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Setting the Bar

An Experimental Investigation of Immigration Requirements

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Abstract

We examine determinants of immigration requirements in a public goods game experiment with endogenous groups. Initially, the game consists of in-group players who enjoy an existing public good and out-group players who may subsequently enter the group. Motivated by different current migration flows and anti-immigration sentiments, our treatments are crafted to investigate how migrants' power of self-determination and public debate among in-group players shape immigration requirements. We employ the minimal group paradigm and immigration requirements are set by in-group voting. In order to immigrate, out-group players have to fulfill minimal contribution requirements. Public debate fosters coherence between the requirements and in-group players' contributions if migrants are free to reject requirements. Conversely, public debate among in-group players fosters economic exploitation of migrants with less bargaining power. Overall the study illustrates the novel potential of applying well-established tools from experimental economics to migration questions.

Keywords: immigration, public good, endogenous groups, voting, experiment

JEL: C91, C92, H41, O15

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1 Introduction

In recent years migration flows have increased rapidly around the world. Between 1990 and 2017, the number of international migrants worldwide rose by over 105 million, or by 69 per cent (United Nations 2017). The number of migration flows to the OECD have increased steadily over recent years (OECD, 2016), particularly regarding humanitarian migration to Europe (Eurostat, 2017). Public opinion polls indicate many consider migration to be the most urgent issue facing the European Union (European Commission, 2017).

Recent elections in several Western countries gave rise to many parties running on an outspoken anti-immigrant platform.[1] As a result to growing public pressures, several OECD countries have shifted towards more restrictive immigration policies in response to changing economic conditions and increasing public sensitivity on migration issues since 2010 (OECD, 2016). While immigration and refugee policies become increasingly restrictive, many OECD countries face a need for immigration to counterbalance ageing populations, supply their domestic labor markets, pay taxes for the provision of public goods and to secure public social security schemes. In the case of Germany, the Prognos Institute estimates a labor force gap of 5.2 million workers in 2030 (see Bundesagentur für Arbeit, 2011; Kolodziej, 2012).

Migration policy setting is crucial for social cohesion and economic welfare in decades to come and, as such, understanding its underlying processes is crucial. Studies in the field of migration largely rely on survey data, administrative data or legal analysis. Migration policies are found to be highly context-specific, i.e. driven by specific cultural, political, economic and geographical settings. In this study, we would like to explore to which extent behavioral, context-independent aspects drive migration policy dynamics by leveraging tool developed in the field of experimental economics. In principle, there are many dimensions of in-group and out-group characteristics that could shape such requirements. As a starting point, we identified two dimensions where a

[1] Examples of parties with anti-immigration rhetoric include the Front National in France, UKIP in Great Britain, the AfD in Germany and the Party for Freedom in the Netherlands (The Telegraph, 2014). Immigration policies of US-American President Trump include travel refugee bans for several countries (The White House, 2017).

well-established tool, the public goods game, can be applied to relevant elements of migration dynamics.

First, given the recent flows both of voluntary migration to seek better economic prospects and of flight from war and terror, we examine how the power or lack of self-determination of immigrations (is the immigrant forced to immigrate or is she able to reject the immigration requirement?) shapes immigration requirements. Second, against the background of increasing anti-immigration sentiments spurred by new anti-immigration parties in many developed countries, we examine the effect of in-group debate before voting for an immigration requirement.

In order to model the immigration situation in our laboratory experiment, we randomly selected the subjects into two groups, citizens (red players) and migrants (blue players). This setup is commonly referred to as minimal group paradigm.[2] We let the citizens play a giving-and-taking public goods game in which they can decide to contribute to or take from the public good (see Khadjavi and Lange, 2015).[3] Periodically, citizens set an immigration requirement in the form of a minimum contribution requirement for migrants.

As described above, the first treatment dimension is self-determination of migrants. In our treatments we differentiate between forced migration and self-determined migration. Two extreme examples along this dimension are migrants displaced by war, persecution and natural catastrophes (forced migration) on the one hand, and economic migrants coming from a safe and stable third country (self-determined migration) on the other hand. The second dimension of our experimental design is the availability of a public debate platform. Public debate may serve as the platform to elaborate immigration policy, or it may catalyze sentiments against immigration, as seen in several European countries and the United States in recent years.

[2] The seminal works by Tajfel et al. (1971) and Billig and Tajfel (1973) show that such a random assignment of roles is sufficient to create feelings of in-group affiliation and in-group favoritism.

[3] See Ledyard (1995) and Chaudhuri (2011) for surveys on public goods games.

Our design enables us to identify how different migration scenarios lead to more restrictive or liberal immigration requirements. Particularly from a public choice perspective, it is informative to analyze the effect of different in-group decision procedures on immigration policy. Voting on an issue which has not been discussed may result in the establishment of a different policy compared to voting on a policy that is preceded by a debate of in-group members. Furthermore, it is not clear whether voting for a policy that sets a threshold for immigrant contributions establishes contribution norms for the in-group. Such social norms may help to overcome the social dilemma associated with the public good provision by private actors. Conversely, in-group members may decrease their contributions or even exploit the public good while out-group members are bound to contribute. The establishment of a 'bar' (required contribution level) may deter potential immigrants despite prospective payoff gains.

Our results highlight that the debate appears to foster the understanding that an overly restrictive immigration requirement and exploitation of migrants may be deterrent. For this reason, in the light of public debate in-group members set minimal contribution requirements for migrants which they voluntarily adhere to themselves. If immigrants are on the flight involuntary (such that immigrants have no choice to reject requirements) and in-group members can debate, the most restrictive immigration requirements emerge regardless of migrants' actual potential to contribute to the public good. In-group members exploit migrants by letting them contribute to the public good while in-group members themselves contribute significantly lower amounts or even appropriate part of the initially existing public good.

Only a limited number of experimental economic studies on public good provision by private actors include processes of endogenous group formation so far.[4] We review papers with

[4] Endogenous group formation in public good games describes the process of a group forming based on some decision making of the players of the game. Such a process contrasts the standard public goods game in which the user group is exogenously determined.

endogenous group formation based on other subjects' characteristics and actions more closely.[5] The literature refers to Ehrhart and Keser (1999) as the first experimental study to allow for endogenous re-grouping. They find that subjects who contributed high amounts to the public good were 'chased' by low contributors. Further related works in this direction include Coricelli et al. (2004), Cinyabuguma et al. (2005), Page et al. (2005), and Gunnthorsdottir et al. (2010).

Closer to our research question, Ahn et al. (2008) investigate endogenous group formation with entry and exit mechanisms: both entry and exit were free or one of them could be permitted by the group members with a majority voting rule while the other was free.[6] Voting was based on individual subjects who might enter the group, given their contribution history in their present group. Our approach differs from the current literature along several dimensions. First and most importantly, we use predefined groups of in-group and out-group members, who we refer to as citizens and migrants, to mirror the setting of individuals born in different countries. Second, citizens do not select certain migrants, but they set a policy that applies to all migrants. Third, in our design migrants may hold bargaining power and reject the immigration requirement set by citizens. Fourth, our design includes debate on the requirement which is not available in the present literature. Based on all these factors, we consider our design highly novel and informative for the literature on immigration and on endogenous user groups in public goods games alike.

The remainder of this work is structured as follows: Section 2 lays out the experimental design, including predictions and information on experimental procedures. The results are presented in section 3. Section 4 discusses the implications of our results for policy and concludes.

[5] Note that there is a strand of literature that examines endogenous group formation in public goods games with self-selection into groups with pre-set institutions (e.g. Brekke et al. 2011; Gürerk et al. 2006; Gürerk et al. 2011). Another literature examines coordination games and group formation (e.g. Salmon and Weber, 2016).

[6] Note also that a companion paper Ahn et al. (2009) investigates endogenous group formation when the public good is congestible.

2 Experimental Design

In this section, we will first introduce the two dimensions of our 2x2 experimental design. Next, we will formalize our design and develop predictions that explain how behavior may change depending on the existence of other-regarding social preferences. In the last part of this section, we will describe the procedures of the experiment.

2.1 Two Dimensions of Immigration Policy

We designed our experiment to resemble a Western welfare-state setting. Our baseline scenario employs a non-satiated public good. We apply the generalized giving-and-taking framework to the public goods game. This framework was first introduced by Khadjavi and Lange (2015). The giving-and-taking framework represents the fundamental distribution mechanism common in Western welfare states. 'Giving' to the public good equals the willingness to pay taxes and 'taking' from the public good equals receiving public assistance.

For our study, we randomly select subjects to be in two sub-groups: 'citizens' and 'migrants'.[7] We use a partner matching that is consistent with the analogy of citizenship and is useful for our analysis of behavior over time. Citizens are always 'in the country' and are able to enjoy the consumption of a public good (with an initial public good endowment). They need to decide how much to give to the public good (analogy: donate, contribute) or take (analogy: receive a social transfer). Initially, all migrants are 'outside of the country' and thus do not profit from the public good. To keep our design simple there is no second public good outside the country that migrants may profit from. We thereby introduce an economic hierarchy between the two groups and define the direction of migration. As potential payoffs are higher for citizens, migrants have an incentive to migrate.

[7] Note that the vocabulary we use in this paper (e.g. 'citizens', 'migrants', 'country', 'giving', 'taking', etc.) does not match the language of the instructions and programs of the experiment. For example, we called in-group players 'red players' and out-group players 'blue players'. For the instructions, see the appendix.

Different initial within-group endowments introduce socioeconomic stratification of both citizens and migrants. We added this feature to our calibration in order to analyze how the initial endowment (i.e. socioeconomic status) determines contributions to the public good and voting on immigration policy.[8]

Table 1. 2x2 Experimental Design.

		Self-Determination of Migrants	
		Self-determined migrants	Involuntary migrants
Ex ante Debate? *(via a chat of red in-group members)*	yes	Choice_chat	Forced_chat
	no	Choice_NOchat	Forced_NOchat

Our 2x2 experimental design varies the self-determination of migrants and the opportunity for debate among citizens about the immigration requirement. An overview of our design is provided in Table 1. The first dimension, self-determination, may have two different conditions: The two 'Forced_' treatments do not give migrants the choice to reject an immigration requirement if their endowments are sufficient to permit entry (i.e. if their endowments are greater than the immigration requirement). Conversely, the 'Choice_' treatments provide the opportunity for migrants to accept or reject the immigration requirement set by citizens, even if they could meet the requirement.

We designed the involuntary vs. self-determined treatment manipulation to resemble different migration flows in the real world. In Choice_, migrants hold self-determination as they can refuse immigration despite eligibility. Conversely, in the Forced_ treatments, migrants are involuntary.[9]

[8] Note that there is a strand of literature on heterogeneous endowments in public good games, including Chan et al. (1999), van Dijk et al. (2002), Cherry et al. (2005), Buckley and Croson (2006), Sadrieh and Verbon (2006).

[9] Note that our design does not include a competition among countries for migrants. Such an extension would have complicated our design considerably. Like many other directions, however, we regard a game of competition among countries as a fruitful avenue for future research.

While they differ with respect to self-determination, migrants in all treatments hold similar public good contribution potentials. We are primarily interested in the consequences of migrants' self-determination on citizens' decision on the magnitude of the immigration requirement, their contributions to the public good and associated welfare. We therefore kept the endowments of the migrants constant and equal to citizens.

The second dimension varies the availability of a free-form text debate among citizens via a chat screen. In the chat treatments (_chat) citizens (but not migrants) are able to debate freely about the game and the height of the bar before voting for it in private. Citizens can debate the advantages and disadvantages of liberal vs. restrictive immigration requirements. They can exchange viewpoints, present evidence and argue in favor or against a certain policy. The public debate treatment allows us to analyze the effect that it has on citizens' contributions to the public good and on the level of the immigration requirements (will debate lower the requirement?). Most importantly, we will analyze how debate interacts with migrants' self-determination. While debate may lead to a more restrictive policy in one case, it could lead to a more liberal one in another. This feature is important as it may reveal motivational channels of subjects playing as citizens in our experiment.

2.2 Formalization

In our experiment, we match three citizens and three migrants (i.e. $n = 6$) in a group. By definition, citizens are beneficiaries of the public good of the 'country', while migrants initially remain outside and may *decide* to immigrate into the country or not (in the Choice_ treatments) or *have to* immigrate into the country given that they are able to fulfill the minimum contribution requirements (in the Forced_ treatments). We defined the payoff of an individual i 'residing within the country' as

$$\pi_i = w_i - c_i + h\left(E + \sum_{j=1}^{n} c_j\right)$$

with the private endowment w_i, initial public good condition E, the marginal per capita return from the public good $h < 1 < hn$ and, in principle, private contribution $c_i \in [-\frac{E}{n}, w_i]$. For a migrant j residing outside the country, the payoff is $\pi_j = w_j$. Note that in our calibration, we set $h = 0.5$, $E = 60$ Taler so that $\frac{E}{n} = 10$ Taler; 'Taler' is the artificial currency in our experiment. The initial private endowments w_j either amount to $w^{low} = 5\,Taler$, $w^{mid} = 10\,Taler$ or $w^{high} = 15\,Taler$ so that for every endowment level, there is exactly one citizen and one migrant. Table 2 illustrates the setup for a given partner-group. We include heterogeneous endowments in our design to learn more about the motivation of different types of citizens. For instance, low-endowed citizens may vote for lower or higher bars compared to high-endowed citizens. They may show distinct sympathy with low-endowed migrants and aim to set a low bar. Conversely, low-endowed citizens may vote for substantially higher bars in order to avoid losing their relative position in the income rank.

The decision stages in our experiment are: (1) citizens set a requirement for migrants (all treatments), (2) if eligible, migrants individually decide to accept or reject the requirement (only Choice_ treatments), and (3) citizens and migrants simultaneously decide how much to contribute to the public good (all treatments).

Table 2. Grouping.

Random grouping of members and random allocation of initial endowment		Citizens (instructions: "red player")	Migrants (instructions: "blue player")
Initial endowment (in Taler)	5	1 Player	1 Player
	10	1 Player	1 Player
	15	1 Player	1 Player

Hence, the decision problem of migrant j includes decision stages 2 and 3 in the Choice_ treatments and stage 3 in the Forced_ treatments. In the Choice_ treatments, in stage 2, migrant j

needs to decide whether to accept the requirement and immigrate (i.e. $e_j = 1$) or not ($e_j = 0$). The third stage is the decision on the private contribution to the public good c_j. Conversely, citizen i always faces decision stages 1 and 3: she needs to vote on the immigration requirement r and decide on her contribution to the public good c_i. In the following, we formulate predictions regarding the requirement $r \in [-\frac{E}{n}, w^{high}]$, i.e. in our calibration between -10 and 15 Taler, set by citizens for migrants. Hence, the action set of a citizen i always reads $c_i \in [-\frac{E}{n}, w_i]$. The action set of a migrant j reads $c_j \in [e_j r, e_j w_j]$, with $e_j \in \{0,1\}$. In the Forced_ treatments $e_j = 1$ if $r \leq w_j$, else $e_j = 0$. In the Choice_ treatments $e_j = 1$ if $r \leq w_j$ and the migrant *accepts* the requirement, else $e_j = 0$.

2.3 Predictions for Payoff Maximization

By solving $\max_{c_i} \pi_i = w_i - c_i + h(E + \sum_{j=1}^{n} c_j)$ we get the standard solution for the linear public good game $\frac{\partial \pi_i}{\partial c_i} = -1 + \mathrm{h} < 0$, which translates to the prediction that citizens appropriate as much as possible, and that migrants contribute the minimal amount or appropriate as much as they can. That is, citizens will appropriate the maximal amount $c_i = -\frac{E}{n}$, and migrants contribute the minimum requirement $c_j = r$.

With this prediction, we can turn to stages 1 and 2 of the game including the setting of the bar by citizens and acceptance or rejection of r by migrant in Choice_ or direct inclusion or exclusion of migrants in Forced_. Let us first predict r for the Forced_ cases. Note again that there are three migrants with endowments $w^{low} = 5\,Taler$, $w^{mid} = 10\,Taler$ or $w^{high} = 15\,Taler$ such that for every endowment level there is exactly one migrant. Payoff maximizing citizens aim at maximizing migrants' contributions to the public good by choosing the optimal r; however as the requirement increases migrants are excluded automatically, starting with the migrant endowed with $w^{low} = 5\,Taler$. More formally, the sum of contributions by migrants $C_{migrants}$ is

$$C_{migrants} = \begin{cases} 3r & if \quad r \leq 5 \\ 2r & if \quad 5 < r \leq 10 \\ r & if \quad r > 10 \end{cases}$$

and $C_{migrants} = 20$ is maximal with $r = 10$. Note that we chose the parameters to generate this interior solution. Payoff-maximizing citizens therefore set the optimal requirement $r^*_{Forced} = 10$ in the Forced_ treatments. The calibration of our design allows for a second straightforward prediction: payoff-maximizing migrants accept *any* requirement.[10] Hence, based on payoff-maximizing citizens and migrants, citizens will vote for requirements of $r^*_{Forced} = r^*_{Choice} = 10$. Migrants will either immigrate automatically in Forced_ or accept this requirement voluntarily in Choice_.

Standard selfish preferences are also straightforward when it comes to the chat opportunity among citizens. That is, it regards promises and non-binding contracts as cheap talk. Consequently, there should be no difference between citizens' decision making after a debate (_chat treatments) and citizens' decision making without a debate (_NOchat treatments).

2.4 Behavioral Economic Deviations from Payoff Maximization

Next, we discuss alternative predictions inspired by insights from behavioral economic research. Surveys on the standard public good game by Ledyard (1995) and Chaudhuri (2011) show that individuals frequently and voluntarily contribute to public goods. Other-regarding, social preferences may motivate such behavior (Meier, 2007). Therefore, the first behavioral economic prediction is that on average, citizens do not appropriate the maximal amount $c_i > -\frac{E}{n}$, and migrants contribute more than the minimum requirement $c_j > r$.

[10] To clarify this point, consider the extreme case of a migrant j with $w_j = 15$ and $r = 15$. Further, assume that all three citizens behave purely selfish and contribute $-3\frac{E}{n}$ (i.e. -30 Taler) in sum. Migrant j will still receive an income of $15 - 15 + 0.5(60 - 30 + 15) = 22.5$ Taler which is greater than staying outside and receiving 15 Taler. Likewise, a migrant k with $w_k = 5$ who accepts a requirement of $r = 5$ will receive an income of $5 - 5 + 0.5(60 - 30 + 5) = 17.5$ Taler 'inside the country' compared to only 5 Taler 'outside'.

Further, let us consider stage two in the Choice_ treatments (i.e. the decisions of migrants to accept or reject the requirement r). Compared to migrants, citizens are privileged based on two characteristics: (1) the privilege to reside within the country at all times and (2) the privilege to contribute to and appropriate from the public good freely. Let us assume that migrants value their social status, represented by their action set, and that they care about intentions of others. The idea is closely related to models of reciprocity and procedural preferences (e.g. Rabin, 1993; Dufwenberg and Kirchsteiger, 2004; Falk and Fischbacher, 2006; Eliaz and Rubinstein, 2014; Dold and Khadjavi, 2017). Citizens may then anticipate and incorporate migrants' preferences for reciprocity when setting the bar. The intuition is that if migrants get too disadvantaged, they will lose utility due to what they perceive as an unfair policy. Consequently, migrants will respond by rejecting a sufficiently unfair policy. Hence, in Choice_ citizens may need to set the requirement *below* the optimal requirement $r^*_{Dict} = 10$ in order to get migrants to accept it (and thereby secure some payoff from migrants' contributions). On the contrary, migrants cannot reject an 'unfair' requirement in Forced_ and citizens can disregard migrants' preferences for reciprocity. As a result the requirement in Choice_ may be lower than the requirement in Forced_, i.e. if migrants are sufficiently reciprocating, then citizens set $r^*_{Choice} < r^*_{Forced}$.

If the above prediction, $r^*_{Choice} < r^*_{Forced}$, holds, then this setting of a comparably lower requirement in the Choice_ treatments by the citizens may be perceived as kind or a signal of trust in the eyes of the migrants. Based on reciprocal preferences, this perception might then again spark greater voluntary contributions to the public good by the migrants. That is, ceteris paribus, migrants may react to a lower minimum contribution requirement in Choice_ by providing greater voluntary contributions in Choice_ than in Forced_. Hence, a tentative behavioral prediction based on reciprocity would be $c_j^{Choice_} > c_j^{Forced_}$.

Finally, let us turn to the chat opportunity. Indeed the behavioral economic literature suggests that a debate among citizens in the _chat treatments potentially changes public good

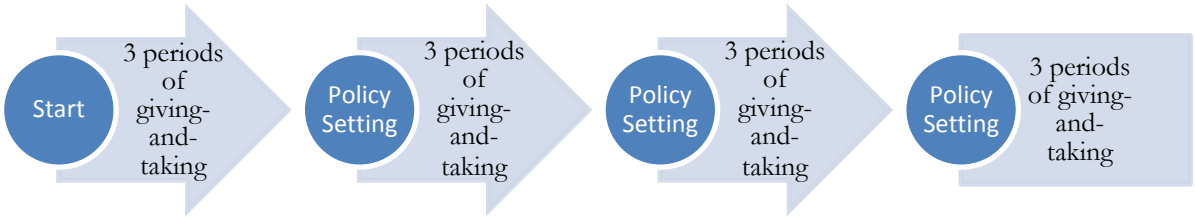
contributions and votes on the requirement. As suggested by the findings of Ostrom et al. (1992) and Brosig et al. (2003), the chat opportunity may offer a mechanism for citizens to coordinate the social dilemma situation of the public good game. Public good provision may be greater in _chat than in _NOchat treatments.

With regard to the immigration requirement, it is even harder to formulate predictions without a set of additional assumptions. Debate might change the immigration requirement based on some group norm; if such a group norm evolves, it may be a norm of fairness or equality which could develop in a lower immigration requirement or a norm of in-group exclusiveness which could develop in a higher requirement. These are just two examples of how debate may play a role. While we regard the possibility of such norms to evolve as a valuable feature that we will investigate with our design, we refrain from extended speculations on this matter.

2.5 Course of Events & Procedures

Figure 1 provides an overview of the timeline of our experiment. After three periods of public good game interaction (of citizens only), citizens were able to implement a migration policy (i.e. to 'set a bar'). After a bar had been set, all players within the country (i.e. citizens potentially joined by (some) migrants) again played the public good game for three periods. The process was then repeated after period 6 and a new policy was implemented. The game was played for another three periods. After period 9, citizens had one last opportunity to adapt their policy. The median requirement of the three citizens (majority rule) was implemented as policy result after every 'policy setting' procedure. We incorporated repeated voting in our design to be able to identify adjustment (and possibly convergence) of the minimum contribution requirement r over time. This rule resembles real circumstances where certain polices are usually debated at separate recurring instances (elections etc.).

Figure 1. Timeline of our Experiment.



All nine original sessions were conducted in the computer laboratory of the University of Hamburg in May 2012. Each session lasted approximately one hour. We used z-Tree (Fischbacher, 2007) for programming and ORSEE (Greiner, 2004) for recruitment. In the four treatments depicted in Table 1, 240 subjects participated in groups of six, with five observations per session.

In addition, we collected data on baseline contributions in the 'Standard_NOchat' treatment in three sessions and the 'Standard_chat' treatment in two sessions.[11] In these treatments three citizens with heterogeneous endowments (5, 10 or 15 Taler) played a public goods game without any migrants and without setting any bars. The two Standard_ treatments act as control treatments and only differ regarding the players' ability to chat at the end of periods 3, 6 and 9. These sessions yield another 34 independent observations (groups). Hence, we analyze the behavior of a total of 342 subjects in six treatments. All subjects were students with different academic backgrounds and no subject participated in the experiment more than once.

Once the participants were seated, a set of instructions was distributed and read out loud by the experimenter. In order to ensure that subjects understood the respective game, experimental instructions included several numerical examples and participants had to answer control questions via their computer terminals. After all periods were played, one out of the twelve

[11] The original session for Standard_NOchat was conducted in Hamburg. Due to a change of affiliations of one of the authors, we replicated the results in two sessions of Standard_NOchat in Kiel (about 60 miles from Hamburg) and added another two sessions of Standard_chat in December 2017 as part of the revision.

periods was randomly selected for payment. Average payment over all treatments was 12.43 EUR.

3 Results

We will analyze the results of our experiment in four steps. First, we will examine treatment effects with respect to the public good provision. Second, we will analyze differences in the levels of the migration requirements and migration decisions. Third, we will have a closer look at the chat contents and analyze correlations with contributions to the public good and the setting of the immigration requirement.

3.1 Public Good Provision

Considering all six players of a group and all periods, average contributions were the highest in Standard_chat with an average of 5.454 Taler followed by Choice_chat with an average of 3.589 Taler. Standard_chat and Choice_chat differ significantly (two-sided Mann-Whitney (MW) test, $p = 0.0250$) Compared to Choice_chat the public good provision is lower in Standard_NOchat (average of -2.898 Taler, difference significant at $p = 0.0001$, MW test), Choice_NOchat (0.907 Taler, $p = 0.0588$, MW test) and Forced_NOchat (0.496 Taler, $p = 0.0343$, MW test) treatments. There is no significant difference between Choice_chat and the Forced_chat treatment in which average public good provision amounts to 2.121 Taler. Figure 2 depicts public good provision averaged over all 12 periods and for all player types and Figure 3 depicts time trends. Table 3 provides descriptive statistics. In accordance with earlier findings on social dilemmas, e.g. by Ostrom et al. (1992) on common pool resources and Brosig et al. (2003) on the public good game, we find that communication helps to foster and coordinate contributions.

Figure 2. Public Good Provision, Citizens and Migrants, Average over all Twelve Periods.

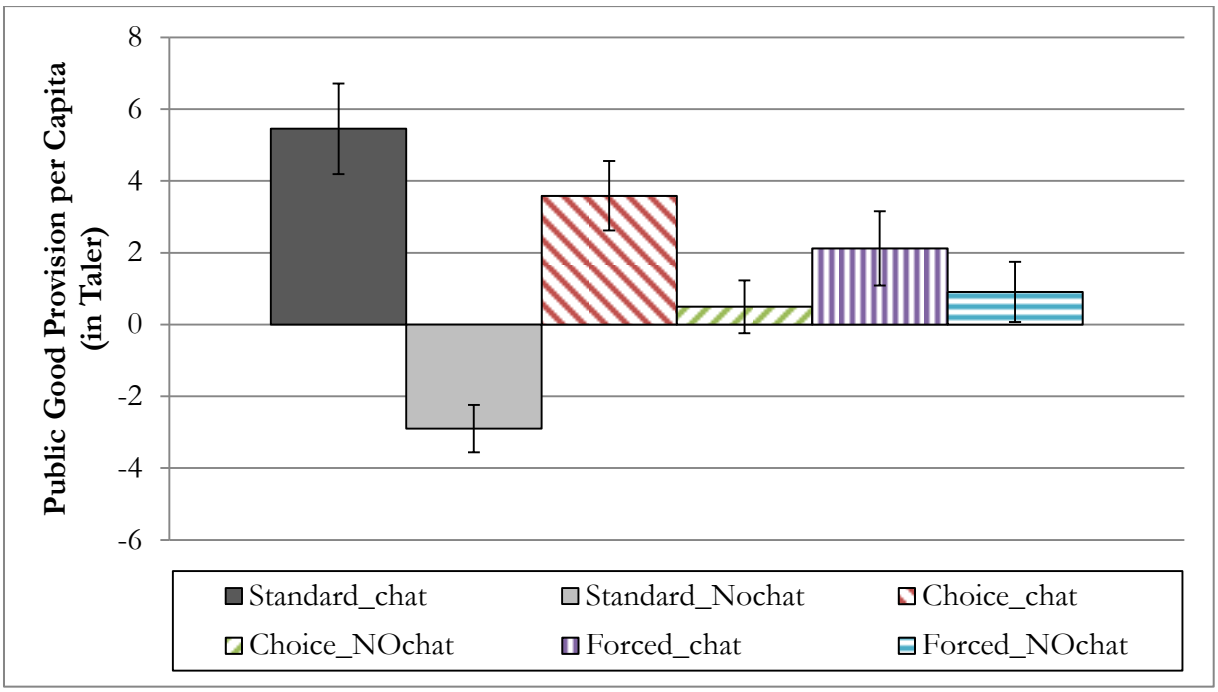


Figure 3. Public Good Provision in the Six Treatments over Time: Citizens and Migrants.

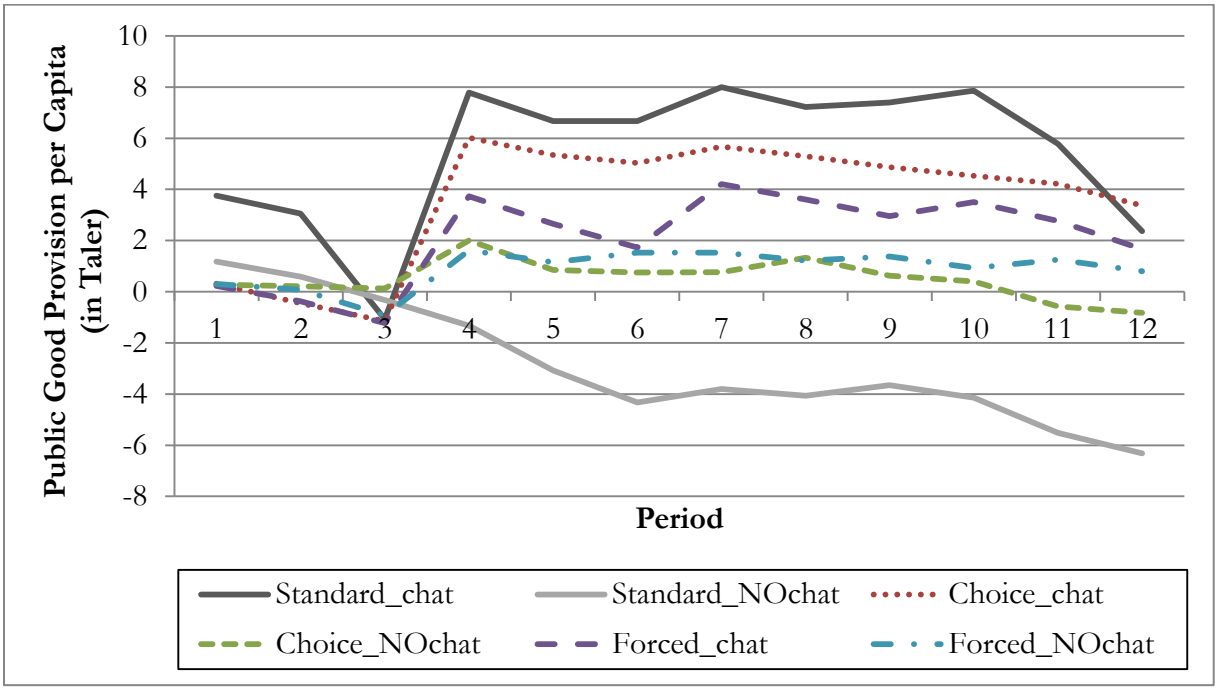


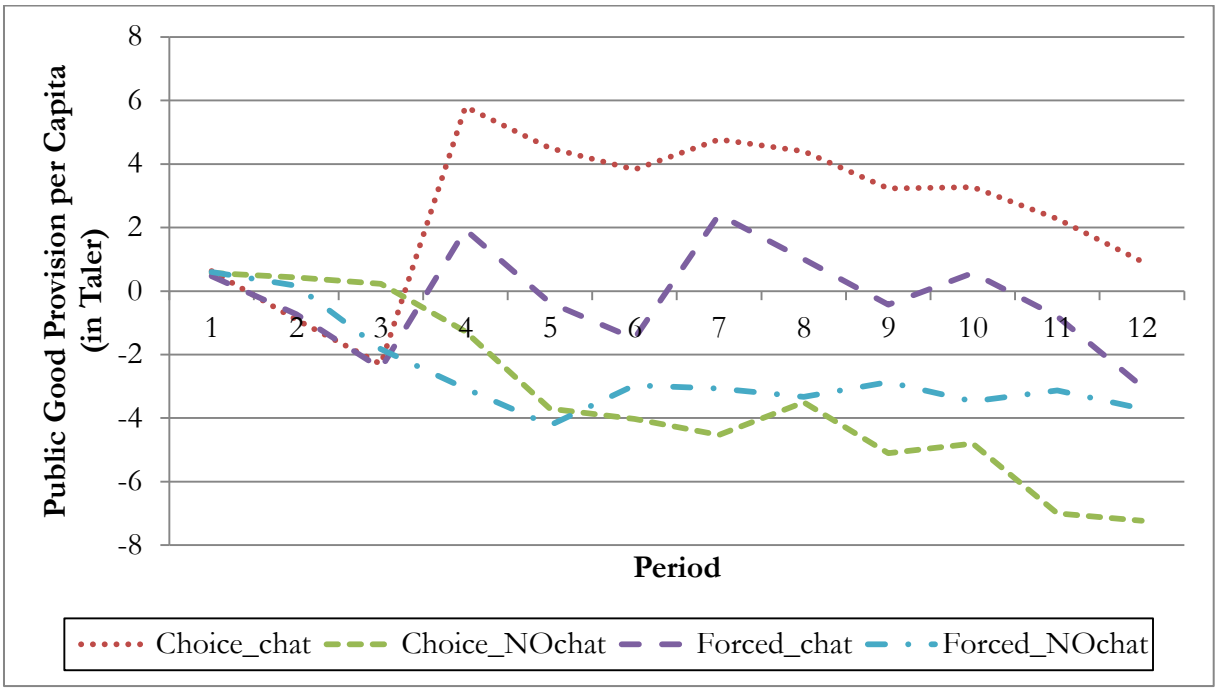
Table 3. Descriptive Statistics, all Groups and Periods.

	Treatment					
	Standard_ chat	Standard_ NOchat	Choice_ chat	Choice_ NOchat	Forced_ chat	Forced_ NOchat
Individuals	36	66	60	60	60	60
Groups	12	22	10	10	10	10
Mean contribution of all players (*in Taler*)	5.454	-2.898	3.589	0.496	2.121	0.907
Mean contribution of citizens (*in Taler*)	-	-	2.536	-3.328	-0.242	-2.575
Mean *voluntary* contribution of migrants (*in Taler*)	-	-	2.757	1.176	1.662	2.215
Mean migration requirement (*in Taler*)	-	-	7.030	5.720	8.410	5.967
Mean vote of 'rich' citizens (*in Taler*)	-	-	7.766	5.566	8.433	5.633
Mean vote of 'middle-income' citizens (*in Taler*)	-	-	6.533	6.300	8.166	6.100
Mean vote of 'poor' citizens (*in Taler*)	-	-	6.866	4.833	8.100	6.433
Percent of migrants who accepted a requirement (in %)	-	-	95.7	100.0	-	-
Mean *accepted* requirement (*in Taler*)	-	-	6.250	5.720	-	-
Mean *rejected* requirement (*in Taler*)	-	-	8.667	-	-	-
Mean income of all player types (*in Taler*)	42.727	38.551	40.155	35.717	36.539	35.859
Mean income of citizens (*in Taler*)	-	-	48.231	44.815	46.604	45.296
Mean income of migrants (*in Taler*)	-	-	32.079	26.619	26.475	26.424

After we have had a glance at the data at most aggregated level, we turn to the *contributions of citizens* (red players) in our migration treatments. Descriptive statistics in Table 3 report mean contributions of citizens over all twelve periods. These contributions amount to 2.536 Taler in Choice_chat, -0.242 Taler in Forced_chat, -3.328 Taler in Choice_NOchat and -2.575 Taler in Forced_NOchat. These mean contributions again hint at contribution differences between _chat and _NOchat treatments. Furthermore, we observe a nearly-3-Taler-difference of contributions

between Choice_chat and Forced_chat; this is a first indication that the *interaction* of the debate with the policy decision rule may play a role.

Figure 4. Public Good Provision in the Four Migration Treatments over Time: Citizens only.



We employ a series of regressions to further investigate similarities and differences. Table 4 reports four specifications providing evidence for important differences in contribution behavior of citizens. Figure 4 depicts contributions of citizens in our treatments over time. While specifications I to III in Table 4 aim to provide the reader with a better feel for the data, the full model in specification IV controls for time effects, initial private endowments and treatment effects for periods four to twelve.[12] We argue that specification IV is most useful for our analysis as it focuses on the periods in which treatment differences of institutions come to play a role for subjects. In periods one, two and three subjects already receive differing information, but debate

[12] We observe that citizens with endowments of 10 and 15 Taler contribute higher amounts to the public good. This finding is in accordance with earlier findings in the literature by Cherry et al. (2005). While it appears to be necessary to control for this characteristic in our analysis of contributions to the public good, we are mainly interested in observing how endowment levels change votes for *setting the bar*. A discussion of this will follow below.

and decision rule institutions do not play a role yet, i.e. there are no treatment effects (all treatment dummies are not significantly different from zero, i.e. with $p > 0.1$).

Table 4. Linear Regressions of Contributions to the Public Good, Individual Behavior of Citizens.

Independent Variable	Dependent Variable: Contribution			
	I First period (OLS)	II All periods	III All periods	IV Periods 4 to 12
Choice_NOchat	-0.067 (2.010)		-5.864*** (1.514)	-8.241*** (1.654)
Forced_chat	-0.167 (2.073)		-2.778 (1.698)	-3.689** (1.872)
Forced_NOchat	-0.033 (1.964)		-5.111*** (1.653)	-6.981*** (1.816)
Endowment 15 Taler	5.250*** (1.819)	3.125** (1.506)	3.125** (1.404)	2.725* (1.495)
Endowment 10 Taler	2.900* (1.588)	2.713** (1.266)	2.713** (1.198)	2.483* (1.284)
Period Dummies	-	*No*	*Yes*	*Yes*
Constant	-2.083 (1.534)	-2.848*** (0.795)	2.059 (1.351)	3.842*** (1.423)
Observations	120	1440	1440	1080
Individuals	120	120	120	120
Groups	40	40	40	40

Note: Random effects estimation (except specification I: OLS). The Standard_ treatments are excluded. The baseline are 'Choice_chat' for treatment effects, 'Endowment5' for effects with regard to the size of the initial endowment and Period 1 (specification IV) or Period 4 (specification V). Standard errors in parentheses. Significance: *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

This circumstance is highlighted by results in specification I; here we observe no treatment differences in the first period by using a simple OLS specification. Considering all periods in specifications III we find more evidence that a chat of citizens fosters contributions to the public good. Citizens' contributions in Choice_chat and Forced_chat are greater than in the two _NOchat treatments. We remove periods one, two and three from our model in specification IV and find evidence that citizens in Choice_chat contribute greater amounts to the public good compared to all other treatments, including Forced_chat (all coefficients are negative and significantly different from zero at $p < 0.05$). Hence, the interaction of a debate opportunity via chat and the migration scenario indeed makes a difference.

3.2 Migration Requirements

Next we consider some drivers of the differences in citizens' contributions. Before we have a closer look at the contributions of migrants to the public good, we follow the chronology of the experiment in order to better understand the dynamics of the game. We analyze the results of the setting-the-bar stage of our design. Note that before periods four, seven and ten, citizens (red players) had to decide on an undisclosed vote on the migration requirement. Table 3 reports descriptive statistics on mean minimum contribution requirements. They are 7.030 Taler in Choice_chat, 5.720 Taler in Choice_NOchat, 8.410 Taler in Forced_chat and 5.967 Taler in Forced_NOchat. To analyze endowment and treatment effects, we employ three OLS regressions for the three decision rounds before periods four (specification V), seven (specification VI) and ten (specification VII); Table 5 reports estimation results and Figure 5 provides a graphic overview. Ceteris paribus, all three models do not reject the null hypotheses that votes by citizens with endowments of 5, 10 or 15 Taler were equal.[13] Hence, we neither find any noticeable solidarity nor any discrimination of low-endowed or high-endowed citizens with their migrant counterparts.

Turning to treatment effects, we find a peculiar time trend for the minimum contribution requirement for migrants in specifications V to VII (Table 5). While the requirements do not differ across treatments in the first voting, subsequent requirements evolve to be especially high in Forced_chat. By the third (and last) voting, the requirement in Forced_chat has evolved to be significantly greater than in the three other treatments (all at least at the 5 percent level). In fact, it supports our behavioral economic prediction, i.e. at least in Forced_chat (but not in Forced_NOchat) the bar is set optimally at $r^*_{Dict} = 10$ Taler and higher than in the Choice_ treatments.

[13] A graphical overview of the requirement votes by poor, middle-income and rich citizens by treatment and including error bars can be found in Figure A.1 in Appendix A.

Figure 5. Minimum Contribution Requirements for Migrants to Join the Group.

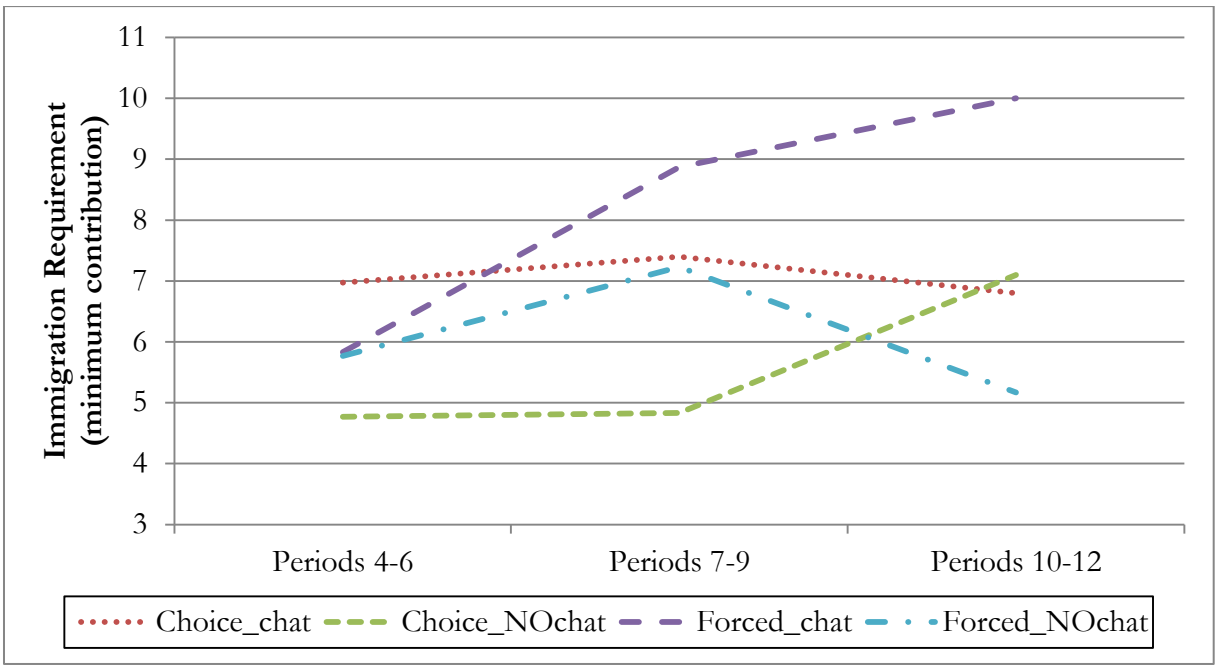


Table 5. Linear Regressions of Migration Requirements, Individual Behavior of Citizens.

Independent Variable	Dependent Variable: Migration Requirement		
	V First voting, after per. 3	VI Second voting, after per. 6	VII Third voting, after per. 9
Choice_chat	1.133 (1.867)	1.467 (1.633)	-3.200*** (0.862)
Choice_NOchat	-1.067 (1.794)	-4.033*** (1.437)	-2.900*** (0.946)
Forced_NOchat	-0.067 (1.641)	-1.633 (1.446)	-4.833*** (1.429)
Endowment: 15 Taler	0.375 (1.181)	0.250 (1.267)	0.250 (1.033)
Endowment: 10 Taler	0.250 (1.006)	1.200 (0.875)	-0.800 (1.440)
Constant	5.625*** (1.402)	8.383*** (1.223)	10.183*** (1.440)
Observations	120	120	120
Individuals	120	120	120
Groups	40	40	40

Note: OLS estimation. The Standard_ treatments are excluded. The baselines are 'Forced_chat' for treatment effects and 'Endowment 5 Taler' for effects regarding the size of the initial endowments. Standard errors, clustered at the group level, in parentheses. Significance: *p < 0.10, **p < 0.05, ***p < 0.01.

This difference suggests that the driver of a lower bar in the Choice_ treatments may be due to citizens anticipating migrants' preferences for reciprocity (a strategic reason). Altruism of citizens is a less likely explanation; else the bar in Forced_chat should not be different. Note that this finding is only possible because our experimental design employs multiple voting periods. Taking our findings on citizens' contributions and the setting of the immigration requirement together, they suggest that the interaction of public debate with different migration scenarios, i.e. Choice_chat vs. Forced_chat, motivates different behavior of citizens in two dimensions. First, citizens contributed significantly more resources to the public good when immigration is self-determined (Choice_). Second, when migration is involuntary citizens in Forced_chat used the debate opportunity to set a bar which maximizes their payoffs. This is neither the case in Choice_chat nor in the two treatments without chat.

How do migrants react to the requirements described above? In principle, migrants have either one or two channels to display their preferences. Given that a migrant's endowment is sufficient to allow entry into the country, she can show her preferences via voluntary contributions beyond the requirement in the Forced_ treatments. In the Choice_ treatments she can (1) accept or reject the requirement, and, given that she has accepted it, (2) show her preferences via voluntary contributions beyond the requirement (like in Forced_). The descriptive statistics in Table 3 reveal that 95.7 and 100 percent of all migrants accepted the given requirement in Choice_chat and Choice_NOchat respectively. These numbers may not appear surprising, given the strong economic incentive to migrate in order to earn a higher income in the group (compared to staying outside the group). They are however also a result of the relatively low requirements in the Choice_ treatments. The mean accepted requirement in Choice_chat is 6.25 Taler while the mean rejected requirement is 8.66 Taler. Recall that the mean requirement in Choice_NOchat is 5.72 Taler and all migrants in Choice_NOchat accepted the requirements. A Mann-Whitney test reports that the difference between all accepted and rejected requirements in the two Choice_

treatments is statistically significant at the five percent level (p=0.0229). We therefore find that the great majority of migrants accept the requirements in the Choice_ treatments. Those migrants who rejected requirements reacted to significantly higher requirements than those who accepted requirements.

The second channel for migrants to react to immigration requirements is the magnitude of voluntary contributions to the public good. Next we hence investigate the impact of our treatments on voluntary contributions of migrants that have entered a group. We define the size of a voluntary contribution as the difference between the contribution of migrant c_j and a set minimum contribution requirement $\bar{r}$, i.e. $(c_j - \bar{r})$.[14] Table 3 reports mean voluntary contributions by treatment. These are greatest in Choice_chat with 2.757 Taler, followed by 2.215 Taler in Forced_NOchat, 1.662 Taler in Forced_chat and 1.176 Taler in Choice_NOchat. To measure the statistical significance of these differences, we employ two random-effects regressions that included between three and nine observations per migrant (the results are reported in Table A.1 in appendix A). For most comparisons, we cannot reject the null hypothesis of equal voluntary contributions of migrants, except for Choice_chat > Choice_NOchat at the 10 percent level. We generally have to be cautious about these comparisons, as treatments did differ significantly with respect to other characteristics, such as cooperation by citizens, as discussed above. It hence appears that migrants mainly react to the high immigration requirements via the channel of rejection, even when the rejection is unfavorable to them in terms of payoffs (due to our clear calibration of parameters).

3.3 Migration Policy Coherence and its Origins in the Debates

It is striking to find that voluntary contributions of citizens are greatest in Choice_chat compared to all other treatments while the immigration requirements in Choice_chat are similar to other

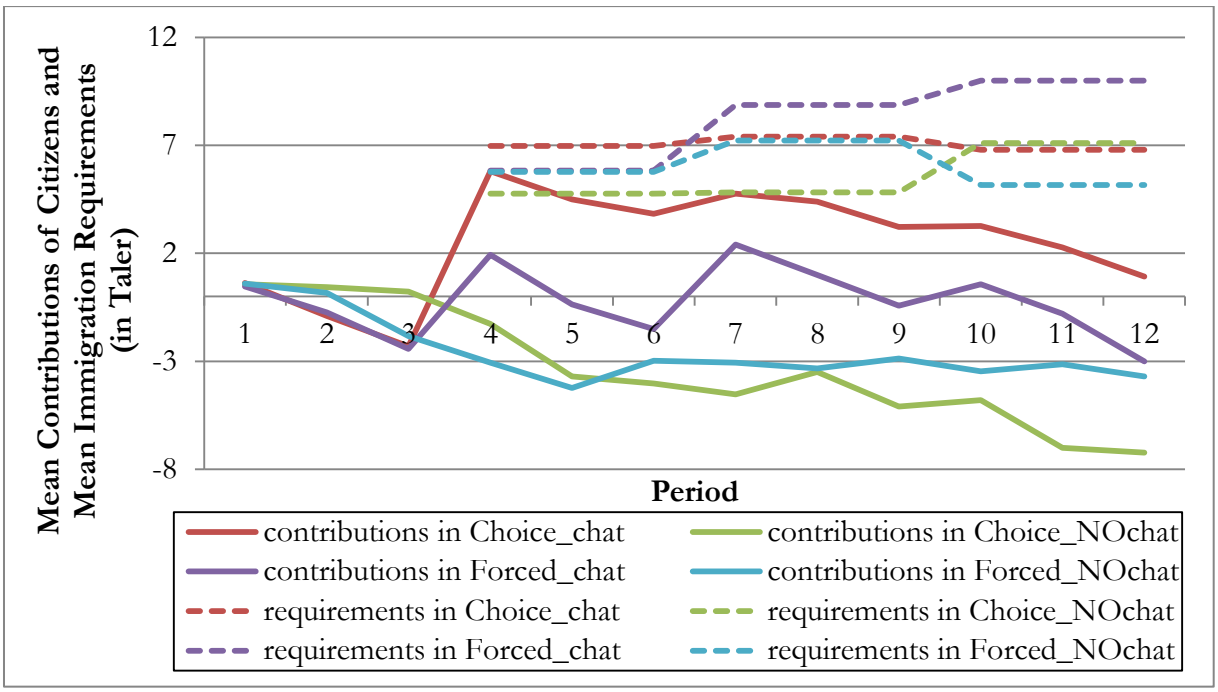
[14] For an adequate comparison, we need to exclude certain migrants from the analysis. First, we exclude all migrants who did not join a group in a given period. Second, we exclude all migrants who faced a requirement equal to their endowment, because these migrants have to contribute exactly the minimum requirement and cannot contribute more Taler voluntarily. Consequently, we are left with 597 observations of 80 migrants from all 40 groups.

treatments (except Forced_chat). What greater picture can we derive from our results? We compare a group's average contribution in a given period and the existing immigration requirement valid in that period. Naturally, these two decisions were made by the same group and are therefore not independent from each other. We employ (two-sided) Wilcoxon signed-rank tests to compare whether the average contributions and demanded requirements differed from each other period by period. This test is depicted by the difference between solid and the dashed lines in Figure 6. Examining periods 4 to 12 individually and each treatment individually, we find that in Choice_NOchat, Forced_chat and Forced_NOchat, groups' contributions and groups' demands differed in the vast majority of periods and at the 5 percent or the 1 percent level. The only exceptions were periods 4 and 5 (no significant difference) and period 6 (significant at the 10 percent level) in Forced_chat. Conversely, in periods 4 to 10 in Choice_chat, there was no significant difference between groups' average contributions and their requirements. Only in periods 11 and 12, we find differences at the 10 and 5 percent level respectively, probably driven by the experiment coming to an end.[15]

This analysis is key for understanding the results of our experiment. Only in Choice_chat, when migrants can determine their paths themselves and citizens can debate, there is a certain level of *migration policy coherence* – a large consistency between what citizens demand from migrants and what citizens contribute themselves. This finding is a fundamental insight that drives our results presented above.

[15] Figures A.2 to A.5 in Appendix A display citizens' contributions and set requirements over time and by treatment.

Figure 6. Public Good Provision over Time: Requirements and Citizens only.



In principle, the finding of policy coherence in Choice_chat could be either driven by a greater sense of solidarity among citizens or by the greater bargaining power of migrants. For the identification of the prevailing mechanism, we delve deeper into the contents of the debates in the chat rooms. Cason and Mui (2015) and Cason et al. (2017) provide examples of a method that can be applied to quantify chat room topics and lets us learn more about the reasons for subjects' behavior. We apply this method and analyze the debates in our two migration treatments with chat, i.e. Choice_chat and Forced_chat, and, in addition, in the Standard_chat treatment for a comparison of topics in a usual public goods game with communication.

To this end, two research assistants were provided with the instructions of the three _chat treatments and the content of the chat room debates. Importantly, the two research assistants were *not* aware of the research questions, the contributions, requirements or any other outcomes. They also did not know which chat room debates belonged to which treatment. The research assistants did not know each other and worked independently from each other. We formulated a

long list of all debate arguments related to our experiment that we could reasonably think of (34 items). These arguments include payoff maximization, solutions to solve the social dilemma, arguments related to the migrants, arguments related to the in-group and arguments related to the immigration requirement. When they had the impression that an argument or topic is present in a given recorded debate, the research assistants coded a 'yes' for that topic, else a 'no'. For brevity, Table 6 presents insights from a set of arguments that show interesting similarities and differences; the long list of all arguments and topics and their prevalence in the different treatments can be found in Table A.2 in Appendix A.

Table 6. Categories for coding messages and observed frequency in chat rooms (selection).

	Forced_chat		**Choice_chat**		**Standard_chat**	
	Relative frequency of coding	Kappa	Relative frequency of coding	Kappa	Relative frequency of coding	Kappa
a. Greetings	0.15	0.87	0.17	1.00	0.11	0.72
b. Maximizing profit	0.73	*0.33*	0.47	0.60	0.61	0.53
c. Discussion about blue players						
i. Fear that blue players will reject the requirement	0.03	1.00	0.18	0.67	-	N/A
ii. Mistrust in blue players	0.35	0.52	0.20	*0.17*	-	N/A
iii. Frustration with blue players	0.25	0.57	0.10	0.63	-	N/A
d. Discussion about red players						
i. Discussion about red players' voluntary contributions	0.40	0.47	0.45	0.53	0.53	*0.32*
ii. Frustration with other red players	0.18	0.89	0.12	0.52	0.11	0.44
iii. Call to be nice/fair to blue players	0.10	*0.26*	0.15	*0.35*	-	N/A
iv. Discussion around revising the requirement	0.37	*0.31*	0.35	0.63	-	N/A

Most arguments appear with a similar propensity in all three _chat treatments (see Table A.2). We however find two interesting differences in the propensity of certain arguments. First, we find that the propensity to discuss '*Fear that blue players will reject the requirement*' (item g-iv) is almost non-existent in Force_chat – in only 3% of the cases, which should be the case since blue players cannot reject the requirement in this treatment. Conversely, in Choice_chat the item was discussed in about 18% of the chats. This difference is significant at p = 0.007.[16] That is, as expected in our hypotheses, citizens in Choice_chat do indeed discuss the threat of migrants rejecting the immigration requirement.

Second, we find a difference in the propensity to discuss '*Maximizing profit*' (item c) between the two migration _chat treatments. In Choice_chat payoff maximization is discussed less frequently (47% of the cases) compared to Forced_chat (73%[17], p = 0.061). There is no difference between frequencies of payoff maximization discussions in Standard_chat (61%) compared to Choice_chat (p = 0.244) and Forced_chat (p = 0.288).[18]

In summary – compared to Forced_chat – the self-determination of migrants in the Choice_chat treatment appears to change the debate in two ways: (1) citizens are aware and discuss the possibility of migrants rejecting the immigration requirement and (2) citizens' debates are less focused on payoff maximization. Our analysis of chat arguments hence reveals mechanisms that drive our results regarding a high level of policy coherence in Choice_chat. In the final section, we will discuss the implications of our experimental results for immigration requirements.[19]

[16] A proper comparison is not possible with a simple MW test, given the structure of the chat data (i.e. debates in groups, three chats of each group in different periods). To this end, we employ a random-effects panel regression and cluster the standard error at the group level. The reported p-value is the test statistic for the Forced_chat treatment dummy (compared to the Choice_chat treatment).
[17] We need to note that this value (73%) is only marginally reliable in terms of inter-rater reliability, with kappa=0.33.
[18] The same estimation approach as described in the previous footnote applies.
[19] Table A.3 in Appendix A additionally provides an overview of pairwise treatment comparisons of overall welfare. We regard it as noteworthy that Choice_chat is the only migration scenario treatment that achieves a welfare level that is statistically indistinguishable from Standard_chat (and Standard_NOchat), while all other migration treatments achieve lower welfare.

4 Concluding Discussion

Many OECD countries have seen a restrictive trend regarding immigration requirements. In contrast, ageing populations will most likely lead to an increase in labor demand in many sectors. Policy makers have to look for ways to reconcile public opposition to immigration with a growing need to attract more immigrants. Due to the (legal) complexity of immigration policies and cross-country and cross-time variation, most empirical migration studies are inherently context-specific. For these reasons, we explore the use of experimental methods to gain context-independent insights into a number of potential underlying determinants of immigration policy setting. Based on current differences in the modes of migration (voluntary and involuntary migration) and the rise of anti-migrant politics in a number of countries around the world, we decided to select two dimensions of immigration policy for our experiment: migrants' freedom of self-determination and public debate. Experimental economics provides a well-established tool to study both aspects, i.e. the public goods game.

We find that public debate can lead to the introduction of high immigration requirements in light of involuntary migrants. Conversely, public debate can also cause a shift of the citizens' focus away from own payoff maximization, i.e. letting migrants contribute while citizens do not, towards migration policy coherence – the coherence of the immigration policy (what is expected of the migrants) and the contribution level of the citizens. This setting, the Choice_chat treatment, is the only one that achieves overall welfare, i.e. including citizens *and* migrants, that is similar to the two Standard_ treatments. In general, we also find that our behavioral economic predictions are much closer to the observed results than the standard payoff maximization (homo economicus) predictions.

We find that immigration requirements are higher than mean contributions of citizens in almost all treatments. Although this finding seems intuitive, we note that, expect in the Choice_chat treatment, citizens expect more than they deliver. This finding could be interpreted as a form of

in-group favoritism (see Tajfel et al. 1971; Billig and Tajfel 1973). As a real-world comparison, we observe that immigration requirements, such as income, can exceed in-group population averages (e.g. see EU blue card requirements).

Furthermore, we find that public debate does not necessarily lead to lower immigration requirements due to solidarity – that is, we do not observe a lower immigration requirement in the case of self-determined migration (Choice_ treatments). In fact, when public debate was possible, immigration requirements were higher for involuntary migrants (Forced_chat). Public debate as such can hence be regarded as a double-edged sword. The opportunity to debate can increase citizens' contributions to the public good and migration policy coherence (in Choice_chat). However, the findings also suggest that it can be used to set disproportionately restrictive immigration requirements in order to maximize profits while keeping citizens' individual contribution levels low.

As one possible explanation, we propose that citizens may consider self-determined immigrants as more equal regarding bargaining power. As a consequence, citizens adhere to the policy that they set for migrants. This explanation must be seen in reference to the general phenomenon of in-group favoritism and individuals' common desire to maintain a positive group identity. Thus, citizens themselves comply with the immigration requirements that they enforce for migrants. Immigration requirements become a social norm for the in-group as well. In our chat analysis we observe that self-determined migration leads to a debate among citizens which includes migrants' possible rejection of the requirement and is less centered on payoff maximization.

We are cautious not to overstate the migration metaphor given drastic differences between the lab and real-world contexts. However, our findings are generally consistent with studies that find that public opinion is more positive towards highly-skilled economic migrants that have more bargaining power over whether and where to migrate (Hainmueller & Hopkins 2014; Mayda 2006).

Naturally, our study does not reflect nearly all facets of immigration policy. When modelling migration scenarios in the laboratory, we sacrifice proximity to the real world in order to identify causal effects shaping actors' decisions. There is also a need for further research and we hope to motivate further experimental studies in this area. There are numerous set-up alternatives that may be considered in the future. For example, one may consider a debate between citizens and migrants, countries which compete for migrants, lower endowments for migrants, and naturalization of migrants after a certain time period. It would also be interesting to observe of citizens' debates and behavior change when migrants have to make great sacrifices to be able to enter the in-group (mirroring refugees' paths). Such factors could provide further valuable insights into the drivers of immigration policy. Our study can hopefully serve as a useful starting point for future tests of hypotheses from the field of migration, using tools developed in experimental economics. This approach has the potential to reveal those elements driving migration policy which may be inherently behavioral in nature rather than entirely depending on the cultural, political, economic and geographical contexts.

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