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Research Statement

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1. Overview

I am an applied microeconomist who uses game theory and experimental data to advance our understanding of how people behave in social environments involving conflict and/or cooperation. My research falls within the area of behavioral economics with a focus on people's prosocial and antisocial behavior and their implications for informing better social and economic policies. My research also intersects with political economy and public economics.

In one stream of research, I develop game-theoretic models and run laboratory experiments to investigate the causes of conflict. The degree of control offered by the laboratory allows me to identify cleanly determinants of (sometimes antisocial) behavior in conflicts that are difficult to study using observational data. For example, I have investigated how behavioral motivations such as fear and self-defense lead to arms-racing behavior and preemptive conflict, I have provided evidence on how preventive motivations for conflict cause early attacks in situations with shifting balance of power, and I have explored how a group of agents form an alliance and successfully coordinate their attacks on an enemy. In addition to better understanding behavioral and material motivations in various interpersonal and intergroup conflicts, I also study how policy makers can design peace-promoting institutions.

In a second stream of research, I study how to design policies or institutions that allow us to harness people's prosocial motivations to promote common goods. More specifically, I have studied how carefully configured communication networks can either promote or damage group cooperation, I have explored how to design information on a set of characteristics about charity receivers that can best promote donation, and I have investigated how people's fairness perceptions and attitudes toward redistributive policies are shaped by the underlying sources of inequality such as pure luck and unequal opportunities.

2. Causes of conflict

In a series of papers on the causes of conflict, I explore various behavioral and material motivations for war including preemptive, preventive and aggressive ones. I study them separately in stylized models and test theoretical predictions in the laboratory.

2.1. Preemptive motivations

During the Cold War, the once-allied US and USSR entered an unprecedented arms race. The arms race created what is known as the *Hobbesian trap*: the dilemma that occurs if fear of an attack leads to more armament, which leads to more fear, and so on, until one or both sides may

feel tempted to launch a pre-emptive strike. Even if no side wishes to destroy the other, the pre-emptive strikes occur out of bilateral fear of an imminent attack. One way out of this trap is the doctrine of Mutually Assured Destruction (MAD), which guided the relations between the superpowers during much of the Cold War. The MAD doctrine is built primarily on two pillars. The first is deterrence. If a military power has an arsenal large enough to sustain second-strike capability, then it would be suicidal for any rival to attack it. MAD requires mutual recognition of this capability. The second building block of the MAD doctrine is the maintenance of a balance of power. If power disparity is significant, the powerful party is likely to launch a first strike to avoid future escalation. However, once a power balance has been established, it is often unstable, since each side strives to outstrip the other (or at least suspects as much of its rival). Both sides therefore try to develop more and more effective weaponry, leading to expensive arms races.

In "**Arms Races and Conflict: Experimental Evidence**" (***Economic Journal***, 2021, with Klaus Abbink and Lu Dong), we model arms races and strikes in a dynamic first-strike game. In this game, two participants play multiple rounds of a money-earning task. In each round, both players can spend money to accumulate weapons. The player with more weapons can spend money to strike against the other player, which almost totally eliminates the victim's earnings potential and removes their capacity to strike. Weapons can serve as a means of deterrence. In four experimental treatments, we find that deterrence is strengthened if weapon stocking cannot be observed, that a balance of power is effective in maintaining peace, and that mutually beneficial trade decreases the risk of confrontation, but not necessarily the likelihood of costly arms races. Our study highlights the role of behavioral motivations such as fear and self-defense in driving costly confrontation.

2.2. Preventive motivations

While a preemptive war is launched in anticipation of an imminent attack by the opponent whose intentions are unknown (i.e., the fear of being attacked), the aim of a preventive war is stopping an opponent from developing the capability to attack. The preventive war scenario arises when there is a rapid shift in the balance of power. The rise of a new power challenging the incumbent hegemon's position inevitably leads to tensions. Allison (2017) coined the term 'Thucydides's Trap' after the ancient Greek historian who wrote on the Peloponnesian War (431−404 BCE): "It was the rise of Athens and the fear that this instilled in Sparta that made war inevitable". The rise of the German empire in the late 19th century threatened a still dominant, but slowly declining British empire. Nowadays, the rise of China has prompted the U.S. to make increasingly hawkish policies toward China. The most recent potential application of the preventive motivation for war is the ongoing Russo-Ukrainian conflict. Ukraine's threat to join NATO may be seen as a rapid power shift that triggers Russia to engage in preventive warfare.

In "**Preventive Wars**" (***R&R Games and Economic Behavior***, 2022, with Klaus Abbink and Lu Dong), we model preventive motivations for war in a simple bargaining game. In each stage, the rising power makes a bargaining offer and the declining power must choose whether to accept it or fight. Between the two stages, the winning probability shifts towards the rising power. In such

a game, preventive war is theoretically inevitable because the rising power faces a commitment problem stemming from bargaining divisions spread over multiple stages. Once the rising power has become superior, it has every reason to renege on any promise about future bargaining agreements. Foreseeing this adverse outcome, the declining power must launch an early attack––preventive war—while it is still stronger than the rising power. A sufficiently large shift in power is at the core of the commitment problem, and preventive wars are launched precisely to forestall a shift in the balance of power in favor of the opponent and avoid losing any bargaining advantages in the future. In line with the theoretical predictions, in experiments we find fewer preventive wars when the power shift is smaller and when the rising state has the commitment power. High fighting costs almost eliminate such wars when the rising power's first-stage offer is sufficiently large. Finally, some peace-promoting mechanisms such as communication and repeated interaction help decrease the likelihood of preventive wars.

2.3. Alliance dynamics and aggressive motivations

The previous two papers study preemptive and preventive motivations for conflict in stylized two-player games. Such models are suitable for understanding great power struggles in a bipolar world. However, conflicts are also common in a multipolar world in which alliance policies matter a great deal to the survival of individual power. In "**How Alliances Form and Conflict Ensues**" (***R&R Games and Economic Behavior***, 2022, with Lu Dong, Jaimie Lien and Jie Zheng), we focus on the interaction of decision-makers in a group, aiming to study the origins of conflicts in a network context. We explore the dynamics of alliance formation and conflict in a laboratory experiment on a signed network game in which players can either befriend or fight against others. The game has multiple equilibria. In particular, a peaceful equilibrium yields the greatest social welfare, while a successful bullying attack transfers the victimized player's resources evenly to the attackers at a cost. Consistent with the theoretical predictions, peaceful and bullying outcomes are prevalent among the randomly re-matched experimental groups. We further examine the dynamics leading to the final network and find that groups tend to coordinate quickly on a first target for attack, while the first attacker entails a non-negligible risk of successful counter-attack by initiating the coordination. These findings provide insights for understanding social dynamics in group coordination.

2.4. Other work in conflict

Three papers consider how psychological versus strategic motivations play out in intergroup conflict. In "**Fighting Alone versus Fighting for a Team: An Experiment on Multiple Pairwise Contests**" (***Journal of Economic Behavior and Organization***, 2021, with Zahra Murad), we compare how psychological motivations influence individual competitive behavior in response to a head start or a handicap when competing alone or competing for a team. We propose that a combination of disappointment aversion and team spirit can explain our experimental findings. In a companion paper "**Is There No 'I' in Team? Strategic Effects in Multi-Battle Team Competition**" (***Journal of Economic Psychology***, 2019, with Lu Dong), we test the theoretical prediction of a best-of-N team contest using the observational data from professional squash

team tournaments. Here instead we find evidence that players are more likely to be motivated by a strategic momentum effect, consistent with the economic model. Finally, in an interdisciplinary work "**Pulling for the Team: Competition Between Political Partisans**" (***Evolutionary Psychological Science***, 2021, with Peter DeScioli and Zahra Murad), we design a tug-of-war experiment in which participants compete individually or in teams based on political partisanship, Democrats against Republicans. However, we do not find the partisan framing is strong enough to motivate more team effort than the neutral framing, contrary to theories asserting the automatic potency of partisanship.

Furthermore, two papers consider other types of behavioral motivations in conflict. In "**Feedback Spillover Effect on Competitiveness across Unrelated Tasks**" (***Behavioral Research in Accounting***, 2020, with Zahra Murad), we find that positive/negative feedback about relative performance spillovers to an unrelated task domain by increasing/decreasing employees' willingness to compete, jointly through belief- and taste-altering mechanisms. In "**Disappointment Aversion and Social Comparisons in a Real-Effort Competition**" (***Economic Inquiry***, 2018, with Simon Gaechter and Martin Sefton), we find in a two-player real-effort contest that social comparison effects are not the source of disappointment aversion, which simply reflects an asymmetric evaluation of losses and gains.

Finally, in an early theory paper "**Prize and Incentives in Double Elimination Tournaments**" (***Economics Letters***, 2016), I provide the first game-theoretic analysis of double-elimination tournaments and study the optimal prize allocation.

3. Cooperation and prosocial behavior

In a series of papers, I study how to design policies or institutions that allow us to harness people's prosocial motivations to promote common goods. These include topics on group communication and cooperation, information policies in charitable giving, and people's attitudes toward redistributive policies.

3.1. Communication and cooperation

Common wisdom says that communication serves as a lubricant for team harmony, leading to improved collective decisions. However, not all communication is well-intentioned. An important aspect of our social life is that communication can be exclusionary. In economic organizations, exclusionary communication can be harmful to a team's unity and efficiency. For example, senior employees may reach backroom deals against newcomers in remuneration allocations. Consequently, the anticipation of exploitation is likely to damage the exploited member's motivation to work for the team.

In "**Talking Behind Your Back: Communication and Team Cooperation**" (***Management Science***, 2022, with Klaus Abbink and Lu Dong), we study when and how different configurations of communication networks among team members may either promote or damage team

cooperation. Specifically, we stage a private communication channel in a three-member team where two out of the three team members (the partners) can exchange private pre-play messages. The third member (the loner), while knowing that the other team members are engaging in a private conversation, is blind to its content. We also study situations where in addition to the private communication channel, the partners can exchange messages in a public communication channel, where the content is accessible to the loner. We find that compared to no communication, communication can be detrimental to team cooperation if it is exclusionary. This harmful effect is not just restricted to the colluding members' unfair profit allocation toward the excluded member and the latter's low investment, but also the excluded member's deviation from the fairness norm in her own profit allocation. One way to restore team cooperation and fairness in profit allocation is to include the loner in the partners' communication, which helps rebuild trust between the partners and the wary loner.

Our findings show that the way communication is organized matters for the extent that cooperative outcomes will emerge in an institution. This is particularly relevant in a world in which more and more organizations make use of telecommunication systems derived from social media, like Slack or Workplace. These allow administrators to fine-tune which communication channels are available to whom.

In a companion paper "**Favoritism and Fairness in Teams**" (***Games***, 2018, with Lu Dong), we set out to test whether minimal group identity is sufficiently strong to establish collusion and hurt group communication. However, we do not find such group identity alters players' fair profit allocations and hence cooperation levels remain high.

3.2. Charitable donation

When soliciting donations, an important consideration for charitable organizations is whether to provide their potential donors with details concerning the characteristics of their clients. In designing such information policies, a crucial question is whether bad characteristics would offset any positive effect of good characteristics on donations. Should organizations withhold the particulars of the recipients from donors to avoid the potential negative impact of bad characteristics if the goal is to promote donations?

In "**Persuadable or Dissuadable Altruists? Impact of Recipient Characteristics on Giving**" (***R&R Economic Journal***, 2022, with Lata Gangadharan, Phil Grossman, Matthew Leister and Erte Xiao), we introduce the idea that altruism can be "persuadable" ("dissuadable") by information about positive (negative) characteristics. The model employs the notion of a donor's subjective prior beliefs of the characteristics of recipients and describes how the donor's response to information about the recipient's characteristics, relative to no information, jointly depends on the position of the donor's subjective prior beliefs of these characteristics and on the shape of the utility function such that the donor's giving decision adjusts with realized characteristics. Persuadable (dissuadable) altruism is observed when the difference between giving under good news and no information is larger (smaller) than the difference between giving under no

information and bad news. As a result, good (bad) news persuades (dissuades) participants to donate more (less).

To test the theoretical prediction, we conduct a lab-in-the-field experiment. We vary the information a donor receives regarding three recipient characteristics: the recipient does or does not present with alcoholism problems (Alcohol), is or is not attending courses to improve employment possibilities (Courses), and is or is not (physically or mentally) disabled (Disabled). Across different characteristics, our results are broadly consistent with the predictions of persuadable altruism. Overall, we find a positive net impact of providing information on aggregate giving. From a policy perspective, our results suggest that withholding information about the recipient may not be a successful fundraising strategy. Instead, providing information, as long as some aspects are positive, may be a useful strategy for charities to consider to achieve their fundraising goals.

In a related paper "**Are Matching Subsidies Effective When the Ask Can Be Avoided**" (2022, with Lata Gangadharan, Phil Grossman and Erte Xiao), we examine the effect of matching subsidies on promoting charitable giving in situations where solicitation can be avoided. Common wisdom says that the matching subsidies increase giving because they reduce the effective price of giving. We challenge this position by arguing that the matching subsidies instead heighten the normative appeal of giving. Importantly, while the effective price mechanism still predicts a positive effect of the matching subsidy when solicitation can be avoided, the norm mechanism predicts no effect in the same situation. Our experimental evidence is consistent with the norm mechanism.

3.3. Distributive justice

People's attitudes toward redistributive policies are shaped by their view about the underlying sources of inequality, that is, whether or not inequality is the result of fair origins. Although views on what is considered fair can differ within the population, many ordinary citizens as well as political leaders endorse a meritocratic view of fairness. In this view, instead of luck, heritage or other factors beyond their control, individuals should be rewarded based on their merit, that is, their effort or choice. In practice, however, the presence of unequal opportunities posits a challenge to making meritocratic judgements. To the extent that unequal opportunities blur the boundary between luck and merit, what then constitutes a reasonable meritocratic judgement in situations with unequal opportunities?

In "**They Never Had a Chance: Unequal Opportunities and Fair Redistribution**" (***R&R Economic Journal***, 2022, with Lu Dong and Jaimie Lien), we set out to answer this question by conducting an online experiment with over 2000 participants. We are interested in individuals' redistributive preferences when they encounter a pair of workers, who have the same incentives to perform well, experienced unequal opportunities. We focus on two important forms of unequal opportunities. One is about inequality in educational opportunities, and the other is about inequality in career opportunities. Contrary to some previous findings that merit

judgements are often insensitive to unequal circumstances, we find that individuals are more inclined to split resources equally when the performance differential involves either type of unequal opportunity. We also find that when participants were given the option to expend personal effort to reveal information about the presence of unequal opportunity, a substantial number of them declined to do so, but held optimistic beliefs about the social norm of seeking such information. These findings enrich our understanding of the factors that lead individuals to support income redistribution, while also obtaining an assessment regarding to what degree redistributing third-party decision-makers are vested in these choices.

3.4. Other work in cooperation

Two papers consider mechanisms to promote cooperation, i.e., supporting Pigouvian taxation, which has a short-term personal cost but comes with substantial long-term benefits. In "**Peer Effects in Public Support for Pigouvian Taxation**" (***Journal of Economic Behavior and Organization***, 2021, with Erte Xiao), we find that peer effects can be harnessed to promote public support among the general public. In a companion paper "**Tax Liability Side Equivalence and Time Delayed Externalities**" (***European Journal of Political Economy***, 2022, with Silvia Tiezzi and Erte Xiao), we show that whether taxes are levied on the supply side or on the demand side does not change people's attitudes toward such taxes.

4. Other work

One early paper makes a methodological contribution to experimental economics by introducing a novel real-effort task ("**Combining 'Real Effort' with Induced Effort Costs: The Ball-Catching Task**", ***Experimental Economics***, 2016, with Simon Gaechter and Martin Sefton). The ball-catching task shares an advantage of real effort tasks in that subjects are required to do something tangible in order to achieve a level of performance, as opposed to simply choosing a number. A drawback, however, of existing real effort tasks is that in using them the researcher sacrifices considerable control over the cost of effort function. The central feature of the ball-catching task is that it allows researchers to manipulate the cost of effort function as well as the production function, which permits quantitative predictions on effort provision. we run three experimental studies to evaluate the ball-catching task and find evidence that point predictions about actual behavior are remarkably accurate and closely in line with the stylized facts from experiments using purely induced values.