The role of self-interest in elite bargaining

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One of the best-known and most replicated laboratory results in behavioral economics is that bargainers frequently reject low offers, even when it harms their material self-interest. This finding could have important implications for international negotiations on many problems facing humanity today, because models of international bargaining assume exactly the opposite: that policy makers are rational and self-interested. However, it is unknown whether elites who engage in diplomatic bargaining will similarly reject low offers because past research has been based almost exclusively on convenience samples of undergraduates, members of the general public, or small-scale societies rather than highly experienced elites who design and bargain over policy. Using a unique sample of 102 policy and business elites who have an average of 21 y of practical experience conducting international diplomacy or policy strategy, we show that, compared with undergraduates and the general public, elites are actually more likely to reject low offers when playing a standard "ultimatum game" that assesses how players bargain over a fixed resource. Elites with more experience tend to make even higher demands, suggesting that this tendency only increases as policy makers advance to leadership positions. This result contradicts assumptions of rational self-interested behavior that are standard in models of international bargaining, and it suggests that the adoption of global agreements on international trade, climate change, and other important problems will not depend solely on the interests of individual countries, but also on whether these accords are seen as equitable to all member states.

self-interest | bargaining | elites | ultimatum game | game theory

Previous studies have shown that humans typically reject low offers in bargaining games, even when doing so goes against their material self-interest (1–4). In these "ultimatum games" (1), a proposer makes an offer to a responder for how to divide a fixed prize. A responder then decides whether to accept or reject the offer. If it is accepted, both players divide the prize as agreed. If it is rejected, both players receive nothing. If both players are completely rational and selfish—an assumption that is widely used by social scientists in formal models of international bargaining (5–7)—then proposers will offer almost nothing to responders, an offer that rational responders nonetheless accept because something is better than nothing. However, humans across a wide variety of settings and societies frequently offer to split the prize evenly and usually reject offers below 25% (4).

This tendency to reject low offers could arise for a number of reasons. Although some models have focused on prosocial motives, such as a preference for "fairness" or an aversion to inequity (8, 9), other work has found no link between rejections in the ultimatum game and prosocial behavior in other games (10). This suggests that humans' tendency to reject low offers in the ultimatum game may stem from other sources, such as spite (11, 12), culture (3, 13), and generalized forms of social learning (14, 15).

Despite the fact that humans frequently reject low offers in the bargaining games, it remains unknown whether real-world policy makers will similarly reject low offers when doing so goes against their material self-interest. Indeed, much of the existing literature assumes that elites are more "rational" and display fewer of the biases in beliefs, preferences, and decision making that are evident in less experienced populations (16, 17). Some research has examined whether leaders are psychologically or physiologically different from nonelite populations—for example, research on anxiety levels in leaders (18) and work on how leaders may be selected for skills in coordination, leadership, and followership (19). The few existing studies that have empirically examined actual decision making by elites in highly particular roles—such as professional tennis players, soccer players, and traders—suggest that, through a combination of learning and attrition, elites are more likely to exhibit self-interested, profit-maximizing behavior than their less experienced counterparts (20–23). Hence, the prevailing view is that, when bargaining, elites merely pay lip service to issues like equity while actually bargaining closer to a norm of rational self-interest (24).

However, no study has experimentally measured the bargaining behavior of policy elites who make major trade, finance, and regulatory policy decisions—despite the centrality of that population to the behavior of modern states and the economy. Many of the previous elite-oriented studies cited above have focused on competitive games, where learning and experience robustly push players closer to a unique mixed strategy equilibrium (20, 21), whereas others have examined market games where experience will plausibly push individual players to consistently accept a particular price (22). However, many bargaining games have multiple Nash equilibria and are more representative of the kinds of joint decision-making challenges that arise in public policy and business strategy. At least two models have shown that learning and experience can push players far away from equilibrium refinements like subgame perfection (which predicts that self-interested players will accept offers that are next to nothing)

Significance

Humans frequently act contrary to their self-interest and reject low offers in bargaining games. Some evidence suggests that elites, however, are much more rational and self-interested, but this hypothesis has never been directly tested in bargaining games. Using a unique sample of US policy and business elites, we find the opposite. Compared with typical convenience samples, elites are even more prone to act contrary to self-interest by rejecting low offers when bargaining. Appearing to anticipate this fact, elites also make higher offers. This may help to explain why policy elites, such as the diplomats who negotiate treaties on topics like global warming, pay close attention to distributional concerns even though such concerns have been a perennial source of policy gridlock.

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(14, 15). Therefore, it is plausible that higher levels of learning and experience in elite populations could push them further from the predictions made by standard models, suggesting that the tendency to reject low offers (found in many Western populations) could persist in populations of elite bargainers. Whether this is or is not the case is an empirical question (25, 26).

To examine whether elite policy makers also tend to reject low offers in the ultimatum game, we recruited a unique sample of 102 international elites with an average of 21 y of experience in high-level negotiations. Sixty-seven respondents had high-level experience in government, including former members of the US House of Representatives, US Department of State, Treasury, and other agencies of government. Twenty-seven were senior strategists within firms, frequently tasked with implementing the provisions of regulatory policy. Eight were from policy think tanks and nongovernmental organizations tasked with consulting government on trade and energy policy (see *SI Appendix* for additional demographics). We compare these elites to a convenience sample of 132 college students who played the identical games, and in *SI Appendix* we compare our elite sample to another convenience sample of 1,007 subjects recruited for the online labor market Amazon Mechanical Turk (mTurk). This recruitment of nonelites was designed to mirror the recruitment strategy that is widely used in political science, economics, and other behavioral sciences.

We studied subjects' bargaining behavior using a variant of the ultimatum game (1) in which two players bargained over a lottery prize of 100 USD, which would be drawn at the end of the study (see *SI Appendix* for instructions and details). This game is structured to be analogous to many international bargaining scenarios, where the payoff to any bargain occurs in the future, where there is potentially a high cost if parties fail to come to agreement within a set period, and where the ultimate value of an agreement is also uncertain. For example, climate negotiations have all of these properties (27), as do many trade negotiations (28). Although the ultimatum game is stylized—real-life international negotiations are likely affected by many local details and circumstances—the game offers the advantage of precision in measurement in a setting that makes salient the question of how players allocate a fixed sum. Because the game is widely used in the behavioral sciences, results we report here can be readily compared with studies on other populations (3, 4).

In the game, two players bargain over this prize using a "take it or leave it" protocol. The proposer makes an offer, P, specifying how much of the prize should be allocated to the responder. The responder simultaneously states a demand, Q, which is the minimum amount that they would be willing to accept. For all proposals where $Q \geq P$ the prize is split accordingly, with P going to responder and the remaining $(100 - P)$ going to the proposer.

Each subject played this game twice, once as proposer and once as responder. Responders' demand (Q) was elicited directly using the "strategy method," as it was important to measure players' exact demand—not simply whether they rejected a particular offer. This method—which involves asking responders to state the minimum offer they will accept, rather than asking them to accept or reject a particular offer—has been successfully used in a number of papers on bargaining, including some of the earliest studies (4, 13, 29). However, using this method means that our results are not necessarily directly comparable with studies that have not used this method (30). In each game, players were randomly paired with another anonymous participant from their cohort. Elites knew they were playing other elites, and college students knew they were playing other college students.

We also examined two decision-making traits and one attribute known to distinguish elite bargainers from college students, as all of these factors might plausibly impact bargaining behavior. First, previous studies show that international elites place a higher value on future outcomes (17). Because both the elites and college students in our study were bargaining over a future outcome, we hypothesized that higher levels of patience would make players value a successful bargain more, causing them to make more generous offers that were more likely to be accepted as well as smaller minimum demands.

Second, we also expect elites to be better at strategic reasoning (16, 17). Finding the best move in strategic games often requires a recursive thought process where each player considers what other players will do, what other players think they themselves will do, and so on, potentially ad infinitum (31–33). Humans have a limited and heterogeneous ability to think through this recursion (34, 35). Responders who fail to think about or anticipate what strategic proposers might offer, and how that offer might interact with any particular demand, could fail to realize that they do strictly better by accepting lower offers (29).

Third, elites have more experience with bargaining, which may affect their intuition about bargaining strategies in ways that are different from novice convenience players. Theoretical models in evolutionary game theory suggest that learning can cause demands to rise over time because proposers with less experience are initially uncertain about the distribution of plausible demands, leading them to make higher offers that are closer to a 50/50 split (14, 15). By making higher offers, proposers improve the payoff of responders who make higher demands, and this increases the chance that high-demand strategies are copied (14, 15). A selection process could also achieve the same outcome as a learning process if less successful bargainers are weeded out over time. We therefore expect elite bargainers with more experience to make higher demands.

We measured patience using a multiple price list task (36). Here, subjects made 20 choices about how they would be paid in the event that they won a separate lottery. Each choice was between an actual prize of 100 USD awarded 30 d from the time of the drawing and a prize of $100 + x$ USD awarded 60 d from the time of the drawing, where x is a positive, increasing number. For each value of x, subjects chose whether to wait longer for a larger reward. Following standard practice, we measure patience as the number of 60-d choices.

To measure strategic reasoning, we used a series of "p-beauty contest" guessing games (37–39) that require a combination of strategic reasoning and awareness of the reasoning skills of the other players. Each player picks a number from 0 to 100. The winner is the player whose number is closest to M times the average of all players' numbers (where M is a positive real number). In the most well-known version of the game, where $M = 2/3$, the Nash equilibrium strategy is 0 if players follow recursion to its logical conclusion by iteratively eliminating dominated strategies. However, numerous studies have shown that many players are unstrategic, and act randomly, choosing 50 on average (4, 35, 37–39). Other, more strategic players anchor their beliefs in this nonstrategic type, and think through a limited number of best responses by playing $50M^K$, where K is the number of iterative best responses that a particular player considers. Put differently, "K" is a measure of how many iterations in the recursive process that a player thinks ahead. Although this game does not exclusively measure a subject's ability to think strategically (40), it has been used to successfully predict behavior in other domains that are steeped in strategic interaction—such as voting* and the design of international treaties (17).

To improve accuracy in the measure of strategic reasoning, we measure subjects' strategic play across multiple p-beauty contest games and vary the multiplier M in each. We categorized each

*Loewen P, Hinton K, Sheffer L, European Political Science Association Annual Meetings, June 16–18, 2011, Dublin, Ireland.

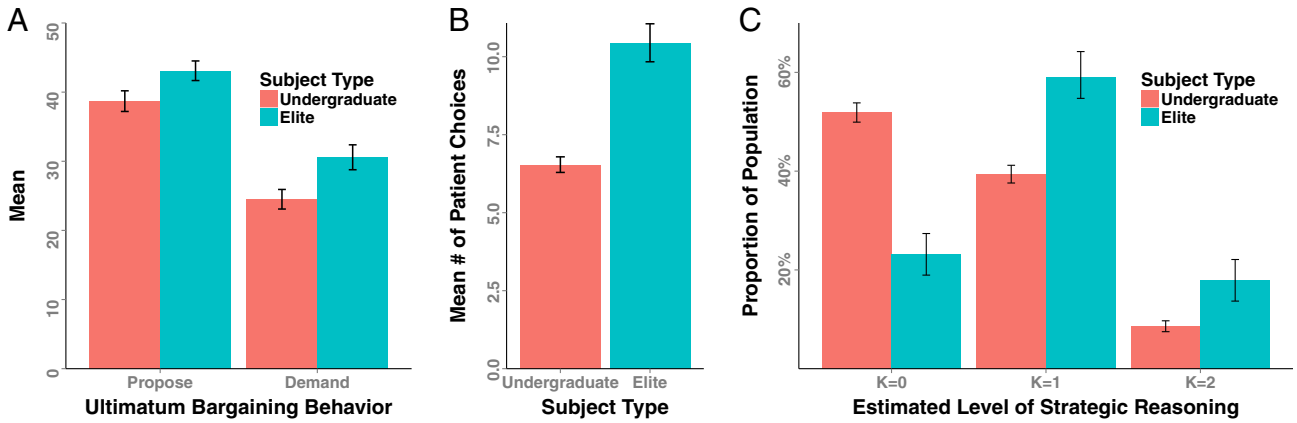

Fig. 1. Population differences between elites and undergraduates. Bars are sample means/proportions. Vertical lines are bootstrapped SEs: (*A*) In the ultimatum bargaining game, elites play further from subgame perfection, both offering and demanding more of a $100 lottery prize. (*B*) Elites make more patient choices in a multiple price list task, on average choosing the more patient option in 10 of 20 decisions. (*C*) Across six different *p* beauty contest games, elites are estimated to be more strategic. Comparatively few elites are level 0 type (who responds randomly to the decision-making task). More elites are categorized as level 1 and level 2 type, who act strategically, taking into account what other players might do.

subject according to whether their behavior most closely coincided with $K = 0$, 1, or 2 (see *SI Appendix* for further details). K levels above 2 are rare (4, 34, 35), and so all higher types are categorized at level 2 as well.

Finally, to measure experience, we asked elites a set of survey questions that included two variables: age and reported years of experience in their current field of work.

Results

We first compare the elite and college samples and find some important differences. Fig. 1*A* shows the mean offer and demand in both our elite and college sample. Consistent with many past results (4, 14, 15), college students make an average offer that is close to 40 (mean = 39; SEM = 1.49), but demand much less (mean = 25; SEM = 1.42). Elites by contrast make significantly higher offers (mean = 43; SEM = 1.47; two-tailed t test $P = 0.04$), and higher demands (mean = 31; SEM = 1.78; $P = 0.008$) than college students. It therefore appears that elites play closer to a norm of demanding and offering 50, suggesting that rejecting low offers may play an even more important role in their bargaining intuitions. This contrasts with the widely held assumption that experience with decision making leads elites to become more self-interested and rational.

Can we explain the difference in bargaining between elites and college students based on other traits? Fig. 1*B* shows the mean number of patient (60-d) choices for college students and elites. As in previous studies, elites make more patient choices (difference in means = 3.4; SEM = 0.6; $P = 4 \times 10^{-7}$), suggesting that they put a higher value on future outcomes (17). This is consistent with their tendency to make higher offers, because they increase the likelihood of a successful bargain. However, it is inconsistent with their tendency to make higher demands, because this makes bargains less likely.

Fig. 1*C* shows the estimated level of strategic learning for elites and college students. Elites are 28.8% (SEM = 4.8%; $P = 1 \times 10^{-7}$) less likely to respond randomly to the task ($k = 0$). They are also 19.5% (SEM = 5.4%; $P = 4 \times 10^{-4}$) more likely to iterate once in their reasoning ($k = 1$) and 9.3% (SEM = 4.1%; $P = 0.03$) more likely to iterate twice ($k = 2$). This higher level of strategic reasoning among elites is inconsistent with their tendency to make higher demands than college students.

So the population results create a puzzle: why are the more-patient and more-strategic elites demanding more instead of less? To address this puzzle, we study individual level behavior in Fig. 2. These results show that there is a significant and negative relationship between responders' demands in the ultimatum game and patience ($\beta = -0.57$; $P = 0.004$) and a strong negative relationship as well with strategic reasoning ($\beta = -5.14$; $P = 0.007$). It therefore appears that players who value future rewards more, and who think more carefully about their strategic best response, do make lower demands. Further analyses in *SI Appendix* show that this relationship holds in both our college and elite samples. This suggests that the population-level differences in patience and strategic reasoning are not driving the differences in individual behavior between elites and undergraduates.

Because neither patience nor reasoning can explain the difference in bargaining behavior, we turn to our final hypothesis, that job experience explains the difference between college students and elites. Fig. 3 shows that within our elite population more experience is significantly associated with higher demands and higher offers. This association suggests that processes of either learning or selection are causing more experienced elites to bargain even less based on self-interest over time. However, it may also simply reflect other demographic traits that correlate with experience—notably age. Unfortunately, age and experience are highly correlated in our elite sample, so it cannot be used to separate these two possible causes of increasing demands.

To distinguish between age and experience, we might compare elites with our undergraduate sample, but the range of variation in that sample is extremely limited. We therefore turn instead to our sample recruited from mTurk, the online labor market. These individuals range widely in age but do not typically have experience in matters related to economic policy and business strategy that are the domain of policy elites. If age tends to drive ultimatum game demands up over time, we would expect to see a strong positive correlation in the mTurk sample, but consistent with other studies (41) we do not (*SI Appendix*). This suggests that it is experience and not age that drives the relationship with increasing demands that we see in the elite sample.

Discussion

This study is the first (to our knowledge) to measure attributes fundamental to strategic bargaining in a sample of the elite population that makes the most important economic policy and business decisions in a modern economy. In contrast to recent studies that found no difference between the general population and more elite college students (42), we find that real-world policy elites—people who, after college, occupy high positions in business and government—offer and ask for significantly more when they engage in bargaining. The results suggest that, although

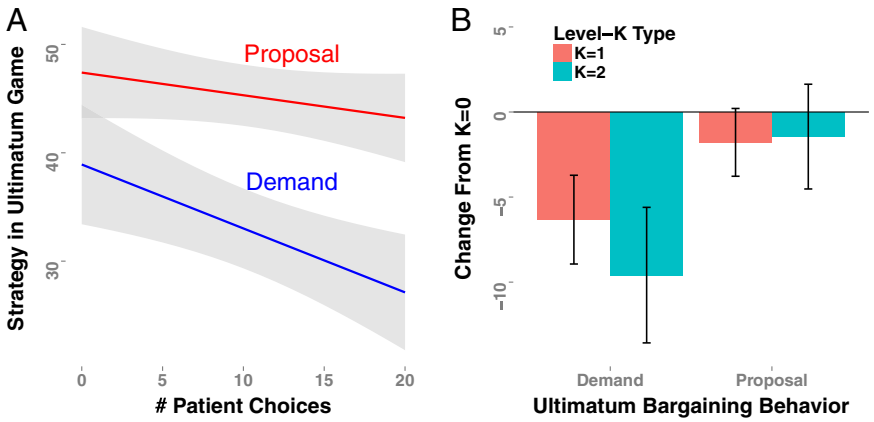

Fig. 2. The individual-level relationship between patience, strategic thinking, and ultimatum bargaining. (*A*) Robust regression shows that making more patient choices is associated with lower demands in the ultimatum game. However, there is no significant relationship with proposals. Lines and confidence intervals are from robust regression on the pooled sample. (*B*) Likewise, compared with unstrategic level 0 players, level 1 and level 2 players make lower demands, but do not make different offers. Bars represent coefficients from robust regression pooling elites and undergraduate samples (who have highly similar coefficients). Vertical lines represent SEs.

differences in patience and strategic reasoning can explain higher offers, they cannot explain higher demands. However, elite demands increase with age and experience, and the difference between elites and college students disappears when we control for these variables.

The classical economic model of humans ("*homo economicus*") assumes that we are self-interested and rational, and any deviations from this behavior would tend to be eliminated through a process of learning or selection (22, 43). However, recent work on the ultimatum game in small-scale societies suggests just the opposite. Demands for 50/50 splits are higher in advanced economies and in small-scale societies with more exposure to advanced markets (3, 13). Similarly, our work with international elites suggests that they deviate even more from the *homo economicus* model than the average citizen in even the most advanced economy, and the size of the deviation increases with experience in high-stakes bargaining institutions. Elites either change how they bargain over time or there is a process of selection that favors elites who demand higher offers when bargaining.

Although we cannot say that the relationship between experience and higher demands is causal, it does suggest that demands for higher offers are likely to persist, even in a population with a high level of bargaining experience. This empirical result supports theoretical models that show demands for higher offers can persist in a population where agents engage in social learning (14, 15). In fact, these models suggest that experience can cause both offers and demands to approach a 50/50 split (14).

Among scholars in international affairs there has been a recent surge of interest in the use of experiments (44–46). The work presented here demonstrates that elites behave differently than subjects normally used for such experiments, which suggests that in some settings it may be important to use elite samples or it may be possible to calibrate nonelite samples against the known properties of elites such as those reported here (16).

A potential concern about our results is that elites demanded higher offers because they cared less about the monetary stakes and more about potential harm to their reputation if their behavior were disclosed publicly. We addressed this concern directly when we interacted with elites by emphasizing to them that their names would not be included in the dataset, and we have also been able to control (albeit crudely) for income effects with self-reported data (see *SI Appendix*, which reports no income effect). In practice, it is unclear what direction reputational concerns might drive the results (do bargainers want to be seen as "tough," or "fair," or something else?). Regardless of the underlying cause, it is unlikely that reputational concerns would have an increasing effect with experience on behavior in the ultimatum game. If anything, an anonymous decision during an

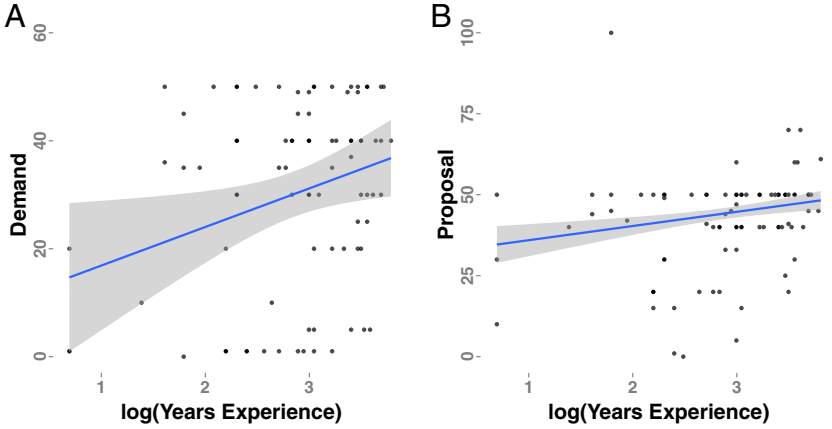

Fig. 3. Ultimatum game decisions in elite subjects by years of professional experience. Best-fit line estimated using robust regression. (*A*) Elites with more years of experience demand more in the ultimatum bargaining game. (*B*) Elites with more experience also offer more in the ultimatum game.

academic study should have a declining effect on reputation for subjects that have had more time to establish their identity in the real world.

In addition to furthering our understanding of human bargaining behavior, our results may also help to explain important aspects of international cooperation. Standard models of international bargaining are based on *homo economicus* assumptions of rational self-interested behavior by governments along with the assumption that policy elites reliably represent the interests of the governments they represent (6, 7). However, the results here suggest that real-world outcomes may be radically different from those predicted by theory because elite policy makers behave very differently than assumed. Across a wide range of topics such as international trade, development assistance, and management of global climate change—domains where a central task of diplomatic bargaining involves allocating the gains from cooperation and managing expectations of equity (47, 48)—real-world policy makers may be prone to offer and expect outcomes that are much more equitable than predicted.

For example, the demand for more equitable offers may help to explain surprising and seemingly irrational behavior in international diplomacy on the problem of global warming. Experts on the mitigation of warming emissions have demonstrated that the least cost strategy would have all nations adopt a common price on emissions such as a carbon tax or emission trading scheme (49), which would create uniform global incentives. However, diplomats reject this advice for imposing large burdens on developing nations that have historically been less responsible for global emissions. Instead, they typically cite text in the preamble of the United Nations Framework Convention on Climate Change that includes the requirement that agreements honor the "common but differentiated responsibilities and respective capabilities" of countries to respond (50, 51). Dispassionate analysts often dismiss preambular language as cheap talk, but in reality "common but differentiated responsibilities" has become a central organizing principle for all diplomatic action on climate change. It lies at the root of the gridlock on global warming that has persisted for decades (48) despite the fact that—just like the ultimatum game—any agreement is better than no agreement. Even the most inequitable accord would likely improve the welfare of nearly all nations compared with the status quo (52).

These demands by developing states for more equitable outcomes may also help explain why rich countries are creating massive new financial transfers linked to climate change that create no tangible economic benefit for the donors. Since the 2009 Copenhagen Conference, diplomats have established multiple institutions to transfer money to developing countries, and they are earmarking a large fraction of those funds to help countries adapt to the effects of climate warming. Many studies have shown that the continued failure to address emissions will force much greater attention to adaptation (52, 53), and the benefits of adaptation are mainly local, which suggests that rational self-interested countries should care little about how others fare. Instead, adaptation funding has become a linchpin in climate talks and the poorest and most vulnerable countries have demonstrated they are willing to reject climate agreements (50) that do not handle adaptation funding in an equitable way.

In summary, both our work with international elites and the empirical evidence on climate talks suggest that self-interest is not sufficient to explain what we see in real-world international negotiations, and scholars who model bargaining should take this evidence into account. For years, most economic analysis of climate bargaining has focused on the opportunity to reduce the total global cost of controlling emissions through hypothetical global regulatory agreements, whereas moral philosophy about how to equitably allocate those global costs has been relatively scant (54). This imbalance in the analytical literature may itself have contributed to persistent policy gridlock because it has focused some policy makers, especially in the rich industrialized countries whose emissions are relatively high, on the imperatives for global regulation while largely ignoring the fundamental challenge in crafting an acceptable deal. If governments want to make progress on the most pressing problems of our time they must recognize that narrow self-interest will not yield acceptable outcomes. Fortuitously, many of their elite policy makers already seem to have internalized that message.

SI Appendix accompanies the paper.

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