

Replication, Realism, and Robustness: Analyzing Political Regimes and International Trade

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Our earlier article established that pairs of democracies trade more freely than country-pairs composed of a democracy and an autocracy (Mansfield, Milner, and Rosendorff 2000). Xinyuan Dai (2002) incorrectly asserts that our conclusion depends on the preferences of the decision makers who formulate trade policy. We show that Dai fails to accurately replicate our model, and hence erroneously claims that the new equilibria she deduces are consistent with it. In addition, we demonstrate that in altering one of our assumptions, Dai offers a model that is less realistic as well as inconsistent with the substantive literature on international bargaining. Finally, we question the robustness of her approach. Due to these problems of replication, realism, and robustness, we conclude that Dai's model is of limited utility.

Our article established that pairs of democracies trade more freely than (mixed) country pairs composed of a democracy and an autocracy (Mansfield, Milner, and Rosendorff 2000; hereafter MMR). Xinyuan Dai (2002) asserts that our conclusion depends on the preferences of the decision makers who formulate trade policy. Dai is incorrect. Her results differ from ours solely because she has changed a key assumption of the model. Given the stated assumptions of our model, each player's behavior in equilibrium is optimal and is a best reply.

It is often useful to debate the merits of a model's assumptions, and it is not surprising that altering the assumptions can affect a model's results. Dai, however, ignores one of our explicitly stated assumptions and fails to acknowledge that her results differ from ours as a consequence. Moreover, she never touches upon the relative merits of her assumption. But when choosing a modeling strategy, it is important to be attentive to the assumptions one uses, preferring those that are more realistic and result in more general conclusions. Dai's model suffers from serious problems in this regard, particularly because of its unrealistic assumptions about international economic negotiations. Furthermore, Dai offers no evidence about the robustness of her claims in contrast to our model. Finally, the empirical record lends greater support to our argument than Dai's, since we found strong evidence that democratic pairs have had more open trade relations than mixed pairs, irrespective of policy makers' preferences.

In the following sections, we elaborate on these problems of replication, realism, and robustness. First, we show that Dai fails to replicate our model faithfully and hence erroneously claims that the new equilibria she deduces are consistent with it. Second, we show that altering our assumption as Dai does yields a model that is less realistic and less consistent with the substantive literature on international bargaining. Third, we question the robustness of her approach. We conclude that her model is of limited utility. Not only does our model capture an important element of international economic negotiations missing in Dai's approach, but

also it yields results that are robust and have empirical support.

CHANGING A KEY ASSUMPTION

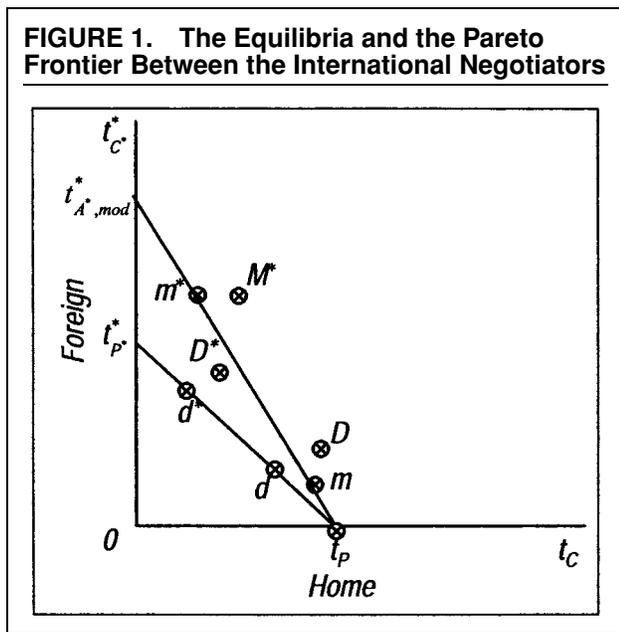
Dai begins by attempting to replicate our model. Her effort, however, is seriously flawed because she fails to adopt one of our stated assumptions. Consequently, she produces a different model with some new equilibria that are inconsistent with our original approach.

Our purpose was to investigate the effects of regime type on international trade negotiations, conceived of as a "two-level game." In such situations, the international negotiators strike an agreement that may, depending on the nature of the regime, require domestic ratification before it can be implemented. As a first cut, we employed a take-it-or-leave-it (TILI) bargaining structure (which was relaxed later in the article) in which either the home or the foreign executive makes an offer that must be accepted or rejected by the other executive. Once accepted, and if necessary, the offer is brought home for domestic ratification by a player we called the legislature. If rejected, the players adopt their noncooperative Nash strategies. The preferences of the players are common knowledge and there is no private information.

The extensive form of our game was explicit. We specifically limited the action spaces of the international negotiators *by assumption*. Since the actors' indifference curves are circles around their ideal points, the Pareto frontier for the international negotiators (i.e., the executives) is the straight line between their ideal points in tariff space (the straight line t_P^*, t_P in Figure 1 in the case of two democracies). In each game that we studied, the TILI offer must—by assumption—lie on the contract curve between the ideal points of the international negotiators. Dai, in contrast, makes no such assumption and so permits the action space to be the entire quadrant in (home and foreign) tariff space.

It is difficult to understand how there could be any confusion about our assumptions. In describing the

FIGURE 1. The Equilibria and the Pareto Frontier Between the International Negotiators



TILI game, we explicitly stated that “we require that the international negotiators choose a ratifiable offer that lies on *their* Pareto frontier when such an agreement exists” (MMR, 308, fn. 9; emphasis added). We reiterated this point in our discussion of negotiations between a democratic executive, *P*, and a foreign autocrat, *A**: “Recall that *P* is required to offer to *A** a point on *their* Pareto frontier” (MMR 310, fn. 11; emphasis added). In the Appendix, the assumption was given high prominence throughout. Indeed, we began the section on “The TILI Game with Home Offers” by reminding the reader that “we require the home executive to offer the foreign executive an agreement that lies on their Pareto frontier” (MMR, 319). The assumption is also referred to elsewhere in the article (e.g., p. 311, fn. 13, and p. 319).

Given our assumptions, all of our conclusions follow logically. Dai is incorrect in asserting that our “solution is not optimal for the executive making the offer” (e.g., Dai 2002, 159–61) and that they “are not best replies” (Dai 2002, 160–1). Given the stated assumptions in our model, each player’s behavior in equilibrium is optimal and is a best reply. Dai’s results, however, do not follow from the model we presented. In Figure 1 (which is drawn for a pair of democracies and for a mixed pair composed of a democracy and an autocracy with moderate trade policy preferences), we show this point graphically. The bargaining outcomes in our model must, by assumption, lie on the Pareto frontier between the international negotiators—i.e., either on the line $t_p^*t_p$ in the case of the democratic pair or on $t_{A^*}^*t_p$ in the case of the mixed pair. The equilibrium strategy of any executive making a proposal must be the element of the action space lying on this Pareto frontier that maximizes that player’s expected utility. The TILI offer for each player, as indicated in our article, is optimal for the executive making the offer under the conditions specified and is indicated by d, d^* ,

m, m^* , or t_p in Figure 1 (depending on the case and the identity of the proposer).

Dai, however, ignores our assumption. Consequently, the outcomes that emerge from her approach—i.e., M^*, D, D^* —lie off the Pareto frontier of the executives. At M^*, D , or D^* , it is as if the foreign executive has bypassed the international negotiation entirely and bargained solely with the other country’s legislature. These are not equilibrium outcomes in our model. Furthermore, as we indicate in the next section, the behavior that would generate such equilibria is at odds with the usual construction of a “two-level game.”

In fact, Dai (2002, 161) acknowledges the accuracy of our results when our assumptions are used. She simply chooses to disregard our assumption that the offer must lie on the Pareto frontier between the international negotiators. It is therefore important to consider whether our assumption is reasonable. Dai offers no explicit discussion of this issue, perhaps because our assumption is more defensible than hers.

MODELING A TWO-LEVEL GAME

Our model derives from an attempt to present parsimoniously but realistically the complex bargaining among domestic and foreign actors that is central to the literature on two-level games. These games posit two, sequential negotiating phases; hence their name. The first phase involves bargaining between the home and the foreign executives to arrive at an international agreement. The second phase requires ratification of the agreement by domestic actors if the country is a democracy. Such international bargaining implies that both executives influence the agreement. We could have modeled a full-fledged bargaining game at the international stage, complete with offers and counteroffers. In the interests of simplicity and parsimony, however, we reduced the bargaining structure to this modified TILI game in which one executive makes an offer drawn from the set of Pareto efficient agreements. Hence while the executive making the offer has most of the “bargaining power,” the other executive has some influence on the bargain by virtue of the restriction on the agreement space. Pure TILI is an extreme bargaining structure for international politics since there are no international constitutions or conventions that give one state the right to impose such a framework on its interactions with other states.

By changing our assumption, Dai effectively removes one of the executives from the international stage of the game. This agent has no impact on the trade agreement. In every two-level game of which we are aware, however, the actors involved in making the bargain are the countries’ chief executives, not their legislatures (or any other domestic actors). Executives bargain first, and then other domestic actors choose whether to ratify the international agreement. As Putnam (1988, 436) wrote in his seminal article on two-level games, “It is convenient analytically to decompose the process into two stages: 1.) bargaining between the [international] negotiators, leading to a

tentative agreement. . . 2.) separate discussions within each group of constituents about whether to ratify the agreement.” Such sequential bargaining is similar to that used by other studies of two-level games (e.g., Iida 1993; Mo 1995).

Dai’s model is inconsistent with the mainstream literature on two-level games. In most models of this sort, the domestic ratifiers act as a constraint but their preferences do not directly affect the outcome of the international negotiations. Legislatures cannot bargain internationally, and executives, when bargaining with each other, select their most preferred agreement first among all of those that their legislatures would ratify. The two-level nature of the game is eliminated in Dai’s model. What remains is effectively a single bargaining game, which at times (i.e., where her results differ from ours) involves only the home legislature and the foreign executive. Dai’s approach provides an unrealistic depiction of international economic negotiations, since it is very unusual for foreign leaders to bargain directly with another country’s legislature.

THE CONSEQUENCES OF RELAXING THE ASSUMPTION

The benefits of Dai’s change to our assumption are not apparent. Not only does this change degrade the model’s realism, but also it reduces the model’s generality. Dai admits that her central result is not general and must be qualified by the preferences of the agents. No such qualification is required by our model.

Furthermore, the model presented in our article is robust to alternative bargaining structures. The second part of our model investigated the consequences of relaxing the TILI restriction on the bargaining game. We considered a more realistic bargaining structure where the gains from any agreement were evenly split between the international negotiators (which we denoted the SPLIT game). We showed that our results are robust to this shift in bargaining structure; moreover, our results hold for *any* division of bargaining power among the international negotiators (MMR, 311).

Dai neglects to conduct this robustness check. Moreover, it is far from obvious how to go about doing so given her bargaining structure. Our analysis, on the other hand, yields clear and unqualified predictions independent of the rules governing bargaining between international negotiators.

CONCLUSION

The results of our original model hold regardless of the preferences of countries’ chief executives. Contrary to the claims of Dai (2002, 159, 161–3), aggregate trade barriers between democratic pairs are lower than those between mixed pairs. Our assertion that “[a] democracy lowers its trade barriers more when it seeks mutually acceptable concessions with another democracy than when it deals with an autocracy, no matter what the relative preferences of the two leaders” is correct (MMR, 310). Equally correct is our argument that “a protectionist legislature forces democracies to lower their trade barriers more than otherwise” (MMR, 311; Dai 2002, 162). There is no “mistake” in our analysis (Dai, 2002, 160, fn. 1).

Dai has failed to replicate our model and has changed one of its key assumptions. Consequently, it is not surprising that she arrives at different conclusions. Changing this assumption, however, creates serious problems. First, Dai’s model is not consistent with either the influential literature on two-level games or the reality of international trade negotiations. In contrast, our model is consistent with this literature and is more faithful to reality than the alternative model that she presents. Second, our model generates results that are robust to variations in the bargaining structure. Dai’s model does not. Third, our results are clearly consistent with the data we present. Dai again makes no attempt to show that her model fits the data better than does ours. In sum, then, Dai’s model is much less useful than ours for the purpose of explaining how domestic politics influences international trade.

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