

The Impact of Migration on Pro-social Behavior

Neelanjan Sircar & Peter van der Windt*

November 7, 2012

This is a mock article: it provides the structure of analysis prior to examining real data on outcomes. All outcome data used in this mock article are simulated and do not represent real-world data in any way. We note that the mock analysis was conducted after data collection but before analysis. In this paper, we characterize native-migrant cooperation through the prism of strategic screening and signaling behavior. We do so through an analysis of pro-social behaviors – benevolence and reciprocity – between natives and migrants in the Democratic Republic of Congo. We extend the classic dictator game to a local round-robin design, which explicitly accounts for the interpersonal aspects of pro-social behavior. Using fake data, we find that recent migrants dilute pro-social behaviors in the village. However, migrants signal their willingness to be good citizens by contributing more to natives under public scrutiny. Moreover, we find that natives actively discriminate against recent migrants.

1 Introduction

In this paper, we characterize and explain levels of migrant cooperation and integration through an analysis of migrant-native benevolence and reciprocity, or pro-social behaviors, at the village level. In order to understand variation in observed pro-social behaviors, we turn to a strategic costly signaling-screening framework to explain how interactions between village natives and migrant populations affect overall patterns of migration to the village. We apply our insights to data collected on pro-social behaviors in villages over an eight month period in 2012 in the Democratic Republic of Congo. In order to collect data on pro-social behaviors, we extend the classical dictator game to a local round-robin design, allowing us to collect realistic data between individuals from the same village. Our results suggest that migrants dilute the level of pro-social

*pv2160@columbia.edu. We thank Alexandra Cirone, Chris Blattman, Macartan Humphreys, Pierce O'Reilly, and Raul Sanchez de la Sierra. Thanks also to the Earth Institute, the Center for the Study of Development Strategies and Massimo Morelli for financial support. Particularly we thank Eustache Lulego Kuliumbwa, Desire Cizungu Bazibuhe, Freddy Koleramungu Zabandora and Jean-Jacques Kamushi Ntawiha for excellent in-country work. We also thank Mieke Van der Windt - Benschop (Peter's mom) for excellent research assistance. **All of the results in this "paper" are based on fake data. The purpose of this paper is to provide a complete analysis on fake data for the purposes of pre-registration with Experiments in Governance and Politics (EGAP). While the data were collected before registration, the paper and all hypotheses have been written before looking at the actual data. All code (including model and graphs) and information for data generating processes of the fake data are available as an appendix.**

behaviors in a village, but they do exhibit a willingness to integrate into the population through costly signaling.

Benevolence and reciprocity, what we collectively refer to as pro-social behaviors, involve actions that help or support others at personal cost. In poor subsistence-based societies, pro-social behaviors are used to mitigate economic risk, structuring quotidian exchange and social norms in what is often called a "moral economy" (Scott (1977)). Pro-social behaviors have also been associated with greater local public goods provision (Habyarimana et al. (2007)) and lower levels of conflict (Varshney (2002)). In weak state environments, villages depend upon these pro-social behaviors, as a substitute for governance, to provide public goods and create a stable environment. Three points are worth noting here, as they relate to migration and political economy. First, since the extent of pro-social behavior of incoming migrants affects the overall well-being of the village, native villagers have a strong incentive to strategically screen migrants for pro-social behaviors. Second, understanding the level of pro-social behavior in a village is indispensable for understanding major political economy issues, such as public goods provision and conflict. Finally, for most political outcomes of interest, the village is the common arena for social interaction, so we are interested in the level of pro-social behavior between natives and migrants at the village level.

We analyze village-level pro-social behaviors among native and migrant populations through the lens of a costly signaling-screening framework (e.g. Spence (1973), Stiglitz (1975)). We argue that natives seek to strategically select pro-social migrants in order to help perpetuate the existing village moral economy. Natives can do so in two ways. The first is *selection-at-the-gate*. Natives may use diffuse social networks, such as common friends or family, to effectively select pro-social migrants. A second technique is an *ingratiating period*. Natives may exclude migrants from the fruits of the moral economy for a fixed period of time (much like a naturalization process) to force migrants to prove their value as good citizens in the village. In particular, natives may initially deny the tools necessary for integration, such as access to land and marriage. In response, migrants may undertake very public costly actions, such as contributions to public goods, to signal their pro-social behavior and build a reputation as good citizen (Gintis, Smith and Bowles (2001)). We therefore analyze two mechanisms: 1) *Screening*: the extent to which natives can screen to select migrant populations that exhibit pro-social behaviors, and 2) *Costly Signaling*: the extent to which migrants undertake public, costly actions to demonstrate good citizenship. Finally, we analyze the overall health of the moral economy in the village by directly comparing pro-social behavior between migrants and natives within their respective groups, as well as across groups.

Pro-social behaviors have traditionally been measured by lab experiment methods such as the dictator game. In order to measure pro-social behaviors at the village level, we implement a significant extension to the classic dictator game, what we call the *local round-robin dictator game*. In this design, participants only play the dictator game alongside other individuals from the same village. Furthermore, individuals play the dictator game alongside each other individual sampled from the village twice, once as a dictator and once as a receiver. Since the design involves individuals from the same village, we provide realistic estimates of pro-social behavior at the village level. The round-robin structure allows us to directly observe reciprocity between two individuals in the village because for each pair we observe each individual getting the opportunity to be the dictator. Due to a more complex data structure, we employ a linear social relations

model (Warner, Kenny and Stoto (1979) ,Wong (1982)), along with insights from Bayesian multi-level modeling (Gelman and Hill (2007)), to analyze the data.

We make three contributions to the study of migration and pro-social behavior in a developing world context. First, we create a one-of-a-kind dataset in the Democratic Republic of Congo, a war-torn, poverty-stricken country particularly well-suited to analyze the impact of migration on pro-social behavior. Second, we devise a costly signaling-screening theoretical framework to understand strategic aspects of migrant integration, specifically in regards to rural-rural migration, which continues to be understudied in the political economy literature. Finally, we make significant methodological innovations, both in the design and analysis of lab-in-the-field games, to provide a general empirical framework to measure pro-social behavior at the local (village) level.

Section 2 provides the theoretical background and a conceptual framework for our analysis in the Democratic Republic of Congo. Section 3 discusses the extension of the classic dictator game to the local round-robin dictator game. The setup of the dictator games, our modeling strategy, and the hypotheses are discussed in Section 4. Section 5 discusses the fake results, and section 6 concludes the paper.

2 A Signaling-Screening Approach to Migration

In this section, we introduce a strategic costly signaling-screening framework to understand pro-social behaviors in the village. We envision observed pro-social behavior in villages to be the outcomes of a set of (potential) interactions between native villagers and migrants, where natives attempt to select pro-social migrants and migrants attempt to signal their willingness to be good citizens of the village.

The *village* is the focal point of our analysis. In much of the developing world, villages are governed by traditional or elected hierarchies and is the level at which citizens engage for access to public goods or services. Furthermore, the level of integration and pro-social behavior in a village decreases the likelihood of violent conflict taking root. Naturally, strategic behavior with respect to screening migrants, and signaling from migrants, tends to take place at the village level. The political economy literature on migration, largely influenced by rural-urban migration, has focused primarily upon the decision to migrate and the selection of destination.¹ However, our focus is rural-rural migration, where migration depends not only on the decision to leave one's village of origin but also upon the acceptance by the destination villages. The vast majority of migration in the underdeveloped world can be classified as rural-rural migration. Even in a rapidly urbanizing country like India, 44% of all migration continues to be classified as rural-rural migration, according to the 2011 Indian Census.

To learn about pro-social behaviors among native and migrant populations at the village level, we introduce a costly signaling-screening framework. The reason for doing so is that incoming

¹People may migrate voluntarily to earn higher wages (Sjaastad (1962)), or higher expected wages (Todaro (1969)), or may be forced to do so because of violence (Schultz (1971)). Destinations might be chosen in order to diversify income risk (Rosenzweig and Stark (1989)), in response to a program subsidy (Rosenzweig and Wolpin (1988)), or because of the presence of other migrants (Carrington, Detragiache and Vishwanath (1996)).

migrants are not a representative subset of the initial native population, and the attributes of these migrants are not known by the native population.² Because migrants are unlikely to mirror the attributes of the natives in the destination village, they are likely to feel greater "social distance" from the natives, which has been shown to decrease pro-social behavior (Hoffman, McCabe and Smith (1996)). Migrants are likely to have different preferences over public goods outcomes, shorter time-horizons, different ethnic group memberships, they might decrease the average frequency and level of repeated interaction in the village, et cetera. Incoming migrants are therefore likely to be less pro-social than the native population, and thus might upset the moral economy (Bowles and Gintis (1998)). Given this danger, village communities attempt to select pro-social migrants in order to help perpetuate the existing moral economy. However the "type" of migrant is only known to the migrant and not to the native. As a result, we argue that natives undertake actions to learn about the type of migrant, and pro-social migrants undertake actions to set themselves apart from those migrants that are not pro-social.

Screening. The screening effect refers to the extent to which natives are successful in only allowing pro-social migrants into the village.³ Natives can do so in two ways. The first is selection-at-the-gate, where natives may use diffuse social networks such as common friends and acquaintances to decrease the level of uncertainty about the "type" of migrant. For example, in this initial screening natives might prefer migrants that have family ties in the village. If a migrant with family ties decides to be selfish, this will entail a loss of social status for the entire family. The family may then directly sanction the migrant, making the decision to be selfish far more costly to the migrant. A second technique is an ingratiation period. Natives may grant migrants entry to the village but wait for some fixed amount of time before reciprocating pro-social behavior by migrants. During this period, natives might restrict access to the tools necessary for integration, such as access to land and marriage, until the migrant has shown herself to be a sufficiently good citizen of the village.

Costly Signaling. The costly signaling effect refers to the extent to which migrants adjust their pro-social behaviors when in an environment of public scrutiny. Villages in the developing world have dense social networks and traditional hierarchies. As a result, many pro-social behaviors, like community development projects, are likely to take place in a universe of extensive public scrutiny, which can be utilized by migrant populations to signal their willingness to be a good citizen. Thus, the extent of pro-social behavior should depend upon whether interaction takes place in the public or private arena.⁴ Migrant populations want to create a favorable standing in the village and demonstrate their willingness to integrate into the population. First, individuals have a need for frequent, stable non-aversive interactions, a condition psychologists refer to as "the need to belong" (Baumeister and Leary (1995)). Second, a favorable standing in the village also has direct strategic benefits such as access to land and marriage. Finally, lack of pro-social

²By taking into account the endogeneity of the decision to migrate Borjas (1987) analyzes what determines the (labor market) qualities of foreign-born persons in the United States, and Rosenzweig and Wolpin (1988) assess how a price change or program subsidy affects the composition of local residents. Migrants might also be different because a non-random sample of the migrant population settle in the village.

³Village communities are often structured following a (traditional) hierarchy where the village chief, or the village chief with a small group of village leaders, make important village-level decisions such as the assignment of land to households, but also whether a family is allowed to settle in the village.

⁴See for example Bandiera, Barankay and Rasul (2005), List (2006) and Elster (1995) for work about differential behavior depending on whether the setting is private or public. Research shows that even subtle cues of monitoring can lead to changes in behavior: e.g. Haley and Fessler (2005).

behavior may be cause for isolation, or even expulsion, from the village. On the one hand, we might expect the difference in pro-social behaviors between public and private arenas to be greatest among migrants since they have an active interest in demonstrating good citizenship. On the other hand, if screening at the gate is an extremely effective tool for natives, we would expect the difference in pro-social behaviors by migrants between public and private arenas to be very small.

Finally, inefficiency of these acceptance mechanisms may lead to fissures in the moral economy and possible segmentation of pro-social behaviors, where natives or migrants direct pro-social behavior towards their in-group members. We therefore analyze a third mechanism of interest:

Group Biases. Group bias refers to the extent that an individual is willing to display pro-social behavior to someone of her own native-migrant status, as compared to someone of the opposite status. Tajfel (1982) has argued that even fairly arbitrary, or minimal, groups display in-group biases. Such in-group discrimination might be because members of the same group have similar tastes or preferences (Alesina, Baqir and Easterly (1999), Alesina and Ferrara (2005)), or because it is easier to monitor and sanction fellow group members (Miguel and Gugerty (2005)). Another reason might be that group identity provides a tangible coordination device for reciprocal exchange, or that norms or an institution for pro-social behavior exists within the group but not across groups (e.g. Chandra (2007), Habyarimana et al. (2007), Fearon and Laitin (1996)). To the extent that native and migrant populations view themselves as separate groups, individuals in the population might exhibit greater pro-social behaviors with others that have the same native-migrant status. In particular, an inefficient screening mechanism may breed distrust between natives and migrants. In such a scenario natives may choose to exclude migrants from the moral economy of the village by displaying native in-group bias, and/or migrants may not feel sufficiently included in the affairs of the village, leading to greater migrant in-group bias. Furthermore, natives may be slow to accept migrants, making integration into the village more costly and creating more effective screening of the migrant population.⁵

Our focus on signaling and screening in regards to migration has strong parallels to the literature on migration and welfare benefits. Tiebout (1956) described "sorting equilibria" where populations sort into optimum communities based on the offering of varying baskets of goods (government services) at a variety of prices (tax rates). This logic has been extended to understand strategic extension/dissolution of welfare benefits by governments in order to manipulate migration into the territory (Peterson and Rom (1989), Voldon (2002)). In this literature, however, benefits are provided by the government. In our scenario, benefits are tied to interpersonal relations in the village, and, thus, the level of benefits are endogenous in a very different way to who migrates into the village.

⁵On the other hand, it isn't clear that native-migrant status is the most salient identity for economic and social competition; villagers may instead sort along ethnic, linguistic, or political party lines. Migrant populations may also prefer to exhibit greater pro-social behaviors towards the native population in order to show gratitude for inclusion in the village. Finally, it may be that the natives are more willing to exhibit pro-social behaviors towards the migrant population due to sympathy for their situation, due to a preference for fairness and inequity aversion (Fehr and Schmidt (1999), Bolton and Ockenfels (2000), Rabin (1993)).

2.1 Pro-social behaviors

In this study of native-migrant relations, we focus on two types of pro-social behavior: *benevolence* and *reciprocity*. Given two individuals i and j , benevolence of i towards j is defined as i 's willingness to donate to or support j in lieu of personal consumption. Benevolence is thus a claim about a one-way interaction. Reciprocity on the other hand is a claim about a two-way interaction. Given two individuals i and j , we define reciprocity between i and j as i 's and j 's mutual willingness to donate to or support the other person in lieu of personal consumption. Common definitions of reciprocity contain some notion of temporality or sequence in behaviors. In our "one shot" environment, we do not observe the sequence of behaviors. However, since individuals have past histories with each other, the willingness of individuals to donate towards each other is a very good snapshot of the level of reciprocity between two individuals (as discussed in Warner, Kenny and Stoto (1979)).⁶

2.2 The Democratic Republic of Congo

We conducted a set of dictator games in the Democratic Republic of Congo (DRC) between January and August 2012. Between 2010 and 2012 the Congo was also home to a survey one of the authors undertook, which collected data in almost 1,120 randomly-selected villages in Congo.⁷ The DRC provides a particularly good case in which to learn about migrant integration. In 1994 the country was host to almost two million (mainly Hutu) ethnics that fled Rwanda. While most of them returned, Congo is still home to more than 150,000 refugees and 1.7 million internally displaced people.⁸ Conflict is one, but not the only, reason for migration. 51% of the adult population originate from outside their current village. Moreover, even "forced" migration involves strategic interactions and choices in displacement. Some villagers decide to stay even in the presence of conflict (Steele (2009)). And those that do leave have to select a village of destination. In Congo this choice depends to a large extent on a destination's absorption capacity and the presence of family – for 37% of migrants in Congo the latter was the reason to choose their current village. In addition to selection effects, the DRC is well-suited to learn about group dynamics. Beyond migration status, ethnic identity is likely to be an important cleavage for benevolence and reciprocity. Identity has historically been based on membership of the ethnic group. The Belgians institutionalized ethnic identity as an organizing principle of the state, and after independence former president Mobutu manipulated these identities for political reasons (Autesserre (2010)). Furthermore, villages in Congo are ethnically diverse with 73% consisting of more than one ethnic group; and in 73% of these the dominant ethnic group constitutes less than 80% of the population. Finally, the DRC is also well-placed to learn about public scrutiny effects. Much migration in Congo is rural-rural migration (e.g. UNHCR (2012)). Destination villages have strong hierarchical forms of organization and exhibit robust moral economies. It is likely

⁶A major benefit of this snapshot approach is that it avoids the "base-rate fallacy." The base rate fallacy describes a scenario where levels of benevolence observed in sequence are attributed to the sequence of actions without accounting for the underlying level of benevolence between two players. Our approach can be viewed as accounting for underlying benevolence and sequences of past behavior at the same time.

⁷The PI was Macartan Humphreys. The figures in this section are based on data from the survey. The data and code is available upon request.

⁸UNHCR at <http://www.unhcr.org> and the Internal Displacement Monitoring Centre at <http://www.internal-displacement.org>. Both accessed on August 26, 2012.

that a favorable identity is particularly important to migrant populations in the Congo where most people are subsistence farmers, and access to land is still largely based upon traditional systems (Vlassenroot and Huggins (2005)).

3 Local Round-Robin Dictator Games

In this section, we motivate a study design strategy for lab-in-the-field dictator games, *local round-robin dictator games*, to estimate benevolence and reciprocity at the village level. As argued in section 2, the village is the natural arena within which to study the role of native-migrant relations since is the level at which signaling-screening occurs, and the level at which most public goods and community development projects are executed. The classic dictator game is played anonymously, i.e. the players do not know each other, and has been used to characterize discrimination between individuals who have minimal information about each other (e.g., a cab driver and passenger). Of course, discrimination may still persist in environments where individuals have regular interaction with each other, such as the village. Estimation of benevolence and reciprocity at the village level requires a significant extension of experimental games in both design and analysis. Accordingly, we propose and execute local round-robin dictator games, where individuals only play alongside other individuals from the same village in a round-robin format. The resulting data structure requires more sophisticated modeling techniques, so we introduce a linear social relations model to analyze the data, allowing us to retrieve robust estimates of benevolence and reciprocity across natives and migrants in villages.

Section 3.1 introduces our design strategy and reviews the existing literature on dictator games, and section 3.2 contrasts our design strategy with more standard anonymous dictator games.

3.1 Designing Attribute-Based Dictator Games

The dictator game is the workhorse lab experiment within the political economy literature to test theory and provide insights into the prevalence of pro-social behavior. The dictator game takes a single player, the dictator, and asks her to split a fixed sum of money, the endowment, between herself and another person, the receiver, where the dictator is under no obligation to donate any money to the receiver. Predictions based on standard Nash equilibria, assuming individuals are purely interested in personal financial gain, are that the dictator will keep all of the money for herself. Empirically, however, one finds that 60% of dictators donate a positive amount of money towards the receiver, with a mean transfer of around 20% of the endowment (Camerer (2003)). This suggests that people have more complex preferences than personal financial gain, and that individuals have preferences for pro-social behaviors, what is typically referred to as exhibiting "other-regarding preferences" (Fehr and Schmidt (1999) and Bolton and Ockenfels (2000)).⁹ Accordingly, the level of donation in a dictator game is often used to measure the extent of pro-social behaviors.

The classic dictator game is anonymous, i.e. players do not know each other nor are they given

⁹For a critique of this interpretation see: List (2007).

any information about each other.¹⁰ The goal of many early studies was simply to demonstrate the inadequacy of utility functions that only assume interest in personal financial gain (e.g. Kahneman, Knetsch and Thaler (1986)). Attribute-based anonymous dictator games, where the dictator is given some experimenter-controlled "cue" regarding the receiver and no other information, trace their roots to the minimal group paradigm (Tajfel and Turner (1986)). The purpose of this technique was to demonstrate that even very subtle cues, such as the color of one's shirt, was sufficient to induce group biases in pro-social behaviors in an anonymous setting. A recent literature in political science and economics has sought to use similar techniques in experimental lab games, cuing gender (Holm (2000)), ethnicity (Habyarimana et al. (2007)), Whitt and Wilson (2007), Fershtman and Gneezy (2001)), or partisanship (Fowler and Kam, 2007) to show evidence of discrimination in pro-social behaviors. The result has been a literature that largely attempts to arrive at claims about identity-based statistical discrimination, differences in the incidence of a particular outcome (e.g. donation) as it varies by the attribute under examination.

The intuitive empirical interpretation of such studies is that it measures the extent of discrimination between random strangers who can only discern the attribute under question. It is natural to use this type of game to characterize "statistical discrimination," the extent to which all beliefs that can be gleaned from an attribute predict differences in outcomes. Phelps (1972) and Arrow (1973) show that observed differences in outcomes along some attribute, such as race, may not be due to race explicitly but to beliefs about other characteristics correlated to race, such as education or wealth. These ideas have been primarily applied to the housing or labor market, where employers and landlords must sort through large numbers of applicants with minimal information. Unfortunately, such studies provide little empirical leverage on the vast universe of environments where attribute-based discrimination occurs between individuals with regular interactions. As we have argued, participation in community development and public goods projects and sharing of common goods occurs between individuals who know each other quite well since they tend to be in the same village.

3.1.1 Local Round-Robin Dictator Games

In this study, the estimands of interest are benevolence and reciprocity at the village level. In order to get estimates in a realistic and unbiased fashion, we rigorously account for the interpersonal nature of benevolence and reciprocity at the village level. We propose a series of dictator games, where each individual has a set of "one-shot" interactions with individuals who are from the same village. For every sample of individuals from a village, each individual serves as the dictator once towards every other individual in the sample, what is commonly called a round-robin design. Since individuals only play the game alongside others from the same village, behavior in the dictator game is a function of previous interactions and current interpersonal relations between the individuals at the village level. Furthermore, for each dyad, each of the two individuals have an opportunity to serve as the dictator, which allows for direct observation of reciprocity.

To motivate our study design we turn to a well-developed literature in the psychology and psychometrics that focuses on the empirical estimation of such interpersonal behaviors. The key

¹⁰The original setup entailed informing the dictator that the receiver was behind a closed door so that no attributes of the receiver affected the decision of the dictator.

insight of this literature is that behaviors of two individuals towards each other (e.g. benevolence of i towards j and j towards i or reciprocity) are necessarily correlated. Failure to estimate this correlation in a realistic way leads to problematic inferences. In particular, interpersonal behaviors are often a function of attributes and characteristics that are unknown to the researcher and failure to account for these elements can lead to biased estimates. At the same time, the correlation in behaviors affects the confidence (i.e, standard errors) in the estimates of donation levels, much like a clustered standard error in standard econometric analysis.

3.2 Benefits of Local Round-Robin Experiments

The local round-robin experimental design extends upon standard anonymous dictator games in three ways. First, since individuals in the same village play alongside each other in our design, donation levels are a function of natural interpersonal relations as opposed to what a dictator can glean about a receiver in an artificial lab setting. Second, since our participants are sampled from the common social network of the villages, realistic social norms and common social relations are likely to mitigate negative biases between individuals, whereas this is not possible in an anonymous lab setting. Finally, the sampling structure of the games allows for enough information to weight observations to retrieve unbiased estimates of theoretically important quantities such as the expected donation of a migrant at the village level.

3.2.1 Full Information of Receivers' Attributes

One of the purported benefits of attribute-based anonymous games is that it is thought to isolate the effect of an attribute of the receiver upon the donation given by the dictator. However, cueing a specific attribute can lead to accidental manipulation of relevant attributes unobserved by the participant, causing problematic inferences. The local round-robin design alleviates these concerns by guaranteeing the individuals participating in the dictator games know each other well enough to discern relevant attributes for realistic play in the dictator game.

To demonstrate the problem imagine a population with two equally-large ethnic groups A and B , who are each particularly unkind to members of the other ethnic group but kind to members of their own ethnic group. To be precise, given an allocation over 5 utils in a dictator game, the dictator prefers to keep all 5 utils when the receiver is from the other ethnic group and prefers to keep 3 utils when the receiver is from the same group. First, imagine a population that does not discriminate based on migration status. Second, imagine a setup where the experimenter has only told the dictator that the receiver is a migrant. Assume further that a dictator has the prior belief that a migrant is equally likely to be from A or B , whereas a native is certain to be from her ethnic group. This results in a scenario where the dictator keeps, on average, 4 utils when the receiver is believed to be migrant and 3 utils when the receiver is believed to be a native. However, it would be wrong to claim that the difference in generosity of 1 util is due to the non-native status of the receiver; it is the belief about ethnic identity that drives this incorrect conclusion. This is particularly problematic if the estimand of interest involves individuals who should have sufficient interaction/information to determine the ethnicity and native-migrant status of each other.

In anonymous games, the inability of the experimenter to control for each relevant attribute results in an "omitted variable bias," the outcome (pro-social behavior) and the predictor of interest (migrant status) are both correlated with an omitted variable (ethnicity). We thus have a failure of the exclusion restriction because the cue affects the variable of interest (migrant status) but also affects the outcome through variables that are unobserved by the experimenter (Angrist, Imbens and Rubin (1996)). Notice that since this actually induces different behaviors on the part of the dictator, no manner of ex post empirical adjustment can retrieve correct estimates.¹¹

By contrast, since the local round-robin design uses participants who know each other well, donation decisions are based upon full information about the relevant attributes of the receiver. Thus, local round-robin designs are able to retrieve meaningful heterogeneous effects across attributes, where these effects only accord with anonymous games when the beliefs and priors of respondents perfectly correspond to the actual (joint) distribution of attributes in the population.¹² Furthermore, since dictators exhibit realistic preferences in the lab, it is theoretically possible to isolate the effect of the attribute of interest (e.g., migrant status) upon pro-social behaviors through ex post empirical adjustment.

3.2.2 Common Network Sampling

Anonymous dictator games force the dictator to make determinations about a receiver in the absence of a natural social context, whereas the local round-robin design explicitly uses individuals who share a common social context (the village). Failure to provide a social context can be problematic because social relations outside the dyad, such as common friends, often mitigate negative biases. To be precise, assume again that individuals hold their ethnic group biases, and the dictator and receiver are of a different ethnic group. However this time the receiver has, at some point, given a loan to the dictator's brother. Due to beliefs of reciprocity or gratitude, the dictator chooses to disregard her ethnic biases and gives 3 utils to the receiver (keeping 2); as she does with members of the same ethnic group. The role of other individuals in the shared social network of a particular dyad, often called dyadic interdependence, should not be underestimated.¹³ These individuals can be used as witnesses to contracts or third party enforcers, which is likely to increase reciprocal behavior.

Our contention is that anonymous games often overestimate the extent of discrimination based upon an attribute because they fail to place dyads within an appropriate social network context.¹⁴ Without a common social network that helps to mitigate discrimination, dictators discriminate upon observable attributes within the experimental setup. In essence, a common social network

¹¹ We are certainly not the first people to raise these concerns. Levitt and List (2007), for example, discuss how personal experiences may cause subjects to play one-shot games as if they have some repetition, and the experimenter may have little or no ability to moderate this phenomenon. Also Henrich et al. (2001) show that participants in laboratory games are likely to retrieve experiences and strategies that, unbeknownst to the experimenter, change the nature of the games.

¹²Note that it is unlikely that players would actually know the joint distribution of attributes in the population for an anonymous game, since the sampling frame is necessarily large enough to maintain anonymity.

¹³There is a large and growing literature on the importance of dyadic interdependence. See, for example, Jackson (2008).

¹⁴Of course, common social networks can also foment negative attitudes. For instance, if an individual, a is in a squabble with b 's family member, a and b may also develop negative opinions of each other.

is likely to reduce social distance between individuals and increase opportunities for reciprocity between them.¹⁵ Since individuals in our local design are sampled from the same village, they share a common social network and context, allowing for realistic evaluations of social distance and trust between individuals.

3.2.3 Post-Stratification and Weighting Dyads

In order to calculate unbiased estimates for many estimands of interest in dictator games, such as the average donation of a migrant, one needs to be able to weight, or post-stratify, the sample by the prevalence of each type of dyad (in our case, migrant-migrant, native-migrant, migrant-native, and native-native). In many settings, it is difficult to construct weights that generate unbiased estimates for estimands of interest, but local round-robin designs provide enough information to characterize the average pro-social behavior at the village level.

In the dictator game, individuals are paired together by the researcher, instead of through natural interaction. This raises the concern that the researcher might be creating situations that are unlikely to exist in real life, e.g., individuals from different regions within a country that do not have regular interaction. For most estimands of interest, we would want to assign no weight to an unrealistic pairing, but this requires detailed information about interaction patterns in the sampling frame, information unlikely to be known by the researcher. Accordingly, we want to restrict our analyses to pairs of individuals that could or should reasonably be able to interact in some common arena. The local round-robin design addresses this concern since individuals are only paired with others from the same village, and residents of the same village can reasonably be expected to interact with each other.

Proper weighting of estimates is straightforward in this setup. To be precise, imagine that a village includes N individuals, which is partitioned into two blocks, N_n and N_m , representing the number of natives and migrants, respectively. We can calculate probability of each type of dyad by village. A native-native dyad occurs with probability $\frac{N_n(N_n-1)}{N(N-1)}$, a migrant-migrant dyad occurs with probability $\frac{N_m(N_m-1)}{N(N-1)}$, a dyad with a native dictator and migrant receiver or a dyad with a migrant dictator and native receiver occurs with equal probability at $\frac{N_n N_m}{N(N-1)}$. We can use these probabilities to give properly population weighted estimates of many meaningful quantities of interest, such as the expected allocation of a native or migrant dictator or the expected receipt of a native or migrant receiver in the population.

¹⁵Levitt and List (2007) shares this critique by arguing that inference from lab experiments measuring social preferences is typically based on interactions of complete strangers, anonymity between subjects, and absence of any social relations between subjects; and that such factors in the real world could induce a greater level of social preferences than observed in the lab.

4 Experimental Design and Hypotheses

4.1 The Sample

Between January and August 2012 we conducted dictator games to analyze native-migrant relations in villages of the Democratic Republic of Congo (the DRC). The study was conducted in 24 randomly selected villages in the territory of Kalehe in Congo's South Kivu province – an area known for large migrant populations due to its proximity to Rwanda and status as a hotbed for rebel activities.¹⁶ Upon arrival in a village, we conducted a household census to collect basic information about each household in the village, including household migration histories.

Since recently migrated populations are precisely the individuals who will find it most difficult to integrate into the village we defined a *migrant* individual as anyone who satisfied the following two criteria: 1) the individual was not born in the village; and 2) the individual had taken up the village as the primary place of residence within the last 5 years. The complement of the above-defined migrant population was taken to be the *native* population. The heads of household resulting from the census, in conjunction with native/migrant status, were used as a sampling frame for experimental games in each village. From this sampling frame, we drew 9 native and 9 migrant individuals to play a set of dictator and trust games.¹⁷ We collected game-behavior for a total of 456 participants. Because each player was both dictator and receiver we obtain 6,948 one-way and 3,474 two-way interactions.¹⁸ Furthermore, to increase participation individuals were compensated by 2,000 Congolese Francs; approximately a day's wage for a laborer/farmer in the region.

4.2 Game Play

The dictator games were always played between the individuals of the same village. Participants played 17 rounds, where each round represented a game with one of the 17 other individuals in the sample serving as the receiver. The day before the games were played, an instant photograph of each individual was taken. In each of the 17 rounds of the game, the dictator was shown a photograph of the receiver, drawn randomly without replacement, and asked to verify that she knew the receiver. For each round of the dictator game, the individual was asked to allocate a total of 5 tokens between the individual in the photograph and herself. The total allocation to a particular individual at the end of the game was the sum of: 1) the number she kept as dictator over the 17 rounds of the game; and 2) the number of token she received from the other 17 individuals.

Since all of the people in the sample knew each other, we prevented individuals from learning

¹⁶To create a sampling frame we made use of data that we created together with the International Rescue Committee and CARE International in 2010. We conditioned the selection of these villages on the presence of migrants (more than 25 migrant households) and basic safety conditions for the surveyors. The code we used to select the villages is available upon request.

¹⁷Results from the trust games we present in another paper.

¹⁸In the first 6 villages, only 16 individuals (8 natives and 8 migrants) were selected. It was only after six villages, when the research team was more experienced and the games did no longer take from sunbreak to sunset, that we could increase the number of players from 16 to 18.

the total allocations accrued to them in order to forestall any disturbances that could be caused by inferences about how much was donated by other people. In order to elicit truthful play in the dictator game, individuals were entered into a lottery for another 2,000 Congolese Francs, where the probability of winning the lottery for each individual was a function of the total allocation accrued to the individual. Since the prize represented approximately one day's wages, we believe the award was sufficiently large to generate truthful play. This was confirmed in the de-briefings with participants.¹⁹ After the conclusion of the games, we selected a winner for the lottery based upon total allocations, where the only piece of information publicly announced was the identity of the lottery winner.

Each of the 18 participants played two versions of the dictator game with the setup described above: one where the dictator made allocations without any other villagers present, and one where the dictator made allocations in the presence of the chief of the village. We randomized the order in which each version was played to prevent contamination of the results by learning effects. In particular, we wanted to discern whether people played the game differently when being monitored by an individual capable of future punishment: the Public Scrutiny Effect.

4.3 Model

In order to analyze the data, we explicitly model the correlation structure in accordance with round-robin social relations data, which is constructed in detail in this subsection. Throughout this paper, we denote the donation of dictator i towards receiver j in village k as y_{ijk} . In order to detect heterogeneous donation effects by the migrant/native dyad type, we model y_{ijk} as a stochastic variable with mean μ_{ijk} and stochastic deviation from the mean ε_{ijk} :

$$y_{ijk} = \mu_{ijk} + \varepsilon_{ijk} \quad (4.1)$$

Individuals in the population may be of the migrant (M) or native (N) type. In order to simplify the notation, we will denote a particular dyad as d_{IJ} , where $I \in \{M, N\}$ and $J \in \{M, N\}$ denote the types of the dictator and receiver, respectively (e.g., d_{MN} denotes a scenario where a migrant is the dictator and a native is a receiver). We model the varying mean, μ_{ijk} , of y_{ijk} as a function of dummy variables of the dyad type and appropriate random effects:

$$\mu_{ijk} = \bar{\theta} + \theta_{NM}d_{NM} + \theta_{MN}d_{MN} + \theta_{MM}d_{MM} + \alpha_i + \beta_j + \gamma_k \quad (4.2)$$

$$\begin{pmatrix} \alpha_i \\ \beta_i \end{pmatrix} \sim N \left(\mathbf{0}, \begin{pmatrix} \sigma_D^2 & \sigma_{DR} \\ \sigma_{DR} & \sigma_R^2 \end{pmatrix} \right), \gamma_k \sim N(0, \sigma_V^2)$$

In (4.2), $\bar{\theta} + \theta_{IJ}$ gives the mean for a donation from a dictator of type I to a receiver of type J , with $\theta_{IJ} = 0$ if $IJ = NN$. Thus, consistent with the discussion in section 2, $\bar{\theta} + \theta_{IJ}$ measures the

¹⁹Much effort was undertaken to make sure the participants not only understood the lottery, but also the games. Enumerators informed participants individually until the enumerator was 100% sure the participant understood the game play, which included a correct explanation of the game by the player to the enumerator. Furthermore, a de-briefing took place with each of the participants that confirmed a good understanding of the game and the lottery by participants. In addition, to obtain consistency across enumerators the latter were trained for over two weeks by the authors in Bukavu and monitored for three months in the field. Furthermore, a script with the game rules which had to be used verbatim was written in French and Swahili, and also trained in the local languages Mashi and Havu. The design and instruments for these experiments can be found at www.petervanderwindt.com/research/networks/.

level of benevolence that an individual with type I shows towards an individual of type J . γ_k is a random effect for village k to control for any village-specific predictors that may affect the mean donation in the population. α_i and β_j denote a random effect for i as a dictator and j as a receiver. These random effects control for individual level characteristics that may determine an individual's willingness to donate to another individual, as well as individual level characteristics that may determine an individual's likelihood of receiving donations from another individual. Finally, dictator and receiver effects for the same individual are allowed to be correlated since it is likely that an individual that is more likely to give donations to others is also more likely receive donations from others.

The stochastic term, ε_{ijk} , in (4.1) needs to be modeled carefully. It is likely that if i donates more to j when i is the dictator, then j will reciprocate and donate more to i when the roles are reversed. We thus model the common covariance matrix between ε_{ijk} and ε_{jik} , estimating separate covariance matrices for migrant-migrant (MM), native-native (NN) and migrant-native (MN) dyads. Such a model has often been referred to as a "round robin" model due to a data structure that resembles the first stage of a sporting competition.²⁰ In standard observational data, it is difficult to estimate this correlation because of biases caused by the fact that i and j select to interact with each other based on personal attributes. However, in lab experimental data, we can get clean estimates of this correlation due to the fact that the experimenter guarantees that each individual interacts with each other individual in the game. This correlation has a natural interpretation as a measure of reciprocity for each dyad type:

$$\begin{pmatrix} \varepsilon_{ijk} \\ \varepsilon_{jik} \end{pmatrix} \sim N \left(\mathbf{0}, \begin{pmatrix} \sigma_{\varepsilon\tau}^2 & \rho_{\tau}\sigma_{\varepsilon\tau}^2 \\ \rho_{\tau}\sigma_{\varepsilon\tau}^2 & \sigma_{\varepsilon\tau}^2 \end{pmatrix} \right); \rho_{\tau} \sim N(\rho, \sigma_{\rho}^2) \quad \tau \in \{MM, MN, NN\} \quad (4.3)$$

In order to estimate the (4.3), we estimate the above equations, with diffuse priors, in the program JAGS through the R2jags package in the statistical program R. In order to estimate the data, we turn to the invariant normal representation due to Wong (1982). Let us denote the dyad between person i and person j as ij . Then, the invariant model estimates:

$$\begin{aligned} u_{ij} &= \mu_{ijk} - \mu_{jik} + \eta_{ij} \\ v_{ij} &= \mu_{ijk} + \mu_{jik} + \zeta_{ij} \\ \eta_{ij} &\sim N(0, \sigma_{u\tau}^2); \quad \zeta_{ij} \sim N(0, \sigma_{v\tau}^2) \\ \sigma_{u\tau} &\sim N(\sigma_u, \sigma_{\sigma_u}^2); \quad \sigma_{v\tau} \sim N(\sigma_v, \sigma_{\sigma_v}^2); \quad \tau \in \{MM, MN, NN\} \end{aligned}$$

The advantage of this parametrization is that it provides more stable estimation of the model and provides values for parameters of interest analytically. In particular,

$$\sigma_{\varepsilon\tau}^2 = \frac{\sigma_{u\tau}^2 + \sigma_{v\tau}^2}{4}; \quad \rho_{\tau} = \frac{\sigma_{v\tau}^2 - \sigma_{u\tau}^2}{\sigma_{u\tau}^2 + \sigma_{v\tau}^2}$$

We will run this model for each version of the dictator game; with and without the chief present. This linear social relations model allows us to make nuanced interpretations of our data. In particular, the θ parameters allow us to measure benevolence and ρ parameters allow us to measure reciprocity in the population.

²⁰See Warner, Kenny and Stoto (1979), Wong (1982) and Snijders and Kenny (1999).

4.3.1 A Note on the Code and Interpretation

The linear social relations model that we fit in this paper gives estimates as a function of the *observed* distribution of donations. Another approach, which we have been unable to implement thus far, would entail modeling the *latent* distribution donations through an ordered probit social relations framework. The data generating process for the fake data creates outcomes from a normal distribution, and then truncates and discretizes the numbers to keep all donations as an integer between 0 and 5. The truncation causes some bias from the mean in the normal distribution, and the discretization and truncation also bias the correlation terms towards zero. Furthermore, the difference between the contributions in two versions of the game are likely to cause inefficient estimates. This is because the donation under no chief and the donation under a chief (controlling for dyad type) are likely to be negatively correlated since it is likely that the chief will have a larger effect for individuals who were donating less as compared to individuals who had nothing to be embarrassed about in front of the chief. In the final paper, there will be some attempt to model the two versions of the game in the same model and also to implement an ordered probit social relations model. The code for analyzing the data, as well as for generating fake data are included as an appendix.

4.4 Hypotheses

4.4.1 Benevolence: Screening Effects

To learn about the extent of screening effects we compare the behavior of migrant dictators with that of native dictators. We do so for when these dictators play either native ($\theta_{MN}(-\theta_{NN})$) or migrant receivers ($\theta_{MM} - \theta_{NM}$). Because migrants are likely to be less ancestrally rooted in the village, we might expect that migrant dictators (compared to native dictators) are less willing to donate to others. On the other hand, if natives are successful in screening incoming migrants at the gate or during the ingratiation period the migrant dictators (compared to native dictators) are particularly benevolent to receivers. Table 1 lists the possible outcomes.

Outcome	$\theta_{MN}(-\theta_{NN})$	$\theta_{MM} - \theta_{NM}$
< 0	Migrant Anti-native Bias	Migrant Anti-migrant Bias
.	Migrant No-native Bias	Migrant No-migrant Bias
> 0	Migrant Pro-native Bias	Migrant Pro-migrant Bias

Table 1: Benevolence: Screening Effects

4.4.2 Benevolence: Costly Signaling

To learn about costly signaling we compare the behavior in the private version with that in the public version of the dictator games. We do this for when the dictator and receiver are native-native ($\theta_{NN}^c(-\theta_{NN})$), native-migrant ($\theta_{NM}^c - \theta_{NM}$), migrant-native ($\theta_{MN}^c - \theta_{MN}$) and migrant-migrant ($\theta_{MM}^c - \theta_{MM}$). Depending on the relationship of the type of dictator and the type of receiver to the chief, we might find differential behavior in private and public. Migrants dictators, having more tenuous citizenship, might need to increase their donations to seem like better

citizens in the village. Migrants might choose to only donate to natives (and not to migrants) at higher levels in order to demonstrate a willingness to integrate in front of the chief. For each of the dyads we list the possible outcomes in Table 2.

Outcome	$\theta_{NN}^c(-\theta_{NN})$	$\theta_{NM}^c - \theta_{NM}$	$\theta_{MN}^c - \theta_{MN}$	$\theta_{MM}^c - \theta_{MM}$
< 0	Native In-group Adverse Signaling	Native Out-group Adverse Signaling	Migrant Out-group Adverse Signaling	Migrant In-group Adverse Signaling
.	Native In-group No Signaling	Native Out-group No Signaling	Migrant Out-group No Signaling	Migrant In-group No Signaling
> 0	Native In-group Signaling	Native Out-group Signaling	Migrant Out-group Signaling	Migrant In-group Signaling

Table 2: Benevolence: Costly Signaling

4.4.3 Benevolence: Group Bias

To learn about the extent of group biases we compare the behavior of a given dictator type to different types of receivers. Given that the dictator is native ($(\theta_{NN}) - \theta_{NM}$) or migrant ($\theta_{MN} - \theta_{MM}$), how important is the identity of the receiver? Standard theories of in-group bias would predict that natives dictators are more benevolent towards native receivers, and migrant dictators are more benevolent towards migrant receivers due to common histories and attributes. Alternatively, we might observe out-group biases if migrants are more benevolent towards the natives in reciprocation for being allowed to stay in the village. We might also find that natives are more benevolent towards the displaced due to sympathy for their difficult and impoverished situation. Table 3 lists the potential outcomes.

Outcome	$(\theta_{NN}) - \theta_{NM}$	$\theta_{MM} - \theta_{MN}$
< 0	Native Out-group Bias	Migrant Out-group Bias
.	Native No-group Bias	Migrant No-group Bias
> 0	Native In-group Bias	Migrant In-group Bias

Table 3: Benevolence: Group Bias

4.4.4 Reciprocity

Because of our round-robin setup we can directly gauge the extent of reciprocity in the population. The first set of outcomes, as given in the top part of Table 4, gives the extent of reciprocity within and across groups. The bottom part of Table 4 presents the possible outcomes for in-group reciprocity, which refers to the idea that a particular dictator type displays greater reciprocity with a similar type receiver than with a receiver of the other type. This may be due to shared histories within groups, or due to latent patterns of interaction and trust. Integration reciprocity suggests that native-migrant dyads display greater reciprocity than in-group dyads because villagers feel the need to greater invest in social cooperation across groups for integration in the village.

5 Results

The left panel in Table 5 provides the average contributions for the four possible dyads between migrant and native players. Similar to a large political economy literature (e.g. Camerer (2003),

Outcome	ρ_{NN}	ρ_{NM}	ρ_{MM}
< 0	Native Native Adverse Reciprocity	Across-group Adverse Reciprocity	Migrant Migrant Adverse Reciprocity
.	No Native Native Reciprocity	No Across-group Reciprocity	No Migrant Migrant Reciprocity
> 0	Native Native Reciprocity	Across-group Reciprocity	Migrant Migrant Reciprocity
Outcome	$\rho_{NN} - \rho_{NM}$	$\rho_{MM} - \rho_{NM}$.
< 0	Native Integration Reciprocity	Migrant Integration Reciprocity	.
.	No Native In-group Reciprocity	No Migrant In-group Reciprocity	.
> 0	Native In-group Reciprocity	Migrant In-Group Reciprocity	.

Table 4: Reciprocity

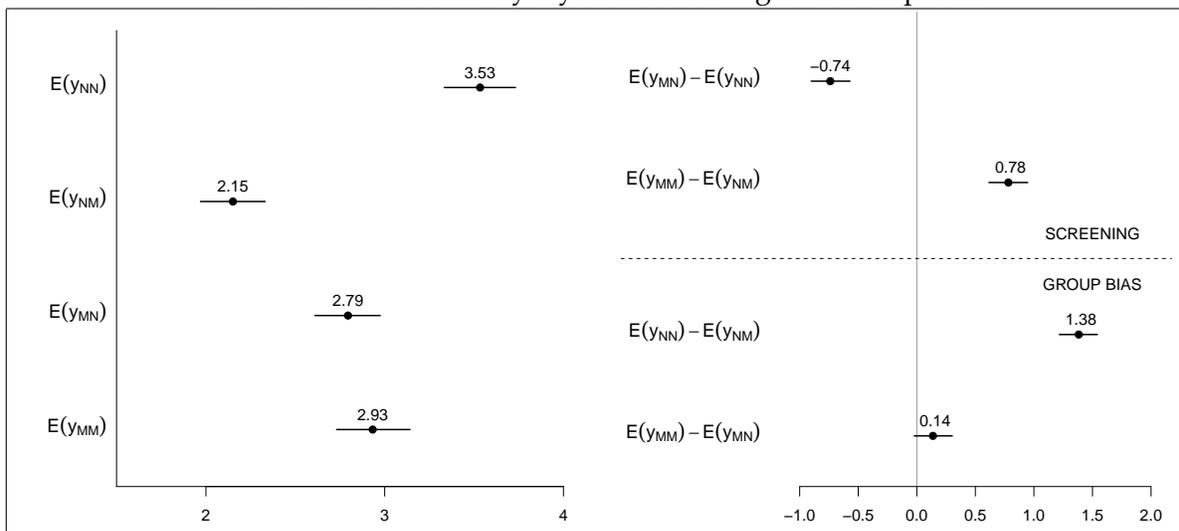
Henrich et al. (2001)), we find that also dictators in village communities in the Democratic Republic of Congo donate non-zero amounts towards receivers. We find that on average dictators give 2.85 out of 5 tokens, or 57%.

To learn whether native populations are successful in selecting pro-social migrants (the *Selection Effect*) we compare the behavior of migrant dictators with that of native dictators. The top of the right-hand panel of Table 5 shows how we have a Migrant Anti-native Bias ($\theta_{MN}(-\theta_{NN}) < 0$). That is, compared to native dictators, migrant dictators give less to native receivers. Moreover, we find a Migrant Pro-migrant Bias ($\theta_{MM} - \theta_{NM} > 0$). In other words, compared to native dictators, migrant dictators give more to migrant receivers. Does this mean the native population was successful in screening for pro-social migrants? While we can't observe the migrants that have been turned away, we do learn about the overall impact of the migrants currently present in the village. Overall entry of migrants seems to have decreased the average amount of contribution in the village. In the presence of no migrants we have $\theta_{NN} = 3.53$. In the presence of migrants the average level of contribution is lower. First, natives give less to migrants than to other natives, bringing the average down. Second, compared to the native-native dyad, migrant dictators give less to both native (2.79/5) and migrant receivers (2.93/5). In other words, the contribution rate in any dyad that includes a migrant is lower than in the native-native dyad. To get a sense of the negative impact of migrant presence we can calculate the average level of pro-social behavior in the village with and without the presence of migrants. When migrants are absent we know that 100% of the interactions in the village are native-native, and we have an average level of contribution of 3.53. Now let's assume the average Congolese village has 1,000 inhabitants of which 200 are migrant. Each of the four dyads is therefore likely to occur and we obtain an average contribution rate of 3.17 in the village.²¹ In-migration has therefore led to an overall decrease in the average level of pro-social behavior in the village. We thus find that native populations are not successful in screening the pro-social migrants.

To learn about the extent of *Group Biases* in Congo we compare the behavior of a given dictator type to different types of receivers. The bottom of the right panel of Table 5 presents the results for the native group ($(\theta_{NN}) - \theta_{NM}$) and the migrant group ($\theta_{MN} - \theta_{MM}$). We have two major results. First, and consistent with standard theories of in-group bias (Tajfel (1982)), we find both a Native Ingroup Bias and a Migrant Ingroup Bias. That is, both natives and migrants display pro-social behavior in particular to someone of her own native-migrant status, as compared to someone of the opposite status ($\theta_{NN} - \theta_{NM} > 0$ and $\theta_{MN} - \theta_{MM} > 0$). Second, this ingroup bias

²¹The four dyads have the following probabilities to occur: NN = (800*799)/(1000*999), NM and MN = (800*200)/(1000*999), and MM = (200*199)/(1000*999). Note that we assume that the level of contributions for the native-native dyad in the presence of migrants is the same when migrants are absent.

Table 5: Contribution by Dyad & Screening and Group Bias



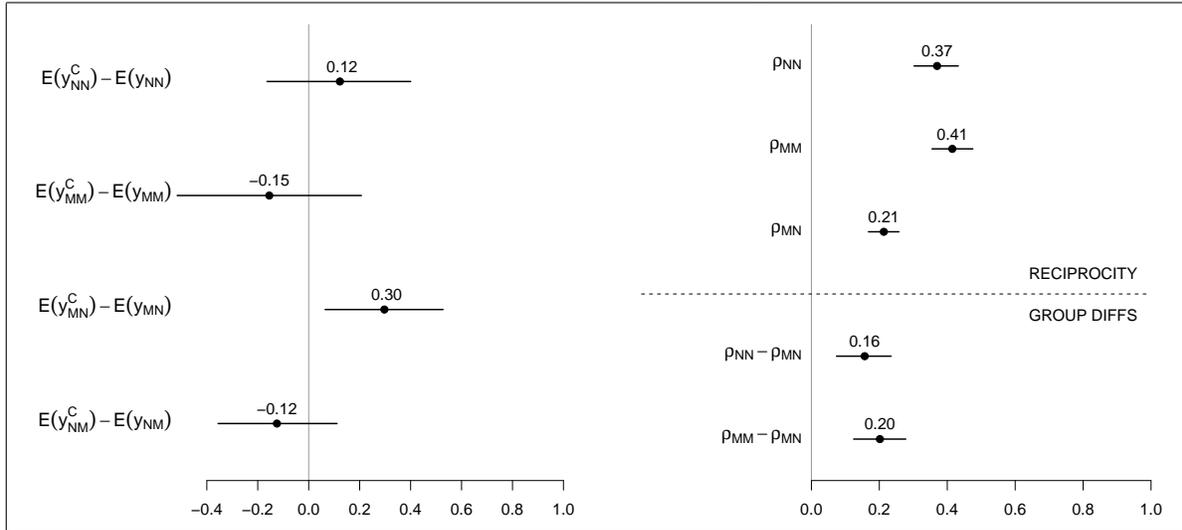
Notes: The left panel gives average contribution rates (out of five) for each type of dyad. The right panel gives the results for the screening effect (given a receiver varying the dictator) and group bias (given a dictator varying the receiver).

is particularly strong for natives. Migrants give only slightly more to other migrant receivers, compared to native receivers (around 5%). Natives, on the other hand, give much more to native receivers (almost 65%). This might not be surprising given that in particular natives have a common histories and attributes that migrants might not have among each other, and natives-migrants definitely do not have. A more pessimistic interpretation is that natives might hold off pro-social behavior until the migrant has integrated into society, or even actively try to exclude migrants from the moral economy of the village by displaying native in-group bias.

The left panel of Table 6 presents the results for *Costly Signaling*. That is, we present the difference between public and private play for each of the four different dyads. We find that native dictators do not change their behavior in the presence of the chief. This is for both the case when they face native or migrant receivers. We also find that that migrant dictators do not change their behavior in the presence of the chief when facing migrant receivers. In contrast, migrant dictators do change their behavior in the presence of the chief when playing with a native receivers (Migrant Out-group Signaling). Migrant dictators, having more tenuous citizenship, do not increase their donations to everybody in the village to seem like better citizens in the village, they only donate to natives (and not to migrants) at higher levels. We argue that is in order to demonstrate a willingness to integrate in front of the chief.

Finally, because of our round-robin setup we can directly gauge the extent of *Reciprocity* in the population. The right panel of Table 6 presents the results. First, the top part shows the extent of reciprocity within and across groups. We find evidence for Native-Native, Migrant-Migrant, and Across-group Reciprocity. That is, we find that the reciprocity within both groups and across these groups (ρ_{NN} , ρ_{MM} and ρ_{MN}) are all positive and statistically different from zero. Second, we find that reciprocity is particularly strong within groups (native-native: 0.37, migrant-migrant: 0.42) compared to across groups (0.21). This is illustrated in the bottom part of the right panel of Table 6 that presents the differences in reciprocity between the group and the

Table 6: Costly Signaling & Reciprocity



Notes: The left panel gives the results for costly signaling. The right panel gives the results for reciprocity.

across group. We find evidence for Native In-group Reciprocity ($\rho_{NN} - \rho_{NM} > 0$) and Migrant In-Group Reciprocity ($\rho_{MM} - \rho_{MN} > 0$). This may be due to shared histories within groups, or due to latent patterns of interaction and trust. We thus do not find evidence for integration reciprocity where native-migrant dyads display greater reciprocity than in-group dyads.

6 Conclusion

This paper characterizes and explains the effect of migration into villages upon pro-social behavior. We introduced a costly signaling-screening framework to understand how strategic interactions impact pro-social behaviors in the face of migration. We apply our theoretical framework to a one-of-a-kind dataset on pro-social behaviors in migrant-heavy villages in the Congo. In order to collect the data, we conducted a set of local round-robin dictator games in Congolese villages from January 2012 to August 2012.

We find evidence that migration dilutes the level of pro-social behavior in a village, and that both native and migrant populations exhibit some in-group bias. However, when under public scrutiny, we find evidence that migrants donate more towards natives to show that they are good citizens in the village, consistent with strategic costly signaling. Thus, while signaling and screening mechanisms at the village level are not entirely efficient, there is some evidence for strategic behavior in sorting the population.

We make two major contributions to the study of migration and pro-social behaviors. First, we derive a theoretical strategic framework to understand migration outcomes as they relate to rural-rural migration, an understudied topic in the political economy literature. Second, we extend classic dictator games to local round-robin dictator games, which provides a framework for the design and analysis of pro-social behaviors between individuals who have regular interac-

tion.

References

- Alesina, Alberto and Eliana La Ferrara. 2005. "Ethnic Diversity and Economic Performance." *Journal of Economic Literature* 43(3):762–800.
- Alesina, Alberto, Reza Baqir and William Easterly. 1999. "Public Goods and Ethnic Diversity." *Quarterly Journal of Economics* 114(4):1243–1284.
- Angrist, Joshua D., Guido W. Imbens and Donald B. Rubin. 1996. "Identification of Causal Effects Using Instrumental Variables." *Journal of the American Statistical Association* 91(434):444–455.
- Arrow, Kenneth. 1973. The Theory of Discrimination. In *Discrimination in the Labor Market*, ed. Orley Ashenfelter and Albert Rees. Princeton: Princeton University Press pp. 3–33.
- Autesserre, Séverine. 2010. *The Trouble with the Congo. Local Violence and the Failure of International Peacebuilding*. Cambridge University Press.
- Bandiera, Oriana, Iwan Barankay and Imran Rasul. 2005. "Social Preferences and the Response to Incentives: Evidence from Personnel Data." *Quarterly Journal of Economics* 120(3):917–962.
- Baumeister, Roy F. and Mark R. Leary. 1995. "The Need to Belong: Desire for Interpersonal Attachments as a Fundamental Human Motivation." *Psychological Bulletin* 117(3):497–529.
- Bolton, Gary E. and Axel Ockenfels. 2000. "ERC: A Theory of Equity, Reciprocity, and Competition." *American Economic Review* 90(1):166–193.
- Borjas, George J. 1987. "Self-Selection and the Earnings of Immigrants." *American Economic Review* 77(4):531–553.
- Bowles, Samuel and Herbert Gintis. 1998. "The Moral Economy of Communities: Structured Populations and the Evolution of Pro-Social Norms." *Evolution and Human Behavior* 19:3–25.
- Camerer, Colin F. 2003. *Behavioral Game Theory: Experiments on Strategic Interaction*. Princeton: Princeton University Press.
- Carrington, William J, Enrica Detragiache and Tara Vishwanath. 1996. "Migration with Endogenous Moving Costs." *American Economic Review* 86(4):909–930.
- Chandra, Kanchan. 2007. Counting Heads: A Theory of Voter and Elite Behavior in Patronage Democracies. In *Patrons, Clients, and Policies*, ed. Steven Wilkinson and Herbert Kitschelt. New York City: Cambridge University Press.
- Elster, Jon. 1995. "Forces and Mechanisms in the Constitution-making Process." *Duke Law Journal* 45(364):364–396.
- Fearon, James D. and David D. Laitin. 1996. "Interethnic Cooperation." *American Political Science Review* 90(4):715–735.

- Fehr, Ernst and Klaus M. Schmidt. 1999. "A Theory of Fairness, Competition, and Cooperation." *Quarterly Journal of Economics* 114(3):817–868.
- Fershtman, Chaim and Uri Gneezy. 2001. "Discrimination in a Segmented Society: An Experimental Approach." *Quarterly Journal of Economics* 116(1):351–377.
- Fowler, James H. and Cindy D. Kam. 2007. "Beyond the Self: Social Identity, Altruism, and Political Participation." *The Journal of Politics* 69(03):813–827.
- Gelman, Andrew and Jennifer Hill. 2007. *Data Analysis Using Regression and Multilevel Hierarchical Models*. New York City: Cambridge University Press.
- Gintis, Herbert, Eric Alden Smith and Samuel Bowles. 2001. "Costly Signaling and Cooperation." *Journal of Theoretical Biology* 213(1):103–19.
- Habyarimana, James, Macartan Humphreys, Daniel N. Posner and Jeremy M. Weinstein. 2007. "Why Does Ethnic Diversity Undermine Public Goods Provision?" *American Political Science Review* 101(4):709–725.
- Haley, Kevin J. and Daniel M.T. Fessler. 2005. "Nobody's Watching? Subtle Cues Affect Generosity in an Anonymous Economic Game." *Evolution and Human Behavior* 26(3):245–256.
- Henrich, Joseph, Robert Boyd, Samuel Bowles, Colin F. Camerer, Ernst Fehr, Herbert Gintis and Richard McElreath. 2001. "In Search of Homo Economicus: Behavioral Experiments in 15 Small-Scale Societies." *American Economic Review: Papers & Proceedings* 91(2):73–78.
- Hoffman, Elizabeth, Kevin McCabe and Vernon L. Smith. 1996. "Social Distance and Other-Regarding Behavior in Dictator Games." *American Economic Review* 86(3):653–660.
- Holm, Håkan J. 2000. "Gender-Based Focal Points." *Games and Economic Behavior* 32(2):292–314.
- Jackson, Matthew O. 2008. *Social and Economic Networks*. Princeton University Press.
- Kahneman, Daniel, Jack L. Knetsch and Richard Thaler. 1986. "Fairness as a Constraint on Profit Seeking: Entitlements in the Market." *American Economic Review* 76(4):728–741.
- Levitt, Steven D. and John A. List. 2007. "What Do Laboratory Experiments Measuring Social Preferences Reveal About the Real World?" *The Journal of Economic Perspectives* 21(2):153–174.
- List, John A. 2006. "The Behavioralist Meets the Market: Measuring Social Preferences and Reputation in Actual Transactions." *Journal of Political Economy* 114(1):1–37.
- List, John A. 2007. "On the Interpretation of Giving in Dictator Games." *Journal of Political Economy* 115(3):482–493.
- Miguel, Edward and Mary Kay Gugerty. 2005. "Ethnic Diversity, Social Sanctions and Public Goods in Kenya." *Journal of Public Economics* 89:2325–2368.
- Peterson, Paul E. and Mark Rom. 1989. "American Federalism, Welfare Policy, and Residential Choices." *American Political Science Review* 83(3):711–728.
- Phelps, Edmund S. 1972. "The Statistical Theory of Racism and Sexism." *American Economic Review* 62(4):659–661.

- Rabin, Matthew. 1993. "Incorporating Fairness into Game Theory and Economics." *American Economic Review* 83(5):1281–1302.
- Rosenzweig, Mark R. and Kenneth J Wolpin. 1988. "Migration Selectivity and the Effects of Public Programs." *Journal of Public Economics* 37:265–289.
- Rosenzweig, Mark R. and Oded Stark. 1989. "Consumption Smoothing, Migration, and Marriage: Evidence from Rural India." *Journal of Political Economy* 97(4):905–926.
- Schultz, T. Paul. 1971. "Rural-Urban Migration in Colombia." *Review of Economics and Statistics* 53(2):157–163.
- Scott, James C. 1977. *The Moral Economy of the Peasant: Rebellion and Subsistence in Southeast Asia*. New Haven: Yale University Press.
- Sjaastad, Larry A. 1962. "The Costs and Returns of Human Migration." *Journal of Political Economy* 70(5):80–93.
- Snijders, Tom A. B. and David A. Kenny. 1999. "The Social Relations Model for Family Data: A Multilevel Approach." *Personal Relationships* 6:471–486.
- Spence, Michael. 1973. "Job Market Signaling." *Quarterly Journal of Economics* 87(3):355–374.
- Steele, Abbey. 2009. "Seeking Safety : Avoiding Displacement and Choosing Destinations in Civil Wars." *Journal of Peace Research* 46(3):419–430.
- Stiglitz, Joseph E. 1975. "The Theory of "Screening," Education, and the Distribution of Income." *American Economic Review* 65(3):283–300.
- Tajfel, Henri. 1982. "Social Psychology of Intergroup Relations." *Annual Review of Psychology* 33:1–39.
- Tajfel, Henri and John C. Turner. 1986. *The Social Identity Theory of Intergroup Behavior*. Chicago: Nelson-Hall Publishers pp. 7–24.
- Tiebout, Charles M. 1956. "A Pure Theory of Local Expenditure." *Journal of Political Economy* 64(5):416–424.
- Todaro, Michael P. 1969. "A Model of Labor Migration and Urban Unemployment in Less Developed Countries." *American Economic Review* 99(1):138–148.
- UNHCR. 2012. Democratic Republic of the Congo. In *UNHCR Global Appeal 2012-2013*.
- Varshney, Ashutosh. 2002. *Ethnic Conflict and Civic Life*. New Haven: Yale University Press.
- Vlassenroot, Koen and Chris Huggins. 2005. "Land, Migration and Conflict in Eastern DRC." *From the Ground Up: Land Rights, Conflict and Peace in Sub-Saharan Africa*. pp. 115–194.
- Voldon, Craig. 2002. "The Politics of Competitive Federalism: A Race to the Bottom in Welfare Benefits?" *American Journal of Political Science* 46(2):352–363.
- Warner, Rebecca M., David A. Kenny and Michael Stoto. 1979. "A New Round Robin Analysis of Variance for Social Interaction Data." *Journal of Personality and Social Psychology* 37(10):1742–1757.

Whitt, Sam and Rick K. Wilson. 2007. "The Dictator Game, Fairness and Ethnicity in Postwar Bosnia." *American Journal of Political Science* 51(3):655–668.

Wong, George Y. 1982. "Round Robin Analysis of Variance Via Maximum Likelihood." *Journal of the American Statistical Association* 77(380):714–724.