior and the behavior of the peers. Similar to Akerlof (1997), the underlying characteristic of our model is the feature that individual utility is declining with increasing distance between one's own behavior and the peer's behavior. While the aim of this section is to outline a model that explains changes in general behavior, we will use the resulting predictions to generate hypotheses in the context of (un)ethical behavior.

In our design, we resort to a two-stage dictator game in which each individual is paired with a charity of his choice. Both, the individual and the charity start with an initial endowment $\boldsymbol{I_c = I_i = I} \in \mathbb{R}^+$ of equal size. At each stage $\boldsymbol{t} \in [1, 2]$, each individual $\boldsymbol{i}$ faces the choice, x_t^i, of either (a) donate (part or all of) one's own money to the charity, (b) retain the equal split, or (c) take away (part or all of) the charity's money and add it to one's own income. We will refer to (a) and (c) as ethical or unethical behavior, respectively. Naturally, the individual's decision is of the form $\boldsymbol{x_t^i} \in [-\mathrm{I}, +\mathrm{I}]$. The only difference between both stages is the information set that the individual possesses about his peer's behavior. That is, after completion of stage 1, the individual observes a random individual's behavior from stage 1. At stage 2 (that is, after the observation), the individual is given the opportunity to revise his initial decision, if desired.

Let $\boldsymbol{\alpha_t} \in (0,1)$ depict the social proximity of an individual at time $\boldsymbol{t}$. Importantly, let an individual's inherent attitude towards (un)ethical behavior be described by θ^i. That is, θ^i represents the individual $\boldsymbol{i}$'s preference to give or take a particular monetary amount within the

boundaries of one's income in a given situation, thus being defined as $\boldsymbol{\theta^i} \in [-\mathrm{I}, +\mathrm{I}\,]$. What is more, let ψ_t^{ij} represent individual $\boldsymbol{i}'s$ prior (stage 1) or actual observation (stage 2) of individual $\boldsymbol{j}'s$ (un)ethical behavior.

(1) $$\boldsymbol{\psi_t^{ij}} = \begin{cases} \widetilde{x_1^j} & if\ t = 1 \quad (truncated\ normally\ distributed\ prior) \\ x_1^j & else \qquad\qquad\qquad\quad (updated\ beliefs) \end{cases}$$

From this it follows that each player maximizes own utility at Stage 1 of the following form:

(2) $$\underset{x_t^i}{\boldsymbol{max}}\ U_t^i = I - \left(1 - \alpha_t\ \right) * \left(x_t^i - \theta^i\right)^2 - \alpha_t\ * \left(x_t^i - \psi_t^{ij}\right)^2$$

At stage 1, individual $\boldsymbol{i}$ has no information about individual $\boldsymbol{j}$'s decision, as all participants carry out their decisions simultaneously. Consequently, $\boldsymbol{i}$ resorts to forming beliefs about the behavior of $\boldsymbol{j}$. As depicted above, individuals face a trade-off decision at stage 1, in which deviation from the individual inherent characteristic θ^i has to be weighed against deviating from one's own beliefs about the peer's behavior ψ_t^{ij}. Because no information about the peers was given at stage 1, the resulting decision is a simple maximization problem of the form:

(3) $$\frac{\partial U_t^i}{\partial x_t^i} = 2\alpha_t\ * \left(\psi_t^i - x_t^i\right) - 2 * \left(\alpha_t\ - 1\right) * \left(\theta^i - x_t^i\right)$$

$$\Leftrightarrow x^* = x_t^i = \theta^i - \alpha_t\ \theta^i + \alpha_t\ \psi_t^{ij}$$

yielding the comparative static:

(4) $$\frac{\partial x_t^i}{\partial \alpha_t} = \psi_t^{ij} - \theta^i$$

We can infer that a change of $\boldsymbol{x_t^i}$ in $\boldsymbol{t}$ depends on the social proximity (that is either a prior in $\boldsymbol{t = 1}$ or an updated belief in $\boldsymbol{t = 2}$) in the following way:

(5) $$\frac{\partial x_t^i}{\partial \alpha_t} = \begin{cases} > 0 & if\ \psi_t^{ij} > \theta^i \qquad (x_t^i\ increases\ in\ \alpha_t\ ) \\ = 0 & if\ \psi_t^{ij} = \theta^i \qquad (x_t^i\ unaffected\ by\ \alpha_t\ ) \\ < 0 & if\ \psi_t^{ij} < \theta^i \qquad (x_t^i\ decreases\ in\ \alpha_t\ ) \end{cases}$$

In order to study the adaptation gap at stage 2, that is the difference in behavior between individual $\boldsymbol{i}$ and $\boldsymbol{j}$ after the second stage, one has to hold $\boldsymbol{j}$'s behavior from stage 1 constant while giving individual $\boldsymbol{i}$ the ability to revise his initial decision.[30]

Proposition: Equation (2) provides a solution to the maximization problem and reduces the adaptation gap to:

(6) $$\left|x_2^i - \psi_2^{ij}\right| = \left|\theta^i - \alpha_2\ \theta^i + \alpha_2\ \psi_2^i - \psi_2^i\right| = \left|\theta^i * \left(1 - \alpha_2\ \right) + \psi_2^i(\alpha_2 - 1)\right|$$

Observe that unlike in Akerlof's (1997) general conformity model, this approach generates a unique equilibrium prediction due to restrictions put on the social proximity parameter, that is $0 < \boldsymbol{\alpha_t}\ < \mathbf{1}$ and the linear reaction function.

Essentially, by assuming that behavioral adaptation is symmetric in either direction this indicates that the gap is driven by the social proximity to the peer that one is observing: the closer individual are in terms of proximity the smaller is the expected gap and the more similar is their behavior. An alternative interpretation is that the peer effect is stronger and leads to a more extensive behavioral adaptation the higher their social proximity is.

Asymmetric Contagion

The main purpose of the extended model is to allow for an asymmetric adaptation to unethical and ethical behavior. It is plausible to assume that not only observing but also starting to act on unethical behavior requires a different mindset and triggers other cognitive processes than it is the case for ethical behavior. Here, the ability to self-justify behavior depends on the (un)ethicality of the (observed) act to the extent that it varies the boundaries of the moral wiggle room (Dana, et al., 2007). Empirical support is provided by the slippery-slope effect (cf. Gino & Bazerman (2009), Welsh et al. (2015)) as well as results on the "broken windows effect" (cf. Beckenkamp et al. (2014), Lefebvre, Pestieau, Riedl & Villeval (2015)), which suggest that unethical behavior is likely to be more contagious than unethical behavior.

We introduce $\boldsymbol{k}$, which represents a factor biasing behavioral adaptation towards the observation of unethical behavior. We assume that the degree of the adaptation bias depends on

[30] Which is exactly what we will do in our experiment. See chapter 3.1.6.

the difference between one's own and observed unethical behavior $\boldsymbol{\theta^i - \psi_t^i}$. With $\boldsymbol{\psi_t^i}$ still retaining its properties from **(2)**, the individual's maximization is of the form:

(7) $$\max_{x_t^i} U_t^i = I - \left(1 - \alpha_t\ \right) * \left(x_t^i - \theta^i\right)^2 - \alpha_t\ * k * \left(x_t^i - \psi_t^i\right)^2$$

with:

(8) $$k = \max(\theta^i - \psi_t^i + 1, 1)$$

This definition illustrates that whenever one's own initial behavior is more ethical than what is being observed from the peer behavioral contagion is stronger than observing more behavior that is more ethical. The strength of the difference in this contagion force depends on the distance between own and observed behavior. This implies the following maximization of the individual's utility:

(9) $$\frac{\partial U_t^i}{\partial x_t^i} = 2\alpha_t\ \mathrm{k} * \left(\psi_t^i - x_t^i\right) - 2 * \left(\alpha_t\ - 1\right) * \left(\theta^i - x_t^i\right)$$

$$\Leftrightarrow x_t^i = \frac{\theta^i - \alpha_t\ \theta^i + \alpha_t\ \psi_t^i k}{\alpha_t\ k - \alpha_t\ + 1}$$

with the comparative static:

(10) $$\frac{\partial x_t^i}{\partial \alpha_t} = \frac{k*(\psi_t^i - \theta^i)}{\left(\alpha_t\ k - \alpha_t\ + 1\right)^2}$$

Under these assumptions, the resulting adaptation gap looks as follows:

(11) $$\left|x_2^i - \psi_2^i\right| = |\ldots| = \left|-\frac{(\theta^i - \psi_2^i)*(\alpha_2\ - 1)}{\left(\alpha_2\ k - \alpha_2\ + 1\right)^2}\right|$$

We can easily see that the slightly differently appearing adaptation gap retains the same properties as in the symmetric model. In conclusion, we expect behavioral adaptation to be driven by social proximity with a bias towards unethical behavior. Put differently, we expect the spillover of unethical behavior to be more pronounced, thus leading to a stronger degeneration of behavior relatively to the rise of good Samaritans.

3.1.6 The Experiment

3.1.6.1 Experimental Design and Procedure

In order to study behavioral contagion, we are mainly interested in answering two questions with our experimental design: first, whether individuals revise their initial behavior in light of observing peer behavior. Second, whether and how a behavioral change depends on both the ethicality of the observed behavior and the social identification with the observed peers. Our design draws on a unique approach to study behavioral contagion in the lab that allows us to account for potential confounds potentially inherent into peer effects studies as argued by Manski (1993) and Angrist (2014) (see Thöni & Gächter (2015) for a similar approach). In order to be regarded as behavioral contagion, revised behavior has to be more similar to observed behavior than one's initial behavior that one has decided upon prior to learning peer information. That is, revision of one's initial behavior must follow the direction of observed initial peer behavior.

Our basic design follows this straightforward procedure: action – observation of a peer – reaction.[31] Consider a variant of a two-player dictator game in which the participant (dictator) is matched with a charity (recipient). The dictator's action space entails taking away money from the charity, leaving the initial situation unchanged, or give money to a self-chosen charity (the basic design follows List (2007) and Bardsley (2008)). In following Eckel & Grossman (1996), we use a charity to increase the saliency of the involved decisions. The experiment is played one-shot with a possibility to revise one's initial behavior. Between the initial decision and potential revision, individuals are given the opportunity to observe the initial behavior of another random participant. Alongside the actual behavior, treatment variations include the alteration of unveiled social proximity information of the observed participant.[32] That is, in addition to learning actual behavior and the amount that was taken away or given by this participant, additional information on the participant's social proximity to oneself is varied with the random treatment assignment. The treatment variation lies in the information given about the social proximity to the observed peers: no information on proximity (Baseline), as well as high proximity (T1) and low proximity (T2) information.

[31] Note that in order to exclude any hedging concerns throughout the whole experiment, information about the specifics of the design were only provided where necessary in order to reach a deliberate decision. That is, at Stage 1 participants were neither aware of the possibility to observe peers later on nor to revise their initial decision, ensuring unbiased initial behavior.

[32] Henceforth, we will use the terms social proximity and social identity interchangeably.

Proximity is calculated based on overlapping answers in the list of statements used in the beginning of each session and then presented to the participants in the form of below- or above-average proximity information to the observed peer.[33] We capitalize on a shortened 25 items list of statements compiled from a major US American dating website to ensure the validity of the questions in successfully matching people (see Gibbs, Ellison & Heino (2006) and Hitsch, Hortaçsu & Ariely (2010) for a discussion).[34] Since the business concept of dating websites is based on achieving high matching success rates, the use of such validated questions improves the success of incepting social identification between participants in the lab.[35]

The experimental procedure is represented by a single iteration of the following three stages:

First Stage - The Action: Starting with an equal distribution of money, each individual decides whether to (i) donate own money to the charity's account, (ii) not change the initial equal distribution, or (iii) take money from the charity and add to one's own account.

Second Stage – The Observation: Each active player observes one passive player of random who has engaged in either ethical or unethical behavior. In all three treatments, the exact information entails the monetary amount taken away from or given to the charity. Ex-

[33] The implementation of the low- and high-proximity information followed a very straightforward calculation. For each participant of the active group, an individual proximity score to both participants of the passive group was calculated based on overlapping answers in the list of statements. From each active participant's individual perspective, the passive participant with the higher (lower) score was labeled as the high (low) proximity peer. In fact, this calculation approach allows for the same passive person to be of high (low) proximity to one active person, while being of low (high) proximity to another active person, thus truly randomizing information. We abstained from providing explicit matching scores or percentages to retain maximum control. In addition, this allows us to alleviate the *false-consensus* effect, in which people systematically overestimate the degree of similarity to others. The provision of social cues of this kind allows the participants to update their beliefs reliably with respect to the actual degree of similarity. See Ellingsen & Johannesson (2008, p. 995) for a discussion.

[34] We should stress the fact that we report lower-bound results. We induce social proximity in a very simple way by providing participants with either the high- or low-proximity signal in the social identification treatments 1 and 2. Although this approach allows us to provide a comprehensive set of information to induce even more salient and distinct forms of social identity (i.e. by providing the exact matching score, the exact answers to the questions, letting participants put different weights on questions according to their individual importance and so on), we resort to this easy-to-use-easy-to-reproduce approach. See Appendix B for the exact list of questions used in our experiment.

[35] In addition, we elicit the strength of social identity to the observed peer using a variant of the self-evaluation scale of one's social identity following Luhtanen & Crocker (1992) to verify the robustness of our social identity implementation approach. The non-parametric and regression estimations yield the same overall results both in direction and in magnitude.

cept for the baseline condition, observers received additional information related to the social identity to the observed peer, stating simply that based on the initial answers this peer is of higher or lower proximity as compared to the other passive peer that one cannot observe.

Third Stage – The Reaction: After observation, the active player is given the choice to revise his initial decision.

The experiment was concluded with a battery of non-incentivized questions to elicit attitude towards, among others, charitable giving and risk.

Our design accounts for the aforementioned reflection problem by randomly assigning all participants into two groups: *active* and *passive*. The group assignment is relevant to the action space available to the participants. If assigned to the *active* group, the participant is in the role of the *observer* and receives the opportunity to revise his initial decision. If assigned to the *passive* group, the participant is in the role of the *observed* person and is neither allowed to observe others nor to revise his own initial decision. In other words, in the *active* group, participants are free to request information about the behavior of one randomly chosen peer following their initial decision and are then given the chance to revise. Whereas in the *passive* group, the participant's initial behavior is held fixed and no further decisions are made.[36]

Payoff structure: Importantly, to exclude any form of strategic interaction that might potentially dilute results or affect the saliency, the participant's decisions only affected one's own and the chosen charity's payments but not those of other participants. That is, each individual's decision had no monetary impact on other individuals, therefore a change in behavior was due purely to behavioral contagion and not due to other-regarding concerns.[37] This becomes even more salient by randomly picking one of the individuals at the end for

[36] The specific differences in the action space are openly communicated to everyone so that participants in the active group are well aware of the fact that the person they are observing can no longer readjust initial behavior. What is more, in order to avoid any unnecessary interferences, risk is not implemented at any point of our design. Independent of one's behavior, there is no risk of facing punishment or being personally exposed. Here, peer effects are studied purely by providing behavioral decisions anonymously without specifically exposing any participant. We will return to a step-by-step breakdown of available information at any stage. Our extended design draws upon earlier studies on peer effects and extends them in order to avoid the aforementioned problems with circular effects, endogeneity, and potential experimenter demand effects.

[37] To some degree, the experimental design resembles the theoretical considerations of Alós-Ferrer & Schlag (2009).

which the behavioral decision was implemented, while everyone else received a flat income irrespective of his actual behavior. In monetary terms, each participant and the respective charity received the ECU equivalent of 15 Euro, thus allowing a participant to leave with a maximum (minimum) of 30 (0) Euro if the participant decided to take away all the money from (give all the money to) the charity. In order to increase the saliency of ethical behavior, we added a multiplier to the setting. That is, the experimenter doubled all Euro remaining in the charity's account at the end of the experiment. After all decisions have taken place, one participant was chosen at random and the respective decision was implemented with respect to taking from or giving to the charity, while every other participant in the session received a flat income of 7.50 Euro including a show-up fee of 2.50 Euro.

Several points are worth noting. In order to retain maximum control and reduce heterogeneity in observed behavior, in each session exactly two participants were chosen at random as passive (that is, being observed by peers), while participants randomly chosen as being active (that is, observing peers) always observe only one of these two passive players. What is more, the treatment differences are based solely on the social proximity information. Importantly, the observing peers received the information that a random draw will determine whether they will observe a high or low proximity peer and that this person would have either taken money away from or given money to the charity. The observer would then randomly learn the behavior of exactly one passive player but was never able to infer other participants' behavior from this information, neither active nor passive.[38] This double-random procedure ensured that each active player's information set would be restricted to the peer's observed behavior and focus the participant's attention on processing this information. In addition, to allow for perfect comparability across treatments, participants were randomly assigned to one of the three treatments within the same experimental session. In

[38] Prior to the actual observation, we elicited incentivized beliefs about the behavior of the two passive participants. Those beliefs ended up being irrelevant in predicting the active participants' behavior. We will return to this point shortly in the analysis section.

sum, this design allows us to measure clean peer effects every time a participant revises his/her initial decision after observing peer behavior.[39] The design is illustrated below:

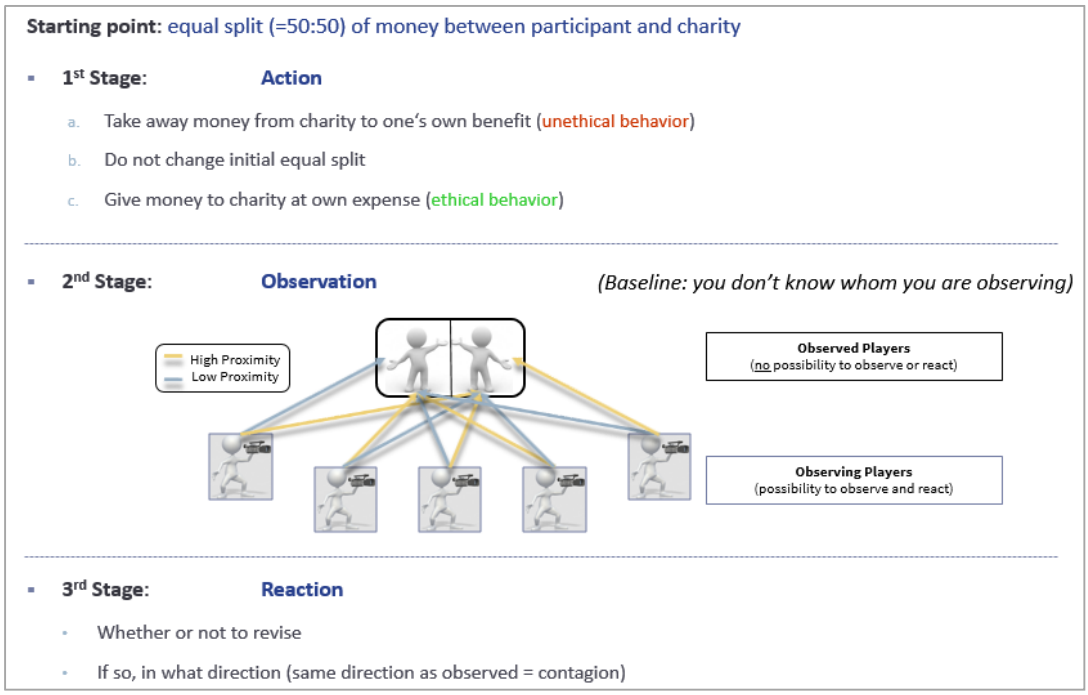


Figure 1: Experimental Design and Procedure

3.1.6.2 Hypotheses

In order to generate hypotheses that are sound with existing theory, we derive our theoretical model as it is discussed in chapter 3.1.5 and our predictions from previous research.[40] The slippery-slope argument (cf. Gino & Bazerman (2009), Welsh et al. (2015)) as well as results on the "broken windows effect" (cf. Beckenkamp et al. (2014), Lefebvre, Pestieau, Riedl & Villeval (2015)) suggest that unethical behavior is likely to be more contagious than unethical behavior. We thus derive our first hypothesis as follows:

[39] With reference to the different concepts in economics and (social) psychology explaining behavioral contagion (as discussed in chapter 3.1.4) and in light of our design, some theories are better at explaining behavior in our experiment than others are. Contagion observed in our experiment is likely to be explained by the theories of *social decisions and social distance* (Akerlof (1997), Glaeser & Scheinkman (2004)), *imitation of preferences* (Sliwka, 2007), as well as by some of the theories in (social) psychology, such as *social learning* (Bandura, 1971), *norms* (Cialdini et al. (1990) and Bicchieri (2006)) and *self-expansion* (Aron & Aron, 1986). Other theories are not applicable due to reasons of absence of learning better outcomes (which is required by Alós-Ferrer & Schlag's (2009) imitation concept), or the ability to not only observe but also be observed by the peers (which is required by, among others, Bernheim's (1994) theory on taste for conformity). While it is questionable whether it is possible at all, we shall not attempt to disentangle clearly, which theory best explains behavioral contagion observed in our experiment.

[40] Our hypothesis will mainly focus on two behavioral traits that we can observe in our experiment: the first is individual $\boldsymbol{i}$'s revised amount after observing a peer's initial decision: $\boldsymbol{x_2^i}$. The second is the adaptation gap of individual $\boldsymbol{i}$ and $\boldsymbol{j}$ after $\boldsymbol{i}$'s revision decision: $\left|\boldsymbol{x_2^i} - \boldsymbol{\psi_2^i}\right|$. We will capitalize on these two aspects to support our hypotheses in the results section.

H_1: ***Unethical behavior is more contagious than ethical behavior.***

Previous research indicates that social identification is a decisive predictor of behavior in different contexts related to charitable giving, trust, punishment, and reciprocity (cf. Leider et al. (2009), Chen & Li (2009)). What is more, some of the existing research on neighborhood effects (cf. Damm & Dustmann (2014)) and our theoretical predictions from chapter 3.1.5 support these assumptions. Consequently, we formulate our second hypothesis:

H_2: ***Social identification amplifies the contagion of behavior in general and unethical behavior in particular.***

As previously argued, we are also concerned with understanding the main driver of behavioral contagion. That is, we try to answer whether the unethicality of observed behavior or social identification to one's peers is a stronger predictor of behavioral contagion. While different streams of research suggest the relevance of both channels, we are the first, to the best of our knowledge, to compare these channels in terms of their impact on behavioral contagion. We follow the existing research on social identity (cf. Tajfel (1982), Hoffman, McCabe & Smith (1996), Bohnet & Frey (1999), Eckel & Petrie (2011), Charness & Gneezy (2008)) and expect behavioral contagion to be more pronounced the higher the social identification with one's peer is, independent of the (un)ethicality of the observed behavior. We thus derive our final hypothesis:

H_3: **Social identification is the main driver of behavioral contagion.**

3.1.6.3 Results and Discussion

We conducted the experiment at the BaER-Lab at the University of Paderborn, Germany. Participants were recruited using ORSEE (2004). We used zTree (Fischbacher, 2007) to run our experiment. In sum, 227 participants throughout 9 sessions were randomly assigned to one of the three main treatments (no proximity, high proximity, and low proximity) as well as to one of the two sub-treatments (observing either ethical or unethical behavior).[41] Each

[41] Out of the 227 participants, 18 (8%) participants were randomly assigned to being observed and thus remained passive after their initial decision, and 24 (11%) decided to opt-out and not to observe peer behavior. The latter represents a significant portion of participants that refuse to learn about peer behavior and thus speak to the aforementioned problem of forcing participants to observe peers. See chapter 3.1.5 for discussion. In total, this leaves us with 185 observations entering our analysis.

session lasted about 45 minutes and the hourly average earnings were €10.50. What is more, an average of €30 was donated per session to various charities.[42]

Figure 1 details our behavior data in two ways: before observation in pooled form and after observation by treatment. Starting with a descriptive observation, we observe some heterogeneity across treatments in terms of the distribution of (un)ethical behavior. On the x-axis, we depict the amount of money that was allocated to the charity. The point of departure is 300, which represents the equal *a priory* distribution of money between the participant (300) and the charity (300). Thus, any value below (above) 300 depicts the individual taking from (giving to) the charity's account.

Prior to observing peer's behavior, decisions are mainly clustered at 300 ECU, which represents the decision to not change the initial equal distribution between oneself and the charity. Across all treatments, a total of 25% of participants decided to revise his/her initial decision. After the observation, however, we find a perceptible skewness towards unethical behavior, particularly in the high proximity condition. Although observing either ethical or unethical behavior is equally likely, this finding provides us with a first indication that taking (unethical behavior) is more contagious than giving (ethical behavior). We will return to this argument shortly in our hypothesis $\mathbf{H_1}$.

[42] See Appendix A for more details.

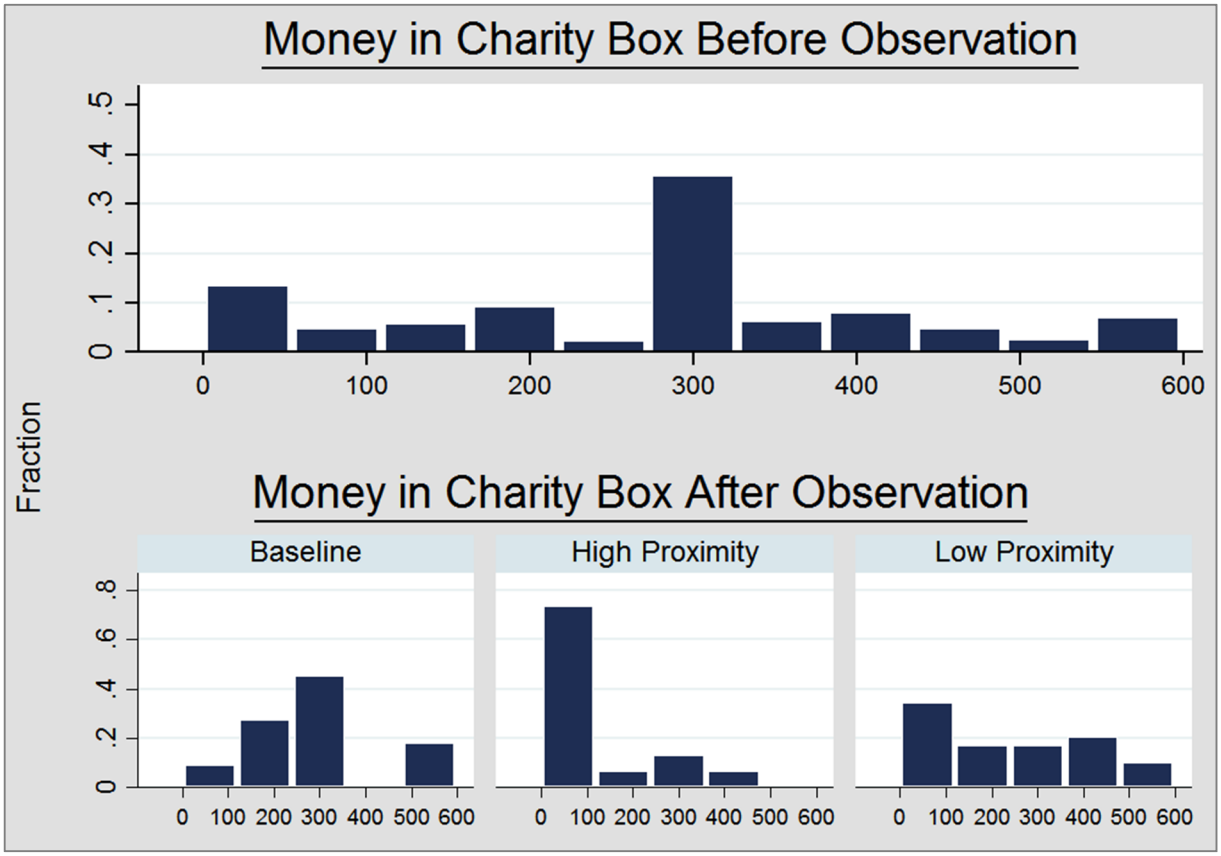


Figure 2: Incidence of choices to not change the initial equal distribution / give money to / take money from the charity before and after peer observation. The horizontal axis depicts a continuum of ECU left in the respective charity's cash account, with 300 representing the starting allocation. The choices were clustered in the figure for the sake of readability. The vertical axis depicts the fraction of participants indulging in the particular behavior.

Next, we turn to testing our hypotheses.[43] We are interested in whether unethical behavior is more contagious than ethical behavior. We will do so by illustrating the amount revised (%) after observation purely depending on the (un)ethicality of observed behavior.[44] More specifically, for the *amount revised (%)*, the results suggests that the (un)ethicality of observed behavior indeed affects the individual's revision decision. When observed ethical (unethical) behavior, meaning that participants observed a peer who gave money to (took money from) the charity, participants gave on average 6.42% more (17.3% less) money to

[43] In general, non-parametric Mann-Whitney-U (MWU) specifications are used throughout this paper to test for differences among those who decided to revise initial behavior. Unless noted otherwise, these findings are robust to alternative non-parametric specifications, such as the Kolmogorov-Smirnov test, and varying examinations of missing observations.

[44] For *amount revised (%), a* positive (negative) value implies that individual $\boldsymbol{i}$ has given more money to (has taken more money from) the charity as compared to his/her initial behavior prior to observing a peer's behavior. Robustness checks involve the analysis of differences in the *adaptation gap (%).* For adaptation gap (%), a value below (above) 1 implies that the adaptation gap, denoted as $\left|x_2^i - \psi_2^{ij}\right|$, has gotten smaller (larger) after individual $\boldsymbol{i}$ had the chance to revise his/her initial decision. A value of exactly 1 means that the adaptation gap remained the same after the revision stage as compared to the initial decision. This could be either due to individual $\boldsymbol{i}$ deciding not to revise his/her initial decision or due to a revision which is equidistant in monetary terms. The results support $\mathbf{H_1}$ and are presented in Appendix A.

the charity as compared to their initial behavior prior to having observed a peer's behavior. The results are significant at the 1% level (p = 0.000, z = 4.365) and indicate a change in behavior almost three times as large when unethical behavior was observed as compared to ethical behavior. The results are highly suggestive of unethical behavior being more contagious. Thus, these results strongly support our hypothesis **H_1** and confirm that unethical behavior is indeed more contagious than ethical behavior independent of social identification.[45] Figure 3 illustrates our findings.

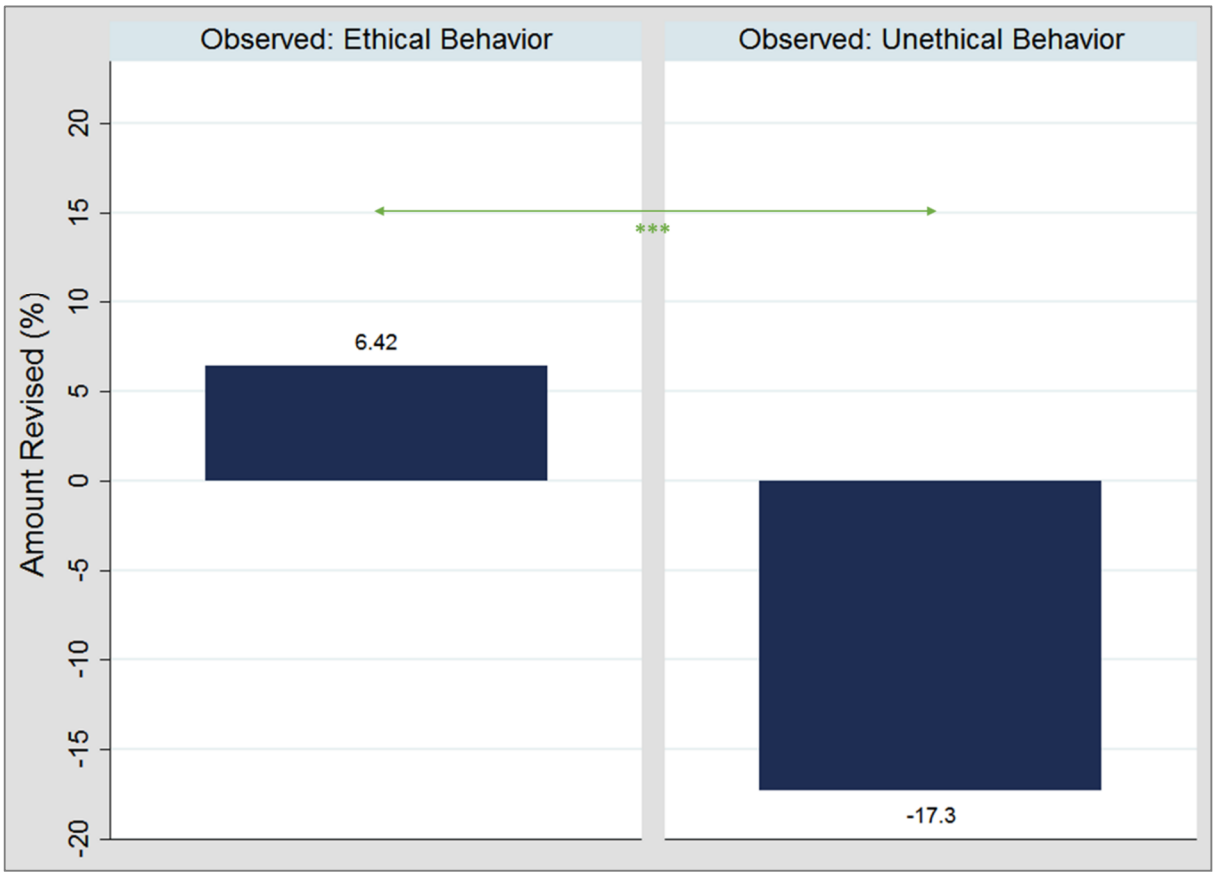


Figure 3: Amount Revised (%) and Observed (Un)Ethicality. The figure depicts the amount revised as percentage of one's initial behavior. Any value above (below) zero indicates that more (less) ECU were given after the revision to the charity relative to one's initial decision. The analysis is broken down into the (un)ethicality of observed behavior by the active participants.

We are also interested in the type of behavioral contagion that is triggered by social identification. Following hypothesis **H_2**, we assume that social identification amplifies the contagion of unethical behavior in an over-proportional way as compared to contagion of ethical

[45] Unless noted otherwise in the results section, we obtain similar results in terms of evidence and significance when using absolute ECU numbers rather than percentages.

behavior. We thus examine the role of social identification in affecting the magnitude and direction of revision choices. Both findings are illustrated below in figure 4.

Our results robustly indicate that higher social identity indeed triggers stronger behavioral contagion, particularly contagion of unethical behavior. As social identity increases, the magnitude of revised behavior increases as well, peaking at -29.8% for the high proximity condition. The differences in behavior are significant at the 1% level ($p = 0.000$, $z = 4.759$) when comparing behavior in the unknown proximity with the high proximity condition. Likewise, the results are significant at the 1% level ($p = 0.000$, $z = -3.448$) when comparing the high proximity with the low proximity condition. Here, again, the negative numbers of amount revised suggest that, in terms of magnitude of revised behavior, unethical behavior is strongly pronounced and thus more contagious than ethical behavior. Overall, we find ample support for our hypothesis $\mathbf{H_2}$ and thus conclude that the magnitude of a revision of one's initial behavior is indeed strongly correlated with social identification.

Consistent with our theoretical model, the results also yield strong support for the idea that the reduction in the adaptation gap is driven by social identification. As predicted by α^{ij}, the stronger the social identification to one's peer is a robust predictor (all at the 1% level) of one's adaptation gap to the observed peer after observation. By the numbers, we obtain $p = 0.000$ and $z = 6.104$ ($p = 0.000$ and $z = -3.441$) when comparing unknown proximity versus high proximity condition (high proximity versus low proximity condition). We find that the adaptation gap is inversely correlated to the social identity.

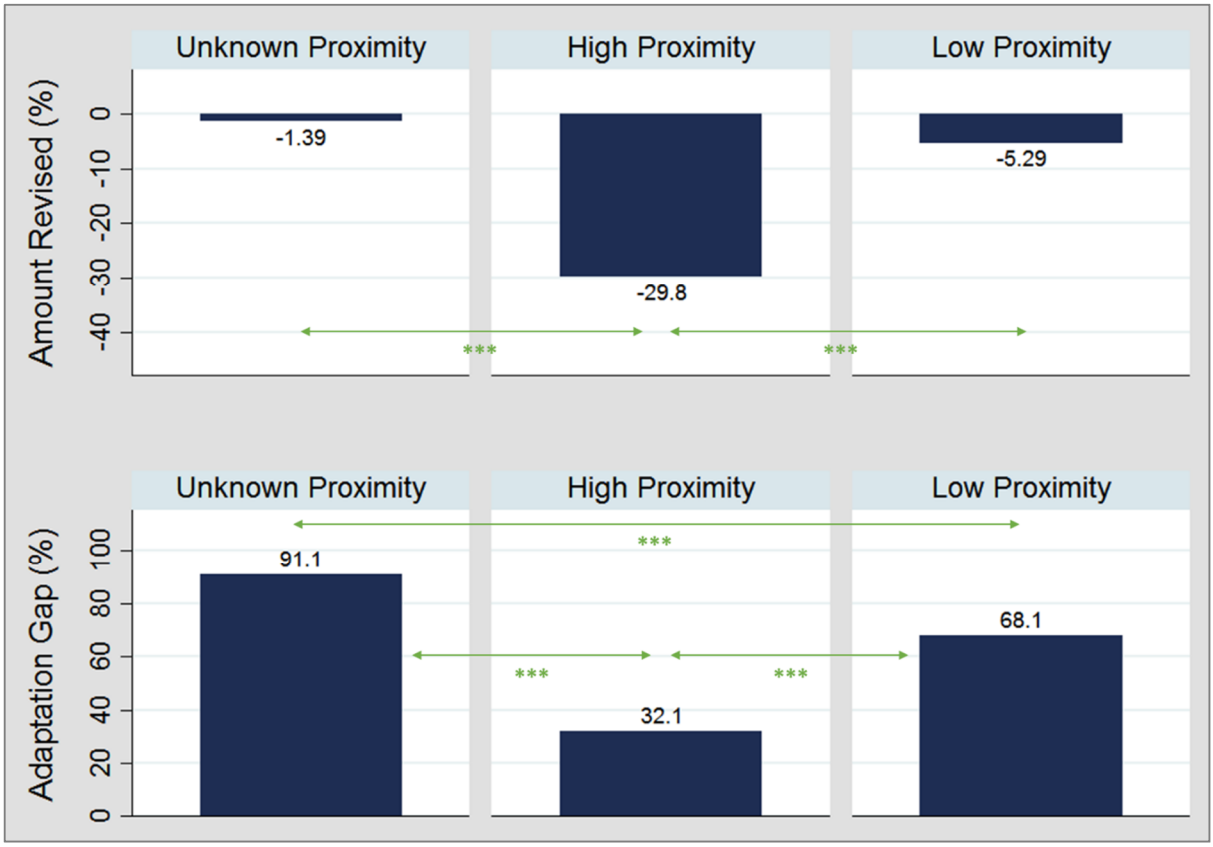


Figure 4: Amount revised (%) and adaptation gap (%) by social proximity.

Along similar lines, behavioral contagion as a function of both social identification and the (un)ethicality of observed behavior is illustrated in figure 5. The behavioral space is described by three alternatives and also speaks to the (non-)existence of observed peer effects:

- **No Contagion:** after observing peer behavior, the participant either did *not* revise his/her initial behavior or revised it into the opposite direction of what he/she observed the peer has done.
- **Contagion:** after observing peer's behavior, the participant did revise his/her initial decision. The revision was directed into the direction of the observed behavior. This behavior indicates the existence of behavioral contagion caused by peer effects.

The breakdown of behavioral changes by different levels of social proximity provides additional evidence for hypothesis **H_2**. When comparing to the condition where no social proximity to one's observed peer was induced, behavioral is more contagious for both low and high proximity situations in both the ethical and unethical domain. Again, since we report

lower-bound results, this is a strong indication that our method of inducing social identification works and is likely to produce even stronger results when social proximity would be introduced in a more sophisticated way.

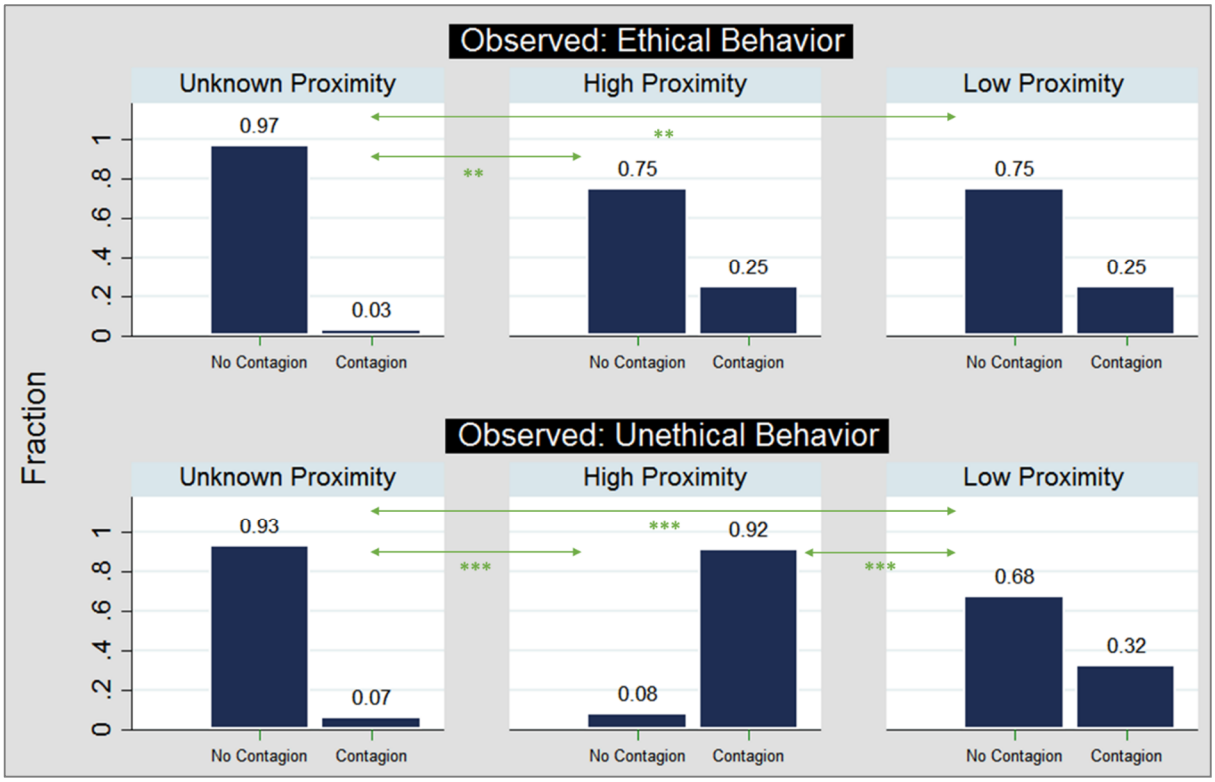


Figure 5: Behavioral change by treatment and observed (un)ethicality. This figure illustrates the fraction of participants exhibiting behavioral contagion broken down into both the observed (un)ethicality of behavior and the social identity to one's observed peer. Unless the active participant revises his/her behavior into the direction of observed behavior the behavior is not classified as contagion.

In terms of explaining the drivers of behavioral contagion, two literature streams have not yet been brought together in existing research: the role of social identification on behavioral contagion on the one hand, and the role of observed behavioral unethicality on the other. Our experimental design allows us to do exactly this for the first time and ascertain the main driver of behavioral contagion. Following our previous discussion, we assume social identification to be a stronger driver of behavioral contagion than the unethicality of observed behavior (**H_3**). As a first, we investigate whether behavioral contagion is different under varied levels of social proximity when directly comparing contagion in the ethical versus the unethical domain using non-parametric comparisons. Our results provide strong support that behavioral contagion is asymmetric. In particular, a variation in social identification yields no significant variation in behavioral changes in the ethical domain. However, the results are strongly statistically significant when looking at behavioral changes as a function

of social identification in the unethical domain. Here, when comparing the high proximity condition to the no proximity (low proximity) condition, the Mann-Whitney-U statistics yield results that are highly significant at the 1% level with p = 0.000 and z = 6.025 (p = 0.000 and z = -4.005). These results highlight the importance of our contribution in this paper: peer effects are not uniformly in place, but rather strongly depend on both the (un)ethicality of observed behavior and the degree of social identification to the observed peer.

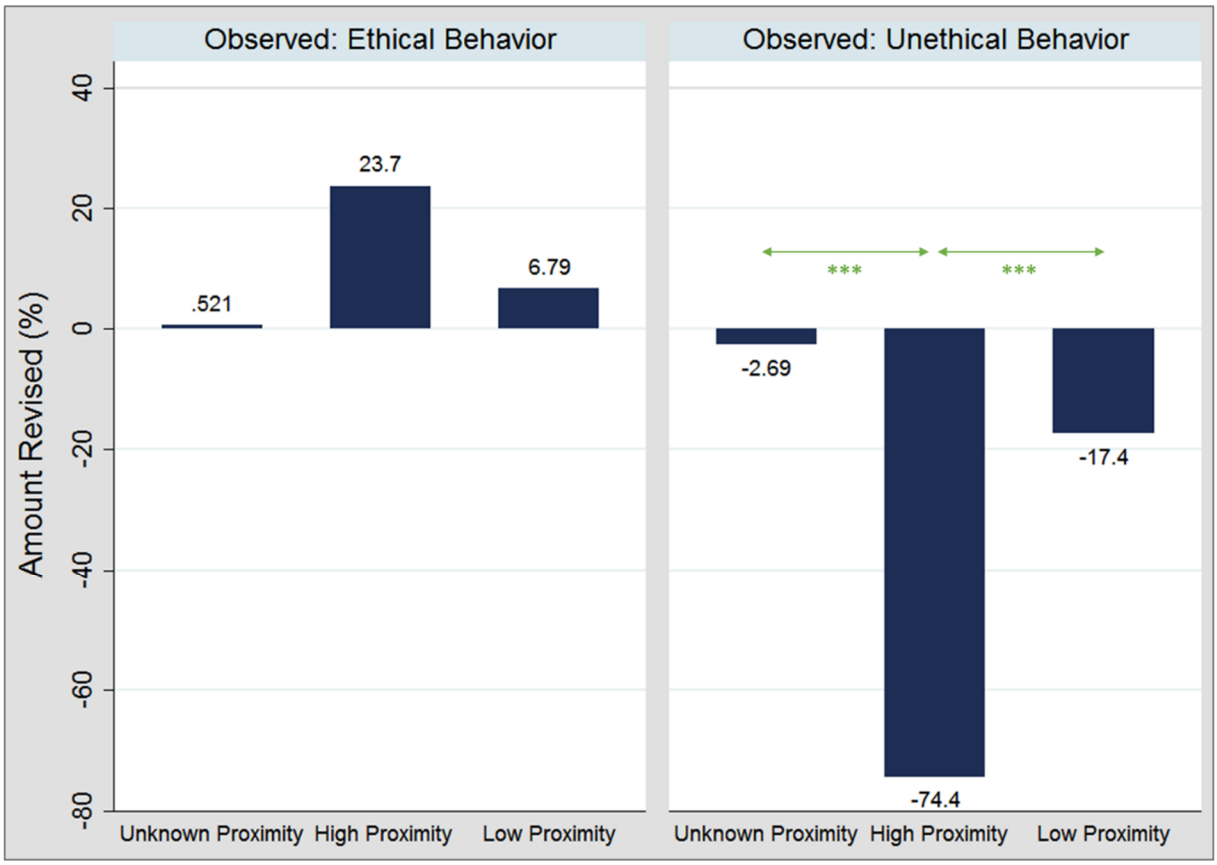


Figure 6: Amount revised (%) by social proximity and observed (un)ethicality.

What is more, we ran several regressions, including OLS, Logit, and Tobit, where applicable, in order to assess the robustness of our results. In sum, across different specifications our results strongly suggest that the observation of (un)ethical behavior does not trigger any particular behavior, neither ethical nor unethical. Thus, the mere observation of behavior alone is insufficient for the existence of peer effects in the (un)ethical sphere, but is rather dependent on the social identification to one's peers. These findings are in support of our hypothesis $\mathbf{H_3}$. Findings are presented in Appendix A.

All in all, we find convincing support for all of our three hypotheses: unethical behavior is indeed more contagious than ethical behavior (H_1), social identification drives the magnitude of behavioral contagion (H_2), and social identification is a more reliable predictor of behavioral contagion than the observed (un)ethicality of observed behavior (H_3). Here, it is important to stress a particular point with respect to the interpretation of the results. Arguably, the experiment's framed environment created by the presence of a charity could potentially carry a norm of prosocial behavior in the lab in and of itself. That is, prior to observing one's peers, some participants at the margin of behaving unethically might carry the normative belief that taking from a charity represents inappropriate behavior and thus initially refrain for it. If so, it would come as no surprise to observe stronger contagion of unethical as compared to ethical behavior because those who wanted to behave unethically in the first place but refrained from doing so might now find justification in their peer's behavior. In this respect, two important remarks should be made: first, if anything, such an assumption would only explain level effects but not treatment differences because such beliefs are by experimental design uncorrelated with the treatments. Consequently, irrespective of the existence of potential norms, our design renders our main finding valid: behavioral contagion is highest where social identity is strongest.[46] In addition, we elicited incentivized beliefs about what participants thought about his peer's behavior prior to observing it. As the regressions results suggest, such beliefs yielded no explanatory power and thus play no role in neither explaining the magnitude nor the differences of behavioral contagion.

From a policy perspective, our results stress that social proximity renders it difficult to change individual behavior, but it rather amplifies one's initial (un)ethicality. We will return to this point in our policy recommendations in chapter 3.1.7. In light of the very conservative inception of social identification of providing very limited information on social identification, we deem these results to represent a lower bound thus strengthening the role of social identification within the context of behavioral contagion. Our lower-bound approach comes from the fact that participants were neither told the exact matching percentage nor the actual interests and preferences they had in common. If having been randomly assigned to one of the social identification treatments, participants only knew whether they were observing a peer with above or below average congruence. A more sophisticated way to induce

[46] I would like to thank Gary Bolton, René Fahr, and Elena Katok for point this out and for related discussions.

social identification and match participants accordingly is likely to produce results that are more pronounced. The well-engineered mechanisms implemented by dating websites to match people and achieve high success rates are a shining example for what is possible: excluding matching partners based on personality traits that represent a no-go (e.g. smoking), putting emphasis on particular interests (e.g. sports, religion), or individual characteristics (e.g. looks, education). We deliberatively refrained from applying sophisticated measures of this kind and rather resorted to an easy-to-use-easy-to-reproduce methodological approach that could be used in future experiments in which inducing salient social identity is key.

Along these lines, the presence of a potential experimenter demand effects (EDE) is worth addressing since their presence has potentially been problematic to prior peer effect studies (for a discussion see Thöni & Gächter (2015)). Because we are mainly interested in treatment differences rather than in overall levels, the experimenter demand effect is deemed less problematic as long as its existence and magnitude is orthogonal to the treatment variation (Zizzo, 2010). Nonetheless, we considered existing experimental studies to rule out experimenter demand effects to the extent possible. Not exclusively to but prominently existing in peer effect studies, forced learning (i.e., forced observation of one's peer's behavior) might potentially induce EDE or even lead to resentment on the side of the participants. Forced observation might trigger thoughts related to being expected to use the information to reconsider and potentially revise initial behavior. In previous general and peer effect studies in particular, this issue has normally been overlooked, mainly to avoid self-selection problems. However, when the option not to learn is withheld from participants, the obtained results are potentially confounded. We deem this challenging to the study of peer effects and should thus be discussed.

Existing research indicates that individuals sometimes choose to deliberately remain ignorant about the state of nature (see Carrillo & Mariotti (2000), Dana, Weber & Kuang (2007), Conrads & Irlenbusch (2013), Bartling, Engl & Weber (2014), and Grossman (2014)). If present, such strategic ignorance might be an important component of our experiment. A potential reason not to acquire costless information is related to the avoidance to indulge in negative self-image updating or guilt aversion (cf. Wells (1978), Baumeister (1998), Charness & Dufwenberg (2006)). One can plausibly assume that such aversion is even stronger when

studying peer effects within an (un)ethical dimension. Thus, forcing participants to learn potentially unpleasant information might lead to biased behavior and might even increase EDE. In order to address this challenge, our design follows Conrads & Irlenbusch (2013) and Bartling, Engl & Weber (2014) and draws on a mechanism in which learning peer information is voluntary (see also Eckel & Petrie (2011)).[47] Additionally, in order to rule out any reputational concerns, social learning, or reciprocity, the experiment includes an anonymously played one-shot interaction with another participant. Such an experimental design allows us to study behavioral contagion in the lab in an unbiased way. To our knowledge, this represents a novel design in studying peer effects in the lab in general and the behavioral contagion of (un)ethical behavior in particular while controlling for potential confounds that peer effect studies suffer from regularly (see Manski (2000), Falk & Fischbacher (2002), Angrist (2014)). In the light of our experimental set-up, any treatment-specific information is provided only after one's deliberate decision to learn peer behavior. Thus, any still potentially existing form of EDE would be fully uncorrelated with the treatments and thus exhibit only a general level-effect, if any.

3.1.7 Lessons Learned: Policy Implications

As argued before, understanding social interactions in general and in particular the potentially resulting peer effects is fundamental from a policy perspective. It does not only help to understand societal and economic outcomes beyond what standard economic forces can explain (i.e., the massive surge in female labor participation rates in World War II (Mulligan, 1998) or the escalation of crime rates (Levitt, 1999)). It also allows us to implement better-targeted policy measures to tackle a battery of challenges such as reducing crime rates, improving health conditions, or increasing labor market participation. "To the extent that theory and measurement of social interactions enables us to understand these massive changes, the study of social interactions potentially has major policy relevance" (Glaeser & Scheinkman, 2004, p. 84). In this chapter, we will discuss some of the policy implications

[47] However, deliberately allowing participants to remain ignorant about peer behavior bears the risk of self-selection effects. It is worth noting that in our experiment 10% of all the participants decided not to acquire peer information. Importantly, however, this choice is unconditional on the participant's initial behavior, thus strongly suggesting the absence of any self-selection mechanism leading to potential biases in our analysis.

that one can infer from our results. We will follow the main theme of this paper and approach this topic from two sides: the ethical and unethical context (for a broader discussion see Irlenbusch & Villeval (2015)).

Starting with the ethical perspective, voluntary redistribution of income e.g. in the form of charitable giving is an integral part of humaneness, with up to 90% of Americans donating to charities. Understanding the drivers of charitable giving, such as altruism and social pressure, has been at the heart of last decade's research, both in the field and in the lab (cf. Levitt & List (2009), DellaVigna, List & Malmendier (2012)). Still, we seem to have an imperfect understanding of what really motivates giving (Andreoni, 2006). Beyond what we have since learned about the existence of peer effects with respect to contribution decisions, our experiment yields several new insights helpful to understanding the extent to which such behavior shows up, especially as compared to unethical behavior. We will return to this comparison shortly.

In turn, unethical behavior in its various forms impairs the daily life. Exemplarily, yearly global tax evasion ranges at an abstruse $3.1 trillion or 5.1% of world GDP (The New York Times, 2011), over $1 trillion is estimated in bribes paid yearly around the globe (The World Bank, 2013), and some 210 million people use illicit drugs each year (United Nations Office on Drugs and Crime, 2011). Here, one might credibly argue that from a purely rational self-maximizing perspective we should observe way less illicit behavior than we actually do. From a game theoretic perspective, in some illicit deals that involve trust-related actions such as bribery do not represent a subgame perfect Nash equilibrium, which is true for both one-shot and finitely repeated contexts. Thus, in many situations the occurrence of illicit behavior is already surprising (for a discussion, see Dimant & Schulte (forthcoming)). A solution to this conflict is the recognition of, among others, peer effects. As has been thoroughly argued throughout the paper, the incorporation of behavioral contagion allows us so explain why observed behavior goes seemingly beyond clear-cut self-maximization, but is rather embedded in and the result of a social context.

Consequently, both aspects raise the following question: how do these findings translate into a real world setting and what to do about it? While being careful at drawing concrete inferences from a laboratory setting and relating them directly to the outside world, our results conclusively indicate the spillover of unethical behavior to be much more likely than

the spillover of ethical behavior. That is, getting people to start donating solely based on peer effects (e.g. through observing others giving to charity) has a long way to go compared to having them do something unethical. What we see, however, is the individual's responsiveness to social identification, in particular on the side of females. A potential solution to have people donate more to a good cause is to provide them information beyond simple statistics on what other people do, i.e. amount of money that has been collected so far (like Wikipedia). Instead, some research already indicates that the inception of social norms especially for settings that most closely match the individual's immediate situational circumstances have the strongest effect on compliance (Goldstein, et al., 2008). Our results suggest to go one step further and provide information that allows us to draw inferences on the social proximity to the peers, thus increasing the saliency of social identification. Exemplarily, a message of the form "People in your neighborhood / with similar demographic characteristics have donated an average of $..." would lead to pick-up rates of this behavior that are higher than when resorting to a simple statistic.

In all likelihood, a similar approach could be applied to make people refrain from behaving unethically. Research on slippery slope indicates that once behavior is spoiled, even honest people converge quickly to a steady state with a plethora of unethical behaviors (cf. Gino & Bazerman (2009), Welsh et al. (2015)). Even more worrisome, recidivism rates for convicts are normally very high, leading to what is called a recidivism nightmare. In the US recidivism rates are up to 80% of re-arrests within the first 3 to 5 years after their release from prison (National Institute of Justice, 2014). This is particularly detrimental from a welfare perspective, as the US spends approximately $75 billion on incarceration and $260 billion on prevention, detection, and prosecution of crime on a yearly basis (Khadjavi, 2015). In terms of effective countermeasures to unethical behavior, our experimental results indicate that exposing individuals to unfaithful of socially close people is likely to trigger repulsion and less unethical behavior, thus contributing to a positive transformation.[48]

[48] For an approach along similar lines, see Pennsylvania State University's Justice Center for Research on desistance from crime (Pennsylvania State University's Justice Center for Research, 2014).

3.1.8 Conclusion and Outlook

Deviant behavior that benefits oneself at the expense of others is socially harmful and brings about second-best solutions that are distortive from a welfare perspective. Conversely, the voluntary redistribution of money to those who have the least, e.g. in the form of donations, is socially desired. It is worthwhile to understand the underlying mechanism that drives (un)ethical behavior in order to implement effective policy measures that mitigate or facilitate either behavior. Beyond pure self-maximizing considerations, behavior is also be the result of social interactions in which the conformity to particular behavior is affected by one's peers (Akerlof (1997), Glaeser & Scheinkman (2004)). One particular mechanism through which social interactions occur are peer effects, which play a decisive role in explaining societal and economic outcomes. A battery of behavioral traits affects the shape and magnitude in which social interactions occur. An extensive stream of literature suggests that individuals are social animals and care for esteem, respect, reputation, among other things (cf. Rabin (1993), Fehr & Schmidt (1999), Akerlof & Kranton (2000), Bolton & Ockenfels (2000), Charness & Rabin (2002), Bénabou & Tirole (2011)). As such, individuals steadily act and react in social environments that define their role and standing within the social group.

Although peer effects have been extensively studied in different contexts both in the field and in the lab, research is still at the outset of understanding the role of peer effects in (un)ethical settings. It is this paper's goal to improve our understanding of whether, to which extent, and through which channels individuals are influenced by their peers to engage in (un)ethical behavior, in which they most likely would have not engaged otherwise.

This paper is in line with and an extension of the seminal Moving-to-Opportunity field research that has allowed us to understand the positive societal spillovers of having the chance to move to a better neighborhood (cf. Case & Katz (1991), Katz, Kling & Liebman (2001), Kling, Ludwig & Katz (2005), Kling, Liebman & Katz (2007), and Chetty, Hendren & Katz (2015)). In going beyond, we try to understand the spillovers of both unethical and ethical behavior and the role of social identity to one's peers by employing a controlled lab experiment. Understanding behavioral contagion is important from a policy perspective in order to set the right incentives and effective measures to improve pro-sociality and mitigate unethical behavior.

By extending existing research from both the methodological and the content perspective, our work contributes to a better understanding of the nature of peer effects and behavioral spillovers, and answers the following two questions in particular: for one, to what extent does the (un)ethicality of a peer's observed behavior influence one's own behavior? For another, what is the role of social identity to one's peers in affecting behavioral contagion? For our purposes, we extend a variant of the give-or-take dictator game as introduced by List (2007) and used by Bardsley (2008) by the use of an ethical setting. To provide clean evidence on peer effects, we capitalize on a one-shot dictator game in which participants are given the opportunity to give to or take money away from the charity before and after learning the (un)ethical magnitude of peer behavior. Treatment variations include different levels of social identity to the observed peers, which we incept by the novel use of a matching algorithm based on a series of dating website questions. We deliberatively refrained from applying sophisticated measures of this kind and rather resorted to an easy-to-use-easy-to-reproduce methodological approach that could be used in future experiments in which inducing salient social identity is key.

Our results suggest that a) unethical behavior is more contagious, and b) social identification with one's peers and not the (un)ethicality of observed behavior is the main driver of behavioral contagion. Our results conclusively yield that the mere observation of behavior alone is insufficient for the existence of peer effects in the (un)ethical sphere, but is rather dependent on the social identification to one's peers.

Beyond these first results, much more scientific research has to be done in order to generate reliable measures to achieve both, more ethical and less unethical behavior. Exemplarily, recent MTO-research points at gender differences in behavioral assimilation (cf. Chetty, Hendren & Katz (2015)). It is important to understand to which extent these differences are driven by the two factors studied in this paper: the (un)ethicality of peer behavior one is exposed to and the magnitude of social identity to one's peers. Our research is hopefully one of many more contributions to come.

3.1.9 Appendix

A: Data Overview, Robustness Checks, and Additional Results

	Treatments			Total
	Baseline (no Proximity)	Treatment 1 (High Proximity)	Treatment 2 (Low Proximity)	
Observed Ethical Behavior	44	27	34	105
Observed Unethical Behavior	39	42	41	122
Total	83	69	75	227

A1: Summary table of the observations by treatment variation and observed unethicality

Our theoretical foundation assumes behavioral adaptation to be asymmetrically biased towards unethical behavior, holding social identification constant. Thus, for *adaptation gap (%)*, the results suggest that the observation of ethical (unethical) behavior leads to a less (more) pronounced closing of the adaptation gap. More precisely, the results indicate that observing unethical behavior leads to a revision behavior that reduces the gap between own initial and observed peer's behavior more strongly (from 100% down to 69.4%) as compared to observing ethical behavior (from 100% down to 78.5%). The differences are marginally significant at the 10% level ($p < 0.074$, $z = 1.787$). This implies that, if anything, individuals who observe unethical behavior go a long way and close the observed gap by some 66% through revising their initial decision, while individuals who observe ethical behavior reduce the gap only slightly by 14%. This result is not only in line with the theoretical predictions of our asymmetric model, but also suggests that one's inherent conquest to do good is less pronounced than to do bad, which yields additional support not only for hypothesis $\mathbf{H_1}$ but also for our asymmetric model specification.

A2: Adaptation gap (%) by observed (un)ethicality. The gap is calculated as the difference between the individual's revised decision and the behavior observed from the peer relative to the difference between one's initial behavior and the behavior observed from the peer. That is, the adaptation gap indicates how different the behavior between two participants are after the active participant was given the chance to revise his/her initial behavior. In this sense, the narrower the gap, the more similar the active and the respective passive participants are in terms of (un)ethical behavior. Participants who did not revise their initial behavior are treated as adaptation gap = 100%. The analysis is broken down into the (un)ethicality of observed behavior by the active participants

Overall, the results relating to hypothesis H_1 (see Figure 3 and A2) indicate that not only is the contagion of ethical behavior only half as likely as contagion of unethical behavior but it is also less pronounced. Following our results, ethical behavior is imitated only to a limited extent as compared to the imitation of unethical behavior.

We ran several OLS specifications to control for treatment effects, initial behavioral heterogeneity, observed behavior, and gender (including several interaction effects). Although not explicitly shown in the regression table, adding controls for, among others, risk, self-control, and greed show up as insignificant and did not alter the robustness of the results presented here. Overall, the presented results are robust to the inclusion of controls and across different specifications and estimation methods. Estimations are available upon request. In addition, we ran robustness checks using Tobit estimations in order to account for potentially censored behavior caused by ceiling effects in revision behavior.

The estimations yield a number of interesting results. For example, the high proximity condition, in which social identity was highest, shows up significantly negative across different specifications. The negative coefficient suggests that comparing to a situation in which social proximity remained unknown to the observer (Baseline), being exposed to a high proximity signal induced a downward revision of one's initial behavior. More precisely, participants took away 29%-36% more money from the charity in the high social identification condition independent of the (un)ethicality of the observed behavior. This effect is not statistically significantly pronounced for the low proximity condition. These numbers are in line with the findings presented previously, indicating that peer effects are particularly present in a high social identification environment, which over-proportionally crowds-out ethical behavior and leads to more unethical behavior. The adaptation gap observed by the individual, which is the difference between one's own and the peer's initial behavior in monetary terms, leads to a similar reasoning: individuals over-proportionally react to a larger gap by negatively revising one's initial amount, indicating that an increase in observed adaptation gap leads to more unethical behavior overall.

In addition, our results also suggest that one's initial behavior strongly predicts the direction of behavioral contagion. This speaks to the idea that the individual's predisposition to behave (un)ethically is essential for the direction of behavioral spillovers caused by peer effects. More precisely, behaving (un)ethically when peer effects are absent renders it likely to behave even more (un)ethically when being exposed to peer effects. Compared to the base level of no change in the initially fair 50:50 split between oneself and the charity, the revision of one's initial (un)ethical behavior is similar in either direction in terms of magnitude. Relative to one's initial behavior, the numbers indicate that an individual is likely to donate (take) between 9%-19% (19-23%) more money when his/her initial decision was to donate (take) money after observing peer's behavior, thus again supporting the asymmetry of behavioral contagion. Consequently, beyond social identification one's initial behavior is highly predictive of how an individual reacts to peer effects. The results also suggest that initial behavior represents a trait that is consistent and robust to the exposure to peer effects: those who

decided to behave (un)ethically in the first place are likely to remain (un)ethical, only to a more pronounced extent. We do not observe behavioral heterogeneity across gender. The table A3 below illustrates our results. In addition to analyzing the magnitude of behavioral change, we find the same robust results when looking at the drivers of behavioral contagion in general. Results using logit estimations are reported in Appendix A4. What is more, we find similarly robust results when further subdividing *No Contagion* into those who were invariant to the observed behavior and thus did not react at all and those who reacted but changed their behavior into the opposite direction of what they have observed (anti-contagion). We apply a multinomial logit regression and report results in Appendix A5.

Dependent Variable: Amount Revised (%)	**OLS Specifications**				**Tobit Specifications**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatments *(Base Level: Unknown Proximity)*								
High Proximity	-29.3860* (16.3469)		-28.7364* (16.5249)	-30.7496** (14.6992)	-34.9762*** (9.7107)		-34.2641*** (9.6609)	-36.0689*** (9.4863)
Low Proximity	-6.1454 (4.4392)		-5.1774 (4.5562)	-6.4478 (5.1175)	-6.8891 (6.2096)		-5.9119 (6.2084)	-6.9097 (6.4023)
Observed Unethicality		37.0772 (24.2322)	34.0409 (25.8306)	34.2158 (39.6806)		38.1142 (24.6067)	34.5891 (24.0454)	33.7526 (26.7849)
Initial Behavior *(Base Level: No Change of Fair Split)*								
Give	9.2353** (4.5455)	15.1657** (7.0586)	15.5747** (6.9108)	18.6116** (9.3087)	10.0438 (7.3871)	15.9512* (8.8428)	16.4712* (8.5974)	19.3937** (8.7559)
Take Away	-9.6093 (6.1702)	-21.4052*** (7.9535)	-19.6451*** (7.4600)	-18.7158* (10.1752)	-11.1630 (7.0013)	-23.3327** (10.1893)	-21.3697** (9.9465)	-20.5225** (9.9621)
Observed Behavioral Gap	-0.0436*** (0.0121)	-0.1022** (0.0480)	-0.0978* (0.0510)	-0.1085 (0.0756)	-0.0471*** (0.0096)	-0.1070*** (0.0405)	-0.1022** (0.0395)	-0.1102** (0.0428)
Number of Interests				-1.9073 (4.1709)				-1.8053 (3.9709)
Gender				-7.5626 (15.0804)				-7.8040 (15.7833)
Interaction 1 *(Gender x Observed Unethicality)*				-5.1273 (26.6440)				-4.9789 (25.8968)
Interaction 2 *(Gender x Observed Behavioral Gap)*				0.0345 (0.0548)				0.0318 (0.0410)
Constant	0.7803 (3.3260)	-22.9721* (11.8731)	-16.3068 (14.1127)	26.1370 (24.8911)	1.0529 (5.7302)	-24.0145* (12.9784)	-16.2959 (13.3357)	-13.1646 (14.5095)
Dummies Questionnaire	No	No	No	Yes^{NS}	No	No	No	Yes^{NS}
Observations	185	185	185	185	185	185	185	185
Adjusted R^2	0.138	0.105	0.144	0.137				

Standard errors in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

A3: Amount Revised (%) as a function of social identification and observed unethicality. Model 1 and 5 (Model 2 and 6) tests for the effect of the treatments (of observed unethicality) while controlling for initial behavior and the observed adaptation gap. Model 3 (Model 7) tests for both treatment effects and observed unethicality simultaneously. Model 4 (Model 8) adds controls for gender and some interaction terms as well as the number of interest. In order to rule out any endogenous concerns and stress the effectiveness of exogenous variation of social proximity we also add dummies for the dating website questions. None of the dummies turn out significant in neither model specification, thus emphasizing the robustness of our results.

Dependent Variable: Adaptation Gap (%)	**Logit Specifications**			
	(1)	(2)	(3)	(4)
Treatments				
(Base Level: Unknown Proximity)				
High Proximity	35.4372***		35.0685***	54.4839***
	(25.4433)		(25.2349)	(50.1293)
Low Proximity	7.7127***		7.5854***	16.4058***
	(4.4677)		(4.4276)	(12.1507)
Observed Unethicality		0.2577	0.6840	0.5725
		(0.3718)	(1.1760)	(1.5174)
Initial Behavior				
(Base Level: No Change of Fair Split)				
Give	1.3153	1.0835	1.2070	1.0064
	(0.7233)	(0.6430)	(0.8143)	(0.8653)
Take Away	2.9752**	4.4048**	3.2950*	3.8362
	(1.5292)	(2.6915)	(2.2759)	(3.7619)
Observed Behavioral Gap	1.0015**	1.0035	1.0021	1.0030
	(0.0007)	(0.0024)	(0.0028)	(0.0043)
Number of Interests				0.9046
				(0.3099)
Gender				1.6828
				(2.7092)
Interaction 1				2.6033
(Gender x Observed Unethicality)				(6.5987)
Interaction 2				1.0006
(Gender x Observed Behavioral Gap)				(0.0043)
Dummies Questionnaire	No	No	No	Yes
Observations	184	184	184	184
AIC	157.0341	188.9185	158.9854	191.0477
BIC	176.0228	204.7425	181.1389	304.9800

Standard errors in parentheses. Odds ratios reported.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

A4: Examination of the adaptation gap (%) using Logit estimations. Participants who did not revise their initial decision are treated as adaptation gap = 100%.

	Dependent Variable: Conformity	**Logit Specifications**		
		(1)	(2)	(3)
Anti-Contagion (Repulsion)	**Treatments** *(Base Level: Unknown Proximity)*			
	High Proximity	1.7488* (1.0053)		1.7638* (1.0125)
	Low Proximity	0.2982 (0.7963)		0.3264 (0.8472)
	Observed Unethicality		0.8589 (3.1571)	0.8794 (3.3638)
	Initial Behavior *(Base Level: No Change of Fair Split)*			
	Give	1.5038* (0.8359)	1.7036 (1.0740)	1.6616 (1.0839)
	Take Away	-0.4926 (1.3722)	-0.8689 (2.2678)	-0.7659 (2.2235)
	Observed Behavioral Gap	-0.0000 (0.0013)	-0.0017 (0.0059)	-0.0014 (0.0059)
No Contagion (Invariance)	*Base Outcome*			
Contagion	**Treatments** *(Base Level: Unknown Proximity)*			
	High Proximity	3.6437*** (0.7034)		3.6327*** (0.7058)
	Low Proximity	2.0636*** (0.5895)		2.0453*** (0.5877)
	Observed Unethicality		-1.2356 (1.2851)	-0.5957 (1.6213)
	Initial Behavior *(Base Level: No Change of Fair Split)*			
	Give	0.3060 (0.5757)	0.1027 (0.6172)	0.1763 (0.7039)
	Take Away	1.1390** (0.5191)	1.4101** (0.5795)	1.2959** (0.6325)
	Observed Behavioral Gap	0.0016** (0.0007)	0.0032 (0.0022)	0.0025 (0.0027)
	Observations	184	184	184
	AIC	232.4102	264.1861	236.1646
	BIC	270.9894	296.3355	281.1737

Standard errors in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.01$

A5: Examination of the drivers of behavioral contagion using a multinomial logistic regression. Behavior of participants who revised their initial decision but into the opposite direction of what they have observed from their peer is treated as anti-contagion (repulsion).

Following the regression results, our results also speak to the idea that behavioral contagion seems to facilitate the magnitude of (un)ethical behavior rather than changing individual behavior to the better or worse, respectively. That is, those who behaved (un)ethically in the first place become even more (un)ethical after being exposed to their peers. This is true for both revision of one's initial amount and the reduction of the adaptation gap to one's peer. In more detail and in line with our previous results, this relation is more pronounced the more salient social identity to one's peers is and in particular in the unethical domain. This is additional support for our hypothesis H_1 that unethical behavior is more contagious than ethical behavior. We find similar results for those who decided to keep the fair equal split in the beginning, while the behavioral change of those who donated initially seem not to be susceptible to changes in social identity. The figure below illustrates results.

A6: The upper (lower) graph depicts the amount revised (%) (adaptation gap (%)) conditional on initial behavior broken down by social proximity. This figure depicts the percentage of initial behavior revised as a function of the participant's initial behavior and broken down into different social identity categories. Essentially, the figure illustrates the magnitude and direction of behavioral contagion after observing the passive peer conditional on one's initial decision prior to having observed a peer.

B: Social Identity Statements

1. I am a reliable person.
2. I am interested in politics and/or economics.
3. Money is important to me.
4. I am an honest and sincere person.
5. I am a cinephile.
6. I am interested in sports.
7. I am a religious person and faith is important to me.
8. I am fond of animals.
9. I am interested in art and/or cultures.
10. I am an active and adventurous person.
11. I am interested in cars and/or technology.
12. I am fond of children and family-oriented.
13. I am interested in foreign languages and/or countries.
14. I am a warmhearted and helpful person.
15. I am a tolerant person.
16. I like to gossip.
17. I am a faithful person.
18. I play an instrument.
19. I like to go out and dance.
20. I am a goal-oriented person.
21. I spend a lot of time in front of the TV.
22. I am a sociable person and like to be among people.
23. I like to play videogames.
24. I am a humorous and entertaining person.
25. I am a strong-willed person.

Average amount of chosen statements (across all treatments): 15.8 (63%)

C: Experimental Instructions

General Information on the Experiment

- First of all, we would like to thank you very much for participating in this experiment. Please read the instructions carefully. The experiment will last for about 45-60 minutes.

- During the entire experiment, no communication is allowed. If there is something you do not understand or if you have any questions, now or at some point during the experiment, please raise your hand and remain seated. One of our colleagues will come to you and answer your question.

- During the experiment, you have the possibility to earn money. The amount you will receive at the end of the session depends on how many "Taler" you earn during the experiment.

- At the end of the experiment, the amount of "Taler" that you have earned will be converted into real money at an exchange rate of 20 Taler = 1 Euro.

- All decisions you make during this experiment will remain anonymous. None of the participants gets to know the identity of other participants in the experiment and decisions cannot be linked to a specific participant. Moreover, you will be paid anonymously at the end of the experiment.

Order of Events:

- The experiment consists of a list of statements that you will receive at the beginning and further decisions. Explanations and information related to these decisions will be given as the experiment progresses. You will make these decisions **once**.

- Both **you** as well as a **charitable organization of your choice** (i.e. an officially registered charity organization) will be provisionally assigned a monetary amount of **300 Taler** each.

- During the experiment you will have to decided on whether you want to…
  - … *take* a part or all of the money from the charitable organization.
  - … *leave* the division of the sum of money as it is.
  - … *give* a part or all of your money to the charitable organization.

- In case you decide to **take money** from the charitable organization, the respective amount of money will be transferred to your individual cash account and exactly the same amount will be deducted from the cash account of the charitable organization.

- Should you decide to **give** money to the charitable organization of your choice, the respective amount of money will be deducted from your individual cash account and given to the charity. The experimenter will double all ECUs remaining in the charity's account at the end of the experiment.

- Your decision remains anonymous and neither the other participants of the experiment nor the experimenters have the possibility to assign your choices to your identity.

- **At the end** of the experiment, **one** participant will be chosen at random and his or her choice will be implemented and count towards the charity (i.e. that choice will be rel-

evant for the payment). In particular, we will double the respective amount and donate it to the charity after the experiment ends. The receipt of this donation will be published on the homepage of the BaER-Lab (www.baer-lab.org) in a timely manner. All other participants will receive **150 Taler** (including the show-up fee) at the end of the experiment.

- The total payoff of the participants:
  - **In case you are the randomly chosen participant**

    300 Taler +/- the amount of money that has been given to/taken from the cash account of the charitable organization
  - **In case you are not the randomly chosen participant**

    150 Taler

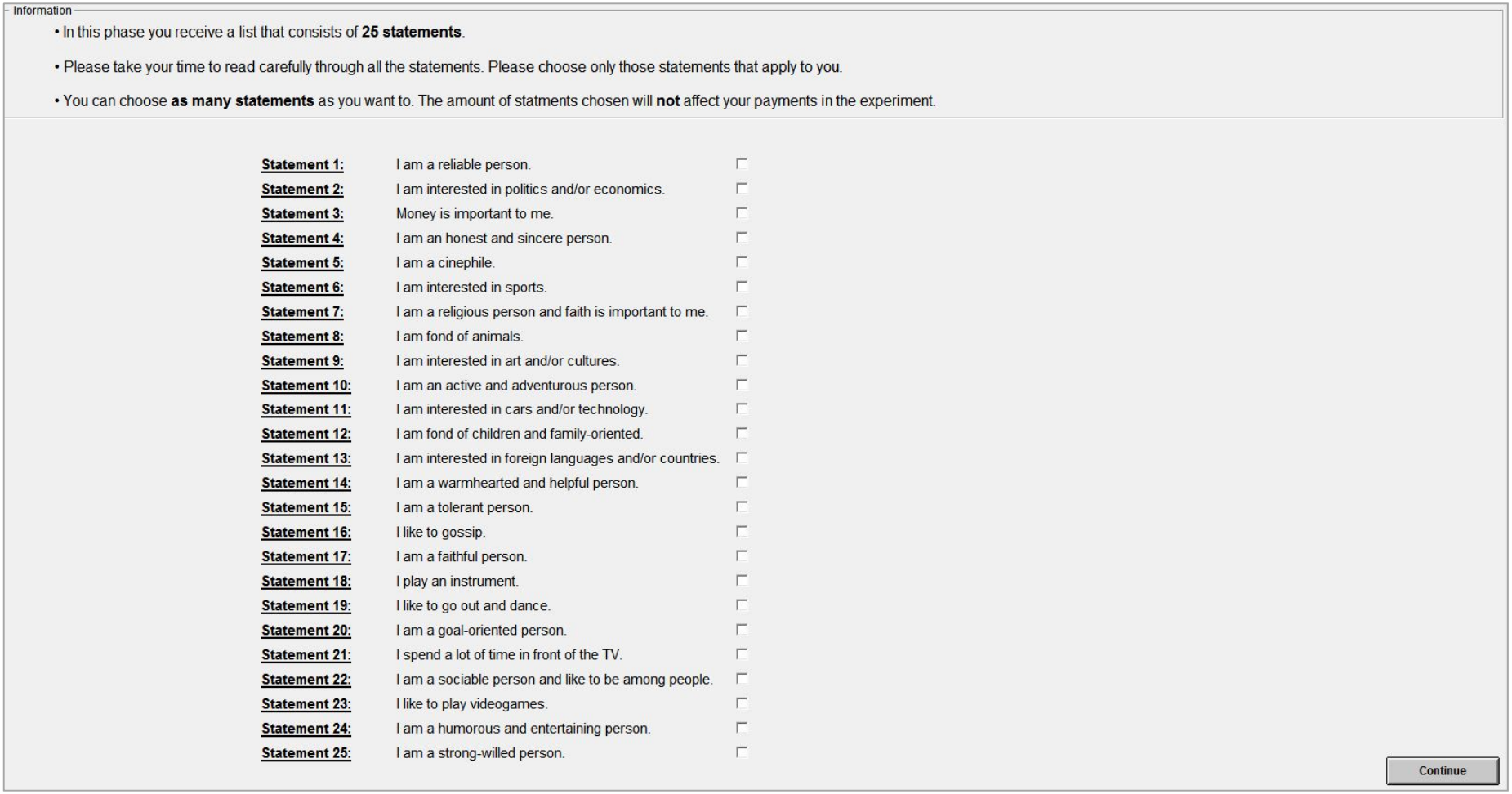
- The total payoff of the charitable organization:
  - (Amount of money in the cash account of the charitable organization of the randomly chosen participant) × 2

- At the end of the experiment, the relevant information on the payment will be made visible to each participant on his or her screen.

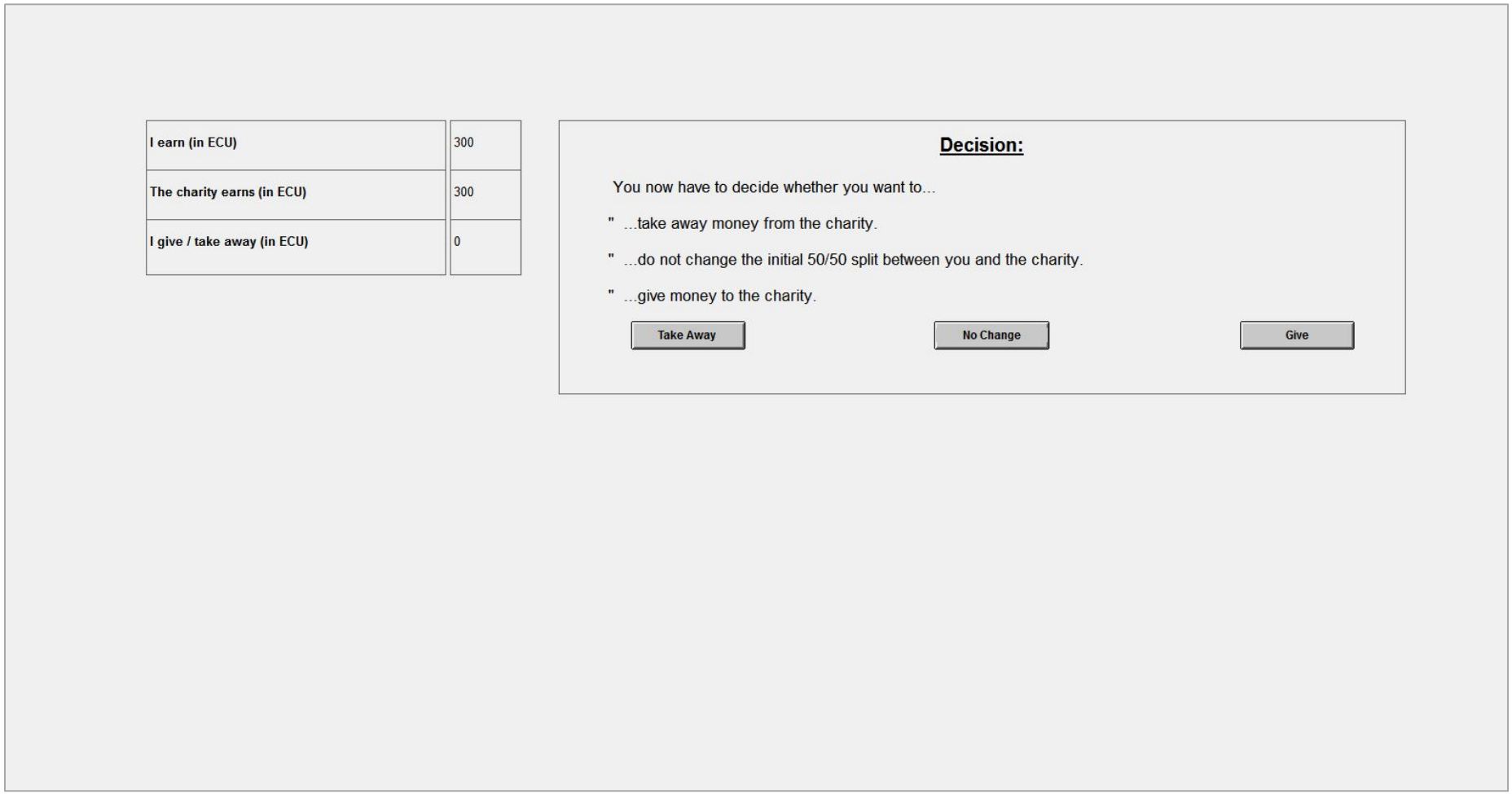
- After the actual experiment concludes, we will ask you to fill out a questionnaire. Please fill out the questionnaire carefully and truthfully.

D: Screenshots of Decision Screens

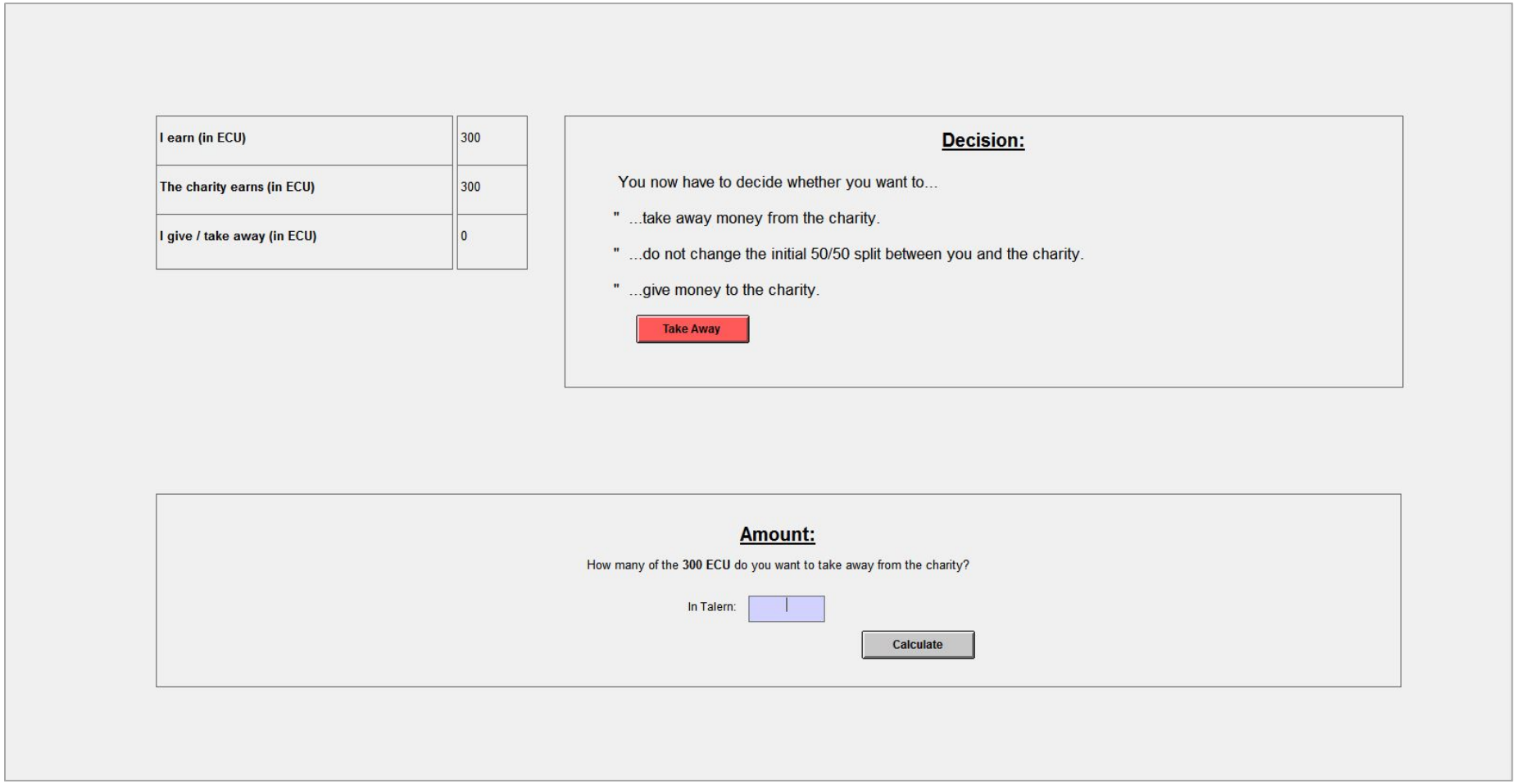
1. List of statements: generates the proximity measure in all treatments



2. First decision: behaving (un)ethically



(Exemplarily for the taking away decision)



3. Observation of one's peer and potential revision of one's initial decision

Important: treatments vary by the information on the social proximity measure (first box): unknown similarity (Baseline), more similar (Treatment 1), less similar (Treatment 2).

(Exemplarily for revision of one's initial decision)

3.2 TAX EVASION REVISED: SURPRISING EXPERIMENTAL EVIDENCE ON THE ROLE OF PRINCIPAL WITNESS REGULATIONS AND DIFFERENCES IN GENDER ATTITUDES

Luigi Mittone*, Johannes Buckenmaier**, Eugen Dimant***

Version: December 2015

ABSTRACT:

This paper experimentally investigates indirect tax evasion that requires the cooperation of an intermediary. We explore the effectiveness of the introduction of a principal witness regulation as a means to facilitate tax compliance. Reactions show a significant drop in tax compliance that, surprisingly, is vastly different across gender with the effect being mainly driven by women. As a result, women decrease their tax compliance significantly reaching an even lower level than men who in turn do not react to the institutional change.

KEYWORDS: Tax Evasion, Gender Differences, Principal Witness Regulation

JEL CLASSIFICATION: D03, D73; D81, H26

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3.2.1 Introduction

Illicit behavior, such as tax evasion, induces negative externalities on both the economic and societal level. Understanding its drivers and implementing suitable institutional measures to curb its severity has been at the center of past decade's theoretical, empirical and experimental research. Beyond theoretical exercises such as the seminal work of Allingham and Sandmo (1972), research that analyzes tax evasion experimentally has been growing, although with a particular focus on income tax evasion only (for a recent discussion see Alm (2012)). Other forms of tax evasion, like indirect tax evasion or the evasion of taxes that are in some way collected through the direct intermediation of a tax officer, e.g. some kind of custom duties, have almost completely been neglected by the experimental literature. In many countries, the introduction of the principal witness regulation (PWR) represents an integral institutional feature aiming at suppressing criminal behavior. In this paper, we are interested in examining the role of PWR in tax evasion behavior.

To the best of our knowledge this is the first experiment studying the influence of an institutional change in the form of a PWR on tax compliance when taxes are indirect. Tax compliance, although almost exclusively referring to direct taxes, has been studied extensively in the literature, however, indirect tax evasion has been almost completely neglected. We contribute to this literature by shedding light on how indirect tax evasion is affected by the specifics of the strategic interaction, a dimension not present in a setting with direct taxes. We use a controlled laboratory experiment modeling a tax reporting scenario with indirect taxes that require the interaction between two parties, the tax payer (TP) and the tax officer (TO). First, TPs repeatedly report taxes over the course of 10 rounds after which we introduce the principal witness regulation (PWR). The experiment then continues for another 10 rounds under this modified regime.

The goal of this study is twofold: First, we seek to analyze tax compliance behavior when taxes are indirect. Second, we investigate the effects of an institutional change via the introduction of a PWR on tax compliance and collusive behavior. We find that the introduction of a PWR induces an initial drop in tax compliance coupled with a reversal in trends before and after the institutional change occurs. While compliance is at a decline in the absence of a PWR we see a steady increase of tax declarations in the periods following the institutional

change. Surprisingly the drop on the aggregate level is mainly driven by female participants. In fact, males' tax evasion propensity is not affected by the new regime, while females' tax compliance significantly decreases, to a level even below that of males.

We find a significant decrease of compliance as a reaction to the introduction of a PWR, hence providing evidence that the institutional frame affects tax compliance. Gender differences have been repeatedly demonstrated in various domains such as risk preferences, social preferences, lying behavior (Childs, 2012), and honesty (Muehlheusser, et al., 2015). For example, Hasseldine and Hite (2003) study framing effects in tax compliance and find a significant frame by gender interaction indicating a stronger reaction to changes in framing for women. We surprisingly observe that woman strongly react to the institutional change while men's behavior seems mostly unaffected indicating vastly different behavior across gender. Our results add to the growing body of evidence on gender differences within the frame of choice under risk and strategic uncertainty, and provide further evidence to the idea that women are generally more sensitive to the contextual frame. An idea put forward in Croson and Gneezy (2009) where it is argued that gender differences can often be explained by a higher sensitivity of women to the contextual frame.

3.2.2 Experimental Design

We use a simple tax reporting game with indirect taxes collected through an intermediary, the tax officer (TO), and hence tax payers (TP) require the cooperation of a third party to evade taxes. The experiment consists of a total of 20 rounds. In each of the rounds 1 to 10 subjects play the tax reporting game, we henceforth refer to this first phase as "Ph1". After 10 rounds subjects are informed through a detailed description on the screen about the introduction of a PWR. That is, we use a within variation of an institutional setting to study the effect of a PWR on tax compliance. Rounds 11 to 20 were played in this modified environment, i.e. in each of the rounds 11 to 20 subjects played the tax reporting game with PWR, we henceforth refer to this second phase as "Ph2". Subjects were informed in the instructions that the existing institution may be subject to change but no information regarding the nature of the change was provided. Subjects were randomly assigned either the role of a TP or that of a TO. Each TO was randomly assigned 3 TPs and that assignment remained fixed

throughout the experiment. For Ph1, the course of events is as follows: TPs receive an income of 80 ECU that has to be declared to the tax authorities represented by the (assigned) TO. Declared income is subject to a tax rate of 50%. An incorrect declaration of less than the full income requires the cooperation of the TO and can be accompanied by a bribe between 1 and 30 ECU that is offered to the TO. The TO receives the tax declarations together with potential bribes of the three TPs assigned to her. She then decides to individually accept or reject each of the incorrect reports together with potential bribes. The rejection of a bribe implies the rejection of the untruthful tax report, forcing the TP to truthfully declare taxes. Correct declarations are automatically accepted. With an exogenous probability of 20%, a TP's declaration is audited and incorrect reports are detected resulting in a fine for the TP that equals 125% of the evaded tax amount (maximal 50 ECU). See Figure 1 for a detailed game tree.

For Ph2, the course corresponds to that of Ph1, with the exception of the existence of a PWR option. We model the PWR by adding an additional stage following detection of an incorrect tax report through an audit. The PWR offers the TP the opportunity to denounce his TO and correct the report, i.e. to truthfully declare taxes, without incurring an additional monetary punishment. A denounced TO on the other hand incurs a fine that equals the bribe received from the respective TP plus an additional 10 ECU. The TOs income per round consists of three components: a fixed wage of 50 ECU, a commission of 15 % of the taxes collected from the three TPs assigned to her, and the bribes she accepted. In Ph2, a TO might also incur a fine that is deducted from her income in that particular round.

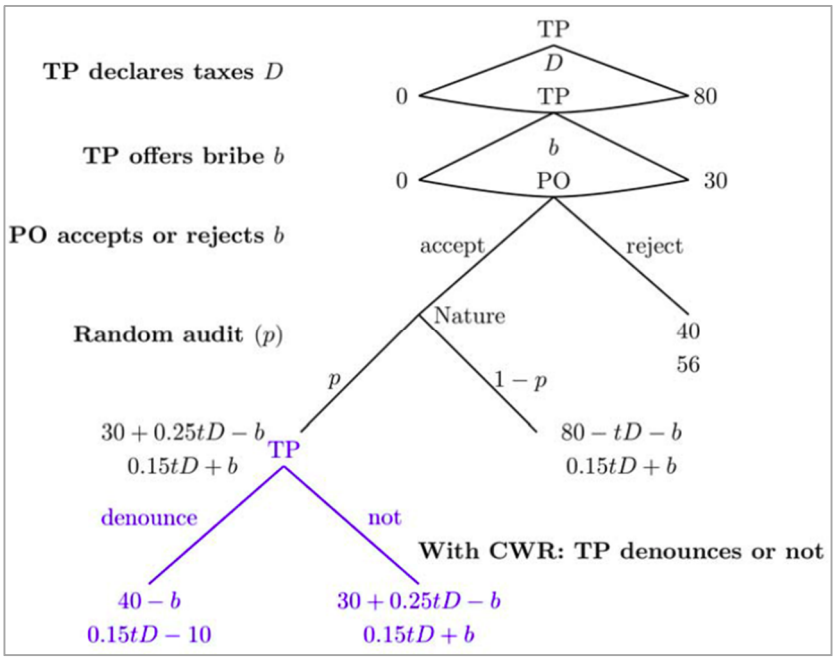

Figure 1: Game tree depicting interaction between TO and single TP within a single round. Blue stage is only available in PWR. D denotes taxes declared, b bribes offered, p the probability of an audit, t the tax rate. For the sake of a simpler exposition the PO's fixed wage of 50 is not depicted.

In order to make tax evasion more salient in the laboratory setting, we introduce a third party that incurs a monetary damage as a result of tax evasion. That is, tax evasion in the experiment translates into an actual social welfare loss outside the lab (see Eckel and Grossman (1996); Lambsdorff and Frank (2010)). The final payoff of each subject was determined as the sum of all earnings over the 20 rounds converted to Euro at a rate of 100 ECU = €0.7. All participants were paid their final payoff plus an additional show-up fee of €3 in cash at the end of the experiment. The experiment was conducted with a total of 128 undergraduate students at the Computable and Experimental Laboratory at the University of Trento. Sessions averaged 60 minutes and consisted 20 rounds followed by an incentivized risk-elicitation task (Holt & Laury, 2002) and a questionnaire. Average earning was €12.

3.2.3 Predictions and Hypothesis

Consider the interactions within a single round between a single TP and a TO, both assumed to be risk-neutral expected payoff-maximizers. In this one- shot scenario a TP optimally declares zero taxes independently of the presence of a PWR. In contrast, experimental evidence suggests that in one-shot scenarios subjects tax compliance is well above zero, but

oftentimes declines over time when decisions are made repeatedly, thus approaching the one-shot equilibrium prediction. Further, in order to forgo punishment, a TP should always denounce the TO in Ph2. The TO, anticipating this behavior, optimally raises her acceptance threshold for bribes from 6 ECU in Ph1 to 10 ECU in Ph2. Intuitively, the introduction of a PWR offers the TP a "safe way out" effectively reducing the risk faced when evading taxes, while on the other hand exposing the TO to a risk of being denounced and fined. Due to risk-aversion we thus expect tax compliance to be lower when PWR is implemented.

The literature suggests that there is ample gender heterogeneity with respect to both risk taking in general and particularly engaging in risky unethical behavior within contexts of or similar to tax evasion. Existing research indicates that males have a tendency to be less risk-averse and engage in illicit behavior more often than women (cf. Croson and Gneezy (2009); Torgler and Valev (2010); Banuri and Eckel (2012)). We thus expect male participants to evade more taxes, than their female counterparts do.

3.2.4 Results and Discussion

We first compare tax compliance behavior before and after the introduction of a PWR. Fig 2 shows a significant decrease of mean tax declarations as a reaction to the institutional change from 20.18 ECU in Ph1 to 14.89 ECU in Ph2 coupled with a reversal in trends.[1] On average, tax compliance was 5.3 ECU lower in Ph1 as compared to Ph2 ($p < 0.001$).[2] The introduction of a PWR offers the TP a safe way out effectively reducing the risk when evading taxes, and furthermore shifts responsibility to the TO potentially also reducing the TP's psychological costs of evading taxes, which then results in lower compliance in Ph2. We now analyze the evolution of tax compliance behavior over time. In Ph1, prior to the institutional change, the slope shown in Fig. 2 is negative, thus indicating an acceleration of tax evasion over time. However, after the PWR has been introduced in Ph2, we observe that now the slope is positive, with the reversal in slopes being highly significant ($p = 0.0021$).[3] Our results

[1] It is worth noting that simply looking at average behavior disguises the participant's actual behavior in the experiment. Analyzing the development of behavior across rounds yields that behavior is not stationary but rather approaches a steady-state over time. We thus report both, averages and trends in order to strengthen the robustness of our results.

[2] Unless noted otherwise, we use Wilcoxon signed-ranks tests for all mean comparisons within subject using individual averages for Ph1 and Ph2.

[3] We examine differences in trend using OLS estimations with a standard error correction that accounts for repeated game effects. Indicated p-values are obtained using post-hoc estimation tests.

suggest that the effect of the institutional change is twofold: First, we observe a negative short term effect resulting from a drop in mean compliance directly after the PWR is introduced. Second, the decline in compliance over time observed in Ph1 is halted, and even reversed, in the periods following the institutional change (see Fig. 2). We interpret the reversal in trends for compliance as an indicator for a potential positive long-term effect from introducing a PWR.[4]

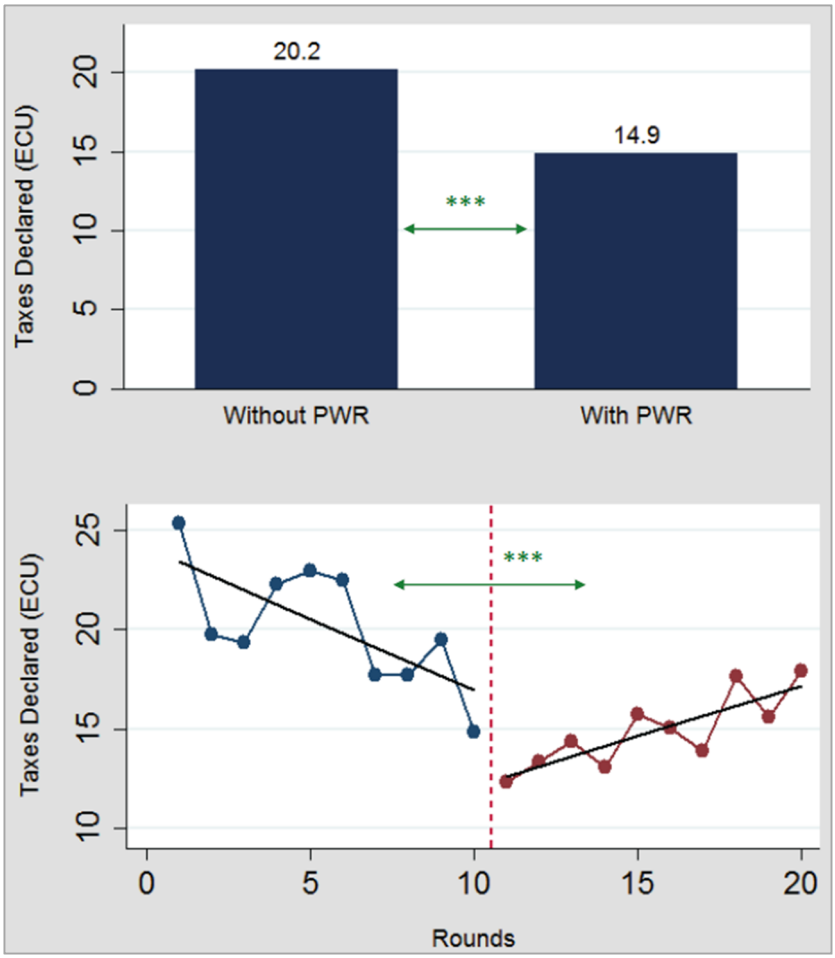

Figure 2: The top figure displays the average tax declared in Ph1 and Ph2 pooled on the individual level. The bottom figure shows the evolution of tax declarations over time.

Let us now consider the amount of bribes paid. As expected we observe a behavioral break following the introduction of the PWR resulting in an upwards shift of bribes paid in Ph2. The average amount of bribes paid before and after introducing a PWR were 12.98 ECU and 14.63

[4] In a control treatment, an additional 36 subjects have played Ph1 for 20 consecutive rounds without introducing a PWR. The findings suggest a gradual decline in tax compliance behavior, thus strengthening our findings related to the impact of a PWR on tax compliance. Results are made available in the Appendix A1.

ECU ($p = 0.0283$), respectively. Evidently, taxpayers acknowledge the higher risk that public officials have to bear after the introduction of the PWR and, at least partially, compensate them with higher bribes. As argued in Section 3.2.3, a rational TO optimally rejects all bribes below 6 ECU in Ph1, and respectively below 10 ECU in Ph1. We use the minimal bribe accepted per round by a TO as an indicator for this acceptance threshold. As expected, we find that the threshold for acceptance increases from 14.53 in Ph1 to 16.27 in Ph2, although not significant ($p = 0.164$).[5] Again there is evidence of a dynamic difference, in Ph1 the threshold stays constant (with an insignificant downward trend), whereas it increases significantly in Ph2 ($p = 0.027$). Again, we observe that behavior is not stationary across periods but dynamically converges to a lower (higher) level in Ph1 (Ph2), suggesting that convergence takes place.

It is not among the specific aims of this paper to investigate the frequency of TOs denouncing corrupted POs, nevertheless it may be interesting to report that on average TOs denounced in 28.62 % of the possible cases. There were no differences between gender.

Notably, our experiment yields surprising results with respect to how differently male and female participants respond to the introduction of a PWR. The main results on gender differences are summarized in Figure 3 illustrating the mean declared taxes in Ph1 and Ph2 broken down by gender, and the development of mean declared taxes by gender over rounds. Previous studies (see e.g., Kastlunger et al. (2010); Torgler and Valev (2010)) found women to be less inclined to be corrupt or evade taxes. For Ph1 (Ph2), our results indicate an average tax compliance of 21.2 ECU and 19.2 ECU (13.1 ECU and 16.5 ECU), for females and males respectively. Pooled over 20 rounds, we observe a mean tax compliance of 17.2 ECU (17.9 ECU) for females (males). In accordance with the literature in Ph1 women are slightly more compliant than men, but become slightly less compliant compared to their male counterparts when a PWR is introduced. Across gender, differences in general tax compliance are not significant, thus indicating that tendencies towards tax evasion are the same for females and males. Most surprisingly, however, we find a strong heterogeneity in reactions to the

[5] In fact, when accounting for learning in behavior and thus only looking at the last 5 rounds of both Ph1 and Ph2, we see a weakly significant increase in averages in the threshold of accepted bribes from 13.3 ECU to 16.9 ECU ($p = 0.063$).

introduction of a PWR across gender. There is a highly significant drop in average tax compliance for females by 8 ECU on average ($p < 0.01$), whereas changes in average behavior for males are small (2.7 ECU) and insignificant ($p = 0.34$). In addition, we observe a highly significant change in slopes for women ($p < 0.01$) and men ($p < 0.01$) respectively. Here, the change in slopes suggests that females and males react differently to the introduction of a PWR: females resort to a stationary high tax evasion behavior, while males gradually converge towards higher tax compliance. In sum, our findings suggest that women show a greater sensitivity in their reactions following the introduction of a PWR, which is both surprising and not completely in line with the existing economic literature.

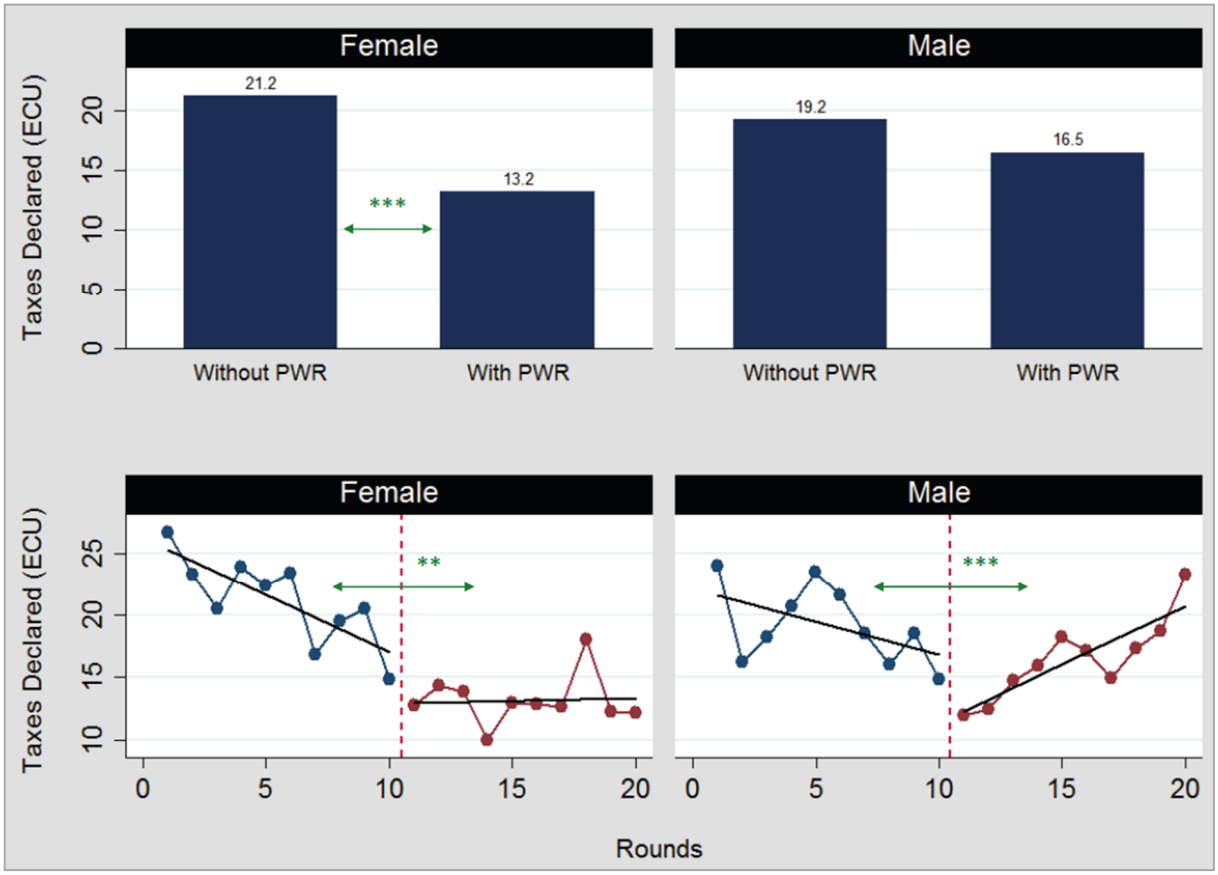

Figure 3: Average Tax Declared by Gender and Shock pooled on the individual level over rounds, and Evolution of Tax Declarations over rounds by gender.

In what follows, we should discuss factors that could drive our surprising results. The experimental design adopted in our study included two main factors that potentially play a role in explaining female participants' reactions to the implemented institutional change. The first ingredient is risk (to be fined) and the second one is the institutional setting adopted to

mimic the decisional frame. For one, a general difference in risk attitudes across gender could potentially explain the significant drop in female tax compliance after the introduction of a PWR, since by the design the PWR sharply reduces the risk of deviant behavior. However, our results survive and remain highly significant when controlling for individual risk aversion attitudes. For another, Lighthall et al. (2009) study how stress affects decision making under risk and find that overall men take more risk than females, but interestingly stress increases risk-taking for men, whereas women become more risk-averse. In Preston et al. (2007), using a different stress manipulation, it is shown that stress induces male participants to perform worse, while female participants perform better under stress in the Iowa Gambling Task, a task shown to measure efficiency in decision making under uncertainty. Assuming that stress affects females and males differently, we can interpret our results as an "inverted stress effect". In Ph1 TOs were aware that the decision to evade exposes them to the risk of being punished, a burden they had to bear alone. In Ph2, the PWR provides a possibility to avoid a severe sentence after tax evasion is detected, thus providing a "save way out" that potentially creates an environment that is perceived as less stressful. One would therefore expect women to engage in higher risk-taking in the less stressful environment after the introduction of a PWR, whereas risk-taking of men would be expected to decrease. The exposure to risk is generally higher in Ph1 than in Ph2, and hence risk-aversion would lead to a decrease in compliance from Ph1 to Ph2. As a consequence, a reduction in stress would amplify this tendency for women, while it might counteract a potential effect of stress for men. This might explain we do not observe an increase in compliance for males. However, our reasoning remains speculative as there is, to the best of our knowledge, no existing research on the interrelations between stress, risk aversion, and gender differences. This offers a potential venue for future research.

A second reason could be that the sudden institutional change affects women more strongly than men, which is in line with (Croson & Gneezy, 2009) who argued that females are more sensitive to the contextual frame. The introduction of a PWR renders the TO formally responsible, hence creating a situation where the responsibility (and risk) is shared among TP and TO. This new distribution of responsibility might enhance the wiggle-room for misbehavior on the side of the females. This second interpretation can be considered as further

evidence that gender effects might oftentimes stem from a higher sensitivity of women to the institutional environment.

3.2.5 Conclusion

Our examination represents the first attempt to shed light on the effective- ness of the principal witness regulation utilizing a controlled laboratory setting. We extend the general tax evasion framework by adding a dimension of strategic interaction that allows us to capture a broader spectrum of tax evasion contexts. Our findings suggest that the introduction of such a policy measure has a negative short-term effect of decreased compliance, but at the same time induces a reversal in the dynamic adjustment over time that hints upon a potential positive long-term effect of a principal witness regulation on tax compliance. In contrast to the literature, we do not find women to be generally more compliant than men, however, there is considerable gender heterogeneity in terms of responsiveness to the introduced institutional change: women over-proportionally react to the introduction of a PWR by reducing tax compliance, while the results suggest that men react with a gradual increase of tax compliance. Our results yield important policy implications. While the introduction of a principal witness regulation not only yields limited effectiveness in mitigating tax evasion, its effectiveness is also highly gender specific and should thus be regarded in policy decision-making.

3.2.6 Appendix

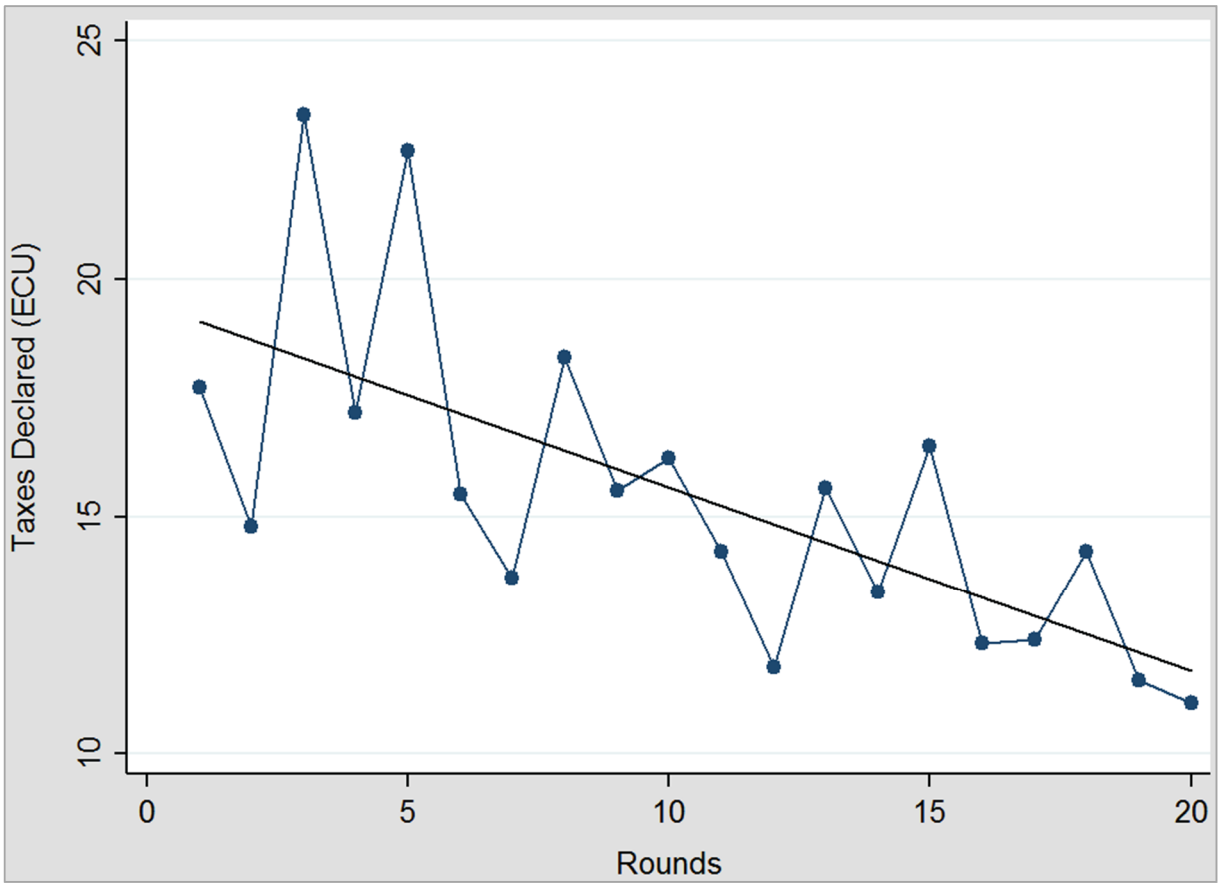

Figure A1: Average tax compliance in an additional control treatment (N=36).

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