Gerald R. Ford School of Public Policy
University of Michigan

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THE FRIENDLY SKIES: MOBILITY AND INTERNATIONAL CONFLICT

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Abstract

Most empirical research linking globalization and conflict focuses on democracy and trade, but these are just two factors in a broad array of changes to the international system since World War II. Key among these are unprecedented shifts in the extent of interaction across borders, most notably in terms of mobility. Drawing on an original dataset of all international air traffic, I find that the United States resorts to force less often in high mobility relationships than it does in low mobility ones. I then generalize this finding by demonstrating a substantial negative relationship between international transit and multiple measures of interstate conflict between all states. These findings suggest a novel way of accounting for the underlying affinities and aversions between states in models of international conflict and the use of force. They also offer preliminary indications of a secondary mechanism that might contribute to the maintenance of the “liberal peace.”

When David Cameron took office Barack Obama wasted no time placing a phone call to the new prime minister to reaffirm the “special relationship” between the United States and the United Kingdom. Relaying the conversation to the press, Obama stated, “As I told the prime minister, the United States has no closer friend and ally than the United Kingdom, and I reiterated my deep and personal commitment to the special relationship between our two countries - a bond that has endured for generations and across party lines.” But what makes a relationship “special,” and how can scholars measure it rather than know it when they see it? The answer to this question should
matter a great deal to those concerned with understanding the origins of international conflict because the underlying affinities and aversions between states likely bear a close relationship with both the frequency of conflict and factors such as shared democracy and bilateral trade that scholars commonly model as the antecedents of conflict. Moreover, while the “special” relationship between the United States and the United Kingdom is a particularly stark example, it serves to focus attention on an entire dimension of the ties between all states that has largely escaped the scrutiny of international relations scholars.

The problem with characterizing these affective ties is that they are multifaceted, and this is part of what gives them their strength and durability. Yet most existing work in this domain focuses narrowly on strategic agreements and overlapping foreign policy preferences. In the case of the US and the UK these certainly exist – the countries are committed to one another’s mutual defense through NATO and almost reflexively back one another’s foreign policy preferences, even when it is costly. But strategic and political ties alone miss the deeper cultural interactions and affinities that durably tie states together at the level of their mass publics as opposed to leaders and elites.

The goal of this paper is to introduce one way in which scholars might capture the extent of these ties, and, by extension, that underlying affinity – the volume of mobility between states measured with data on air traffic. The advent and popularization of air travel has generated unprecedented flows of people across international boundaries, and, using an original dataset on global air traffic, I identify a

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1 The United Kingdom’s support for US preferences in Iraq is a prime example. For more on this see Baum (2013).
substantial negative relationship between the volume of these connections and the probability of international conflict.

One can, however, conceive of this relationship as the result of either correlation or causation. Because this article is the first to even identify general relationship between population mobility and conflict I develop both versions of the argument. I contend that, at a minimum (i.e., the correlation argument), mobility captures the strength of the social ties between countries and is an accurate indicator of the underlying affinities and familiarity between states. Moreover, because it is the aggregation of many individuals’ actions, mobility captures an aspect of the relationship between states that is distinct from the long-standing controls for the affective and strategic ties between states including the number of military alliances (Singer 1966), alliance portfolio similarity (Buena de Mesquita 1975), or United Nations voting records (Signorino and Ritter 1999). It also stands apart from existing measures of interaction in terms of trade independence. The more ambitious causal argument is that mobility improves information exchange and increases the affinities between populations and changes public opinion and through these mechanisms actually limits conflict between states.

In the pages that follow, I will develop both of these possibilities in more detail, but the potential for endogeneity (specifically reverse causality) and the absence of a plausible identification strategy, means that the causal argument cannot be definitively established empirically. It should be noted, however, that this is precisely the same problem that persists in both the democratic peace and trade interdependence.
literatures, where causal arguments have been posited but challenges remain (e.g. Gartzke 2007, 2000; Farber and Gowa 1995; Gibler 2007). The goal for this article is therefore relatively modest, but points the way toward something potentially more important. It is the introduction of a measure of the underlying affinity between states that has gone unappreciated in the extant literature, and a call to action for more explicit consideration of the potential for a causal relationship between mobility and international conflict.

The remainder of the article proceeds as follows. In the next section I lay out the theoretical linkages between mobility and international conflict. To establish robustness, I test for a relationship between mobility and conflict in two distinct empirical domains. First, I consider how these forces might influence the choice to resort to force as opposed to alternative methods of dispute resolution by the United States. I then generalize the argument by assessing the relationship between mobility and the incidence of international conflict measured with data on militarized interstate disputes, fatal militarized interstate disputes, and international crises as defined by the International Crisis Behavior (ICB) project. I conclude with a discussion of the implications of these findings and directions for future academic research.

**Mobility as an Indicator of Affinity**

The substantial body of existing research on the underlying propensity for conflict between states focuses primarily on accounting for the similarity of states’
foreign policy and security positions. The idea is that states with similar interests are less likely to come into conflict with one another than are those whose interests diverge.

The simplest version of this thesis is that states with formal alliance relationships are less likely to fight and therefore that alliances must therefore be accounted for in any assessment of likely conflict (Singer 1966). Alliances, however, have been credited with both preventing and provoking international violence. De Mesquita and Lalman (1988) argue that the relative tightness or polarization of alliances at a global level has an important relationship with international conflict and violence. Others, drawing on examples such as World War I, suggest that rigid alliances can draw states into conflicts that they might otherwise be able and inclined to avoid. Some have gone so far as to argue that alliances function in large part to mediate the potentially conflictual relations between signatories (Cha 1999; Schweller 1998; Weitsman 2004), calling their use as a measure of shared interest into question. Bueno de Mesquita (1981) actually finds evidence that allies actually fight each other more often than non-allies. Bearce, Flanagan and Floros (2006) further the argument that alliances are a suspect measure of shared interests because their effect is contingent on the power ratio between allies. Along similar lines, Long, Nordstrom, and Baek (2007) find that alliances with provisions for nonaggression, peaceful dispute settlement, and military institutionalization are considerably more associated with peace than those without these features.

This simple conception of bilateral alliances, however, quickly gave way to the idea that the similarity of states’ alliance portfolio could convey more nuanced
information about the extent to which their policy positions overlapped (Buena de Mesquita 1975). Altfeld and Buena de Mesquita (1979) proposed that alliance portfolios could be interpreted as revealed security preferences, and since then many scholars have used these measures to account for the similarity of states’ international interests. Noting the potential issues with formal alliances (for example, the fact that France and the United Kingdom at closer formal alliance ties with the Soviet Union than the United States at the close of World War II), others have added more granularity to alliance measures by proposing alternative ways of capturing the overlap of policy preferences such as United Nations voting patterns (Signorino and Ritter 1999).

None of these approaches, however, are completely satisfying on their own. Measures of bilateral alliance tend to miss important relationships that have not been officially ratified for political reasons and fail to address the changes in alliance norms over time. For example, there is no formal mutual defense treaty between the United States and Israel despite clear statements by the United States assuring its support, reflecting both the difficult strategic situation in the Middle East as well as a general decline in codified defense treaty obligations across all states. Moreover, such measures have a built-in tendency to treat strong and seemingly sacrosanct relationships (e.g. the aforementioned relationship between the United States and the United Kingdom, which are committed to mutual defense through NATO) with seemingly weaker relationships (e.g. the United States and the Philippines, which also have a mutual defense treaty). It seems somewhat less than guaranteed that the United States would go to war with China in defense of the Philippines were their dispute over the Spratly Islands to
escalate. The more nuanced measures of alliance portfolio similarity and UN voting records are also limited. In the first case the scope is still constrained to security relations and is afflicted by the same issues as bilateral treaty measures, and the second suffers from the reality that general assembly voting is strategic, and that resolutions are generally non-binding and politically insignificant.

Population mobility captures a very different, but equally important, aspect of the ties between states. By focusing on alliances or United Nations votes, scholars are implicitly making the assumption that conflict is primarily the product of elite decision-making. While this is perhaps often (or even preponderantly) true, when we consider “special” relationships such as the one between the United States and the United Kingdom or others in which conflict seems inconceivable, it is the ties between populations as much as those between elites that cement the bond. This link between mass opinion and foreign policy is particularly felt in an era in which the nature of large-scale conflict means that mass consent is almost always a prerequisite for the major use of force, even in autocracies (Baum and Potter 2008).

Mobility is a composite of a wide array of meaningful social, cultural, and economic interactions. For example, high levels of mobility are associated with the cultural affinity and interest captured by tourism. It also incorporates important aspects of the ties between diaspora and immigrant communities and their homelands and, in this regard, is superior to measures of ethnic or linguistic similarity because it captures active bilateral relationships rather than those that are vestiges of interaction that may have occurred generations prior. Mobility also captures a side of international trade that
is wholly distinct from the measures of aggregate import/export data that are commonly employed in the interdependence literature. A great deal of international trade is so fungible and mobile that its relationship with peace and conflict is somewhat suspect. Russett (1997) clearly articulates the standard logic of trade interdependence, stating, “if we bomb the cities or factories of a close trading partner – where we also are likely to have heavy private investments – we are bombing our own markets, suppliers, and even the property of our own nationals.” However, many trade relationships lack this level of integration and investment. This is particularly true of trade in resources and commodities, but it also applies to a great deal of outsourced production. For example, a typical trade interaction might involve nothing more than an electronic order placed by a multinational corporation to a Chinese manufacturer, loading a container in China, shipment to the United States via a third-party cargo vessel, and, finally, a payment by electronic bank transfer. In contrast, to the extent that mobility relates to commerce, it captures the movements of executives developing and maintaining business connections and investment opportunities, and the flow of workers who will bridge countries together. Finally, measures of mobility are sensitive to the deterioration of relations between states in a way that other measures are not. Any souring in relations that increases the probability of conflict is likely to be rapidly reflected in a decreased willingness by citizens to go the potentially hostile state. In this regard mobility is a particularly sensitive measures of the underlying quality of bilateral relations that stands in contrast to the various measures of alliance, which are sticky
and can often outlive the sunny relationships and/or strategic calculations that gave rise to them.

In sum, even absent a causal relationship between mobility and international conflict, the flow of individuals internationally still conveys important information about the nature of the underlying relationship between those states. This information is important because the underlying propensity for conflict between states in the international system is far from consistent and existing measures do an incomplete job at best of capturing it.

**Mobility as a Cause of Peace?**

Although almost entirely neglected in more recent research, the idea that the mobility of individuals can contribute causally to peace is not without precedent. Karl Deutsch (1957) pioneered arguments about mobility as a “transaction flow” that contributes to international peace by fostering “mutual sympathy and loyalties,… ‘we-feeling’, trust, and mutual consideration.” In this view, mobility is a key attribute of “security communities,” or integrated political areas such as Western Europe or North America in which international conflict is essentially “ruled out” (Deutsch et al. 1957). Keohane and Nye (1977) put forward a similar logic in their conception of “complex interdependence,” which is based in part on the idea that the sense of identity and shared community helps mitigate violent conflict. These authors were not alone in making such arguments – in his seminal volume, *The Causes of War*, Blainey (1988) spends the better part of a chapter addressing what he sees as the widely held notion
that connectedness and communication between countries should reduce conflict, suggesting the relative prominence of such arguments only a quarter century ago. Finally, more recent constructivist arguments have reached similar conclusions, though by a different route. Scholars like Wendt (1999) and Ruggie (1998) claim that reinforcing and socializing interactions, facilitated by international mobility, influence the interactions between states.

There are also rationalist explanations that potentially link mobility to a reduction in conflict. Mobility contributes to iterated interactions and the shadow of the future, to borrow Axelrod’s (1981) concept. Frequent and repeated contact at multiple societal levels brings with it communication and improvement in the transmission of information between mass publics and decision-making elites that allows states to more closely approximate the rational actors envisioned in the bargaining and war literature (Wagner 2000; Baum and Potter 2008). Improved information, in turn, results in better knowledge about both the preferences and resolve of potential adversaries, and this is just the sort of knowledge that prevents the misunderstandings that contribute to conflict and enables settlements short of armed conflict that are preferable to both sides. Fearon (1995) points out that even rational states might still be forced into war as a credible means to reveal private information, but only when their disagreement about their relative strength is so extensive that “no negotiated outcome is mutually preferred to war.”

Approaching the question from a completely different angle, considerable evidence from some of social psychology’s foundational studies bolsters the possibility
that the interactions generated by increases in international mobility might contribute to peace. For example, Zajonc and those who built on his work established that, under experimental conditions, familiarity breeds liking (Miller 1976; Zajonc 1968; Bornstein 1989; Sawyer 1981; Kunst-Wilson and Zajonc 1980). Along similar lines, Tajfel and Turner (1986) find that individuals routinely categorize others into groups in order to simplify a complex social environment. Individuals view themselves in a positive light by establishing membership in a prestigious “in-group,” which is established through interaction – hence the link to the increased density of interaction generated by international mobility. Individuals tend to minimize potential conflict with members of groups to which they belong and undertake actions (including conflict) that will increase the prestige of their in-group at the expense of outside groups. Finally, scholars have established that, under some circumstances, interaction can reduce prejudice (Watson 1947; Williams 1947; Pettigrew 1998). Allport (1954) argues that that equal group status, common goals, intergroup cooperation, and authority contribute to a climate in which interaction can reduce tensions. Upon first inspection, these conditions seem strict, suggesting that the positive effects of interaction, especially at the international level under examination here, would be relatively rare. Empirical findings, however, indicate that the effect is, in fact, surprisingly easy to trigger (Pettigrew 1998).

The conditions that Allport specifies do, however, help to explain why mobility might mitigate conflict in some cases and not in others. For example, all these conditions are wholly absent in the relationship between Israelis and Palestinians – a prominent stand-in for a host of cases in which there is deep familiarity and conflict, but
persistent conflict. In distinct contrast, the degree to which these conditions (excluding authority) hold has increased over time in the relationship between the United States and China, a case in which low-level interactions appear to have had primarily positive consequences. More generally, Allport’s conditions suggest that inherently unequal, non-cooperative international relationships – for example, those characterized by colonialism or some other form of economic or cultural exploitation – are unlikely to generate the sort of changes that I am attributing to mobility.

Mobility occurs at the level of the individual, while conflict occurs between states. Thus, the question remains how individual experiences aggregate to state behavior. This issue of aggregation is actually a more general, though widely overlooked, challenge in the study of international relations (but see Tomz and Weeks forthcoming for more on this point). It certainly persists in the relationship between trade and conflict and the democratic peace, which are also theories characterized by aggregate individual behaviors. In general, systemic theories of international relations are weak when it comes to the processes by which the beliefs and actions of individuals aggregate to the actions of a state. Instead they rely on a stylized anthropomorphization of an entity (the state) that, in reality, has no preferences and cannot undertake actions independent of the individuals from which it is comprised.

This issue raises particular concerns in this analysis because it is unlikely, if not impossible, for the majority of the population of a state to gain the first-hand contact that could trigger the mechanisms that I have described. How is it then that the opinion of the small subset of the population that does gain familiarity through mobility
contributes to more peaceable actions by a state? One plausible possibility is that this process occurs through the interaction between opinion leaders and a broader population that has only a weak knowledge of the international system and loosely-held opinions about it. This interaction between decision-making elites and an informationally disadvantaged public is a central fixture in the literature on opinion and foreign policy (Baum and Potter 2008), but it is also the precise informational arrangement that best facilitates the rapid diffusion of an opinion or attitude through a population (Watts and Dodds 2007).

A considerable body of work documents the reliance of average voters on opinion leaders. Research has shown that citizens are able to overcome informational disadvantages and make reasonable political decisions by relying upon informational shortcuts (Sniderman et al. 1991; Popkin 1993; Lupia and McCubbins 1998), most notably by assessing the opinions of trusted political elites (Larson 2000; Krosnick and Kinder 1990; Iyengar and Kinder 1987). Watts and Dodds (2007) add more theoretical rigor to this long-standing idea that there is something very important about the informational inequalities between political leaders, opinion leaders and average voters. They demonstrate that it is not only the role of these opinion leaders, but also a general public with very loosely held opinions that allow attitudes to take hold and cascade through society. In the present analysis, this is the equivalent of the process by which the changes wrought by the mobility of a minority can alter the opinions and behavior of the broader society. This requirement for loosely held opinions meshes well with the extensive literature on public knowledge of and opinions about foreign affairs. The
scholarly consensus on the public’s knowledge of foreign matters and its effect on policy has consistently held that the public knows little about the world outside its immediate experience and that opinions about this world are weakly held (Delli Carpini and Keeter 1996; Holsti 2004).

Drawing on these insights, it is possible that mobility influences the actions of states both through the direct effect of interaction and familiarity on decision-makers and though opinion leaders who sway a popular opinion (to which leaders are ultimately beholden). The process by which public opinion then aggregates to state action is clear in a democracy (through elections), but the link between public opinion, especially elite opinion, and government action is no less present in an autocracy (Hermann and Kegley 1995), though some autocracies are certainly more subject to these pressures than others.²

**Implications**

Both the causal and correlational versions of the argument imply two distinct things about states with relatively high mobility between them: 1) that there should be less of a tendency to resort to force when such an opportunity arises, and 2) there should be less conflict overall between such states. It is possible that the mechanisms that I have identified alter the incidence of opportunities for conflict, the resort to force when such opportunities arise, and the overall frequency of conflict – assessing both use of force given opportunity and the overall incidence of conflict allows me to partially pull these possibilities apart.

² For more on the differences between autocracies in this regard, see Weeks (2008).
The notion that mobility could be associated with a reduction in the use of force when compared to other modes of conflict resolution is reminiscent of some democratic peace work that finds that democracies are less likely to resort to force in a dispute. For example, according to Morrow (1999) “when disputes do emerge, democratic dyads choose more peaceful processes of dispute settlement than do other pairings of states.”3 The introduction of a “denominator” also removes the need for some of the more controversial controls (for example, the entire question of politically relevant dyads) required by dyadic models of conflict events data. In addition, by beginning with use of force data I insulate the argument from the many critiques swirling around the militarized interstate dispute data by demonstrating that the relationship between mobility and conflict holds in multiple, distinct contexts.

That said, the existing bodies of work on alliances, interdependence, and democracy are most developed in the empirical context of dyadic conflict events data. In order for findings on mobility to speak to these literatures, it is worth assessing the relationship between mobility and conflict in a standard events framework. Thus, the expectation that there should be less conflict overall within high mobility dyads both generalizes the argument beyond the United States (the use of force data, which I will introduce in detail momentarily, only assesses the United States) and speaks most directly to existing work on the “liberal peace.”

This leads to two hypotheses:

\[ H1: \text{As mobility between states increases, the use of force given the opportunity for force will decrease.} \]

H2: As mobility between states increases, the probability of conflict between those states will decrease.

Research Design

Testing Hypothesis 1 requires identifying potential uses of force that did not actually emerge, which is potentially challenging. To make it tractable, I limit the initial analysis to the decisions about the use of force of one country – the United States – and rely on Howell and Pevehouse’s (2007) database of such opportunities, which has not previously been analyzed in this context.

Howell and Pevehouse (2007) identify opportunities for force with front-page New York Times articles reporting violent acts against the United States, threats to the stability of foreign regimes, major violations of international law and human rights, and nuclear proliferation. The focus on newspaper articles circumvents the problem of defining arbitrary thresholds for what constitutes a crisis or a dispute, limits the problem of determining when an incident begins and ends by looking simply at the period of coverage, and solves the challenge of arbitrating the relative importance of incidents by allowing this dimension to be captured by the extent of coverage.4

The resulting variable is dichotomous and takes on a value of “0” when the United States forgoes an identified opportunity to use force and “1” when it responds with a “major use of force,” which is defined as the mobilization of two or more aircraft carrier task groups, over a battalion of ground forces, or one or more combat air wings. These

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4 See Howell and Pevehouse’s (2007) detailed appendix for more on the nuances of these data.

The narrow focus on the United States in this analysis has several advantages. First, focusing on one country removes the need to control for the many confounders that clutter analyses of MIDS, and avoids the well-founded critiques of the MIDs data (e.g. Fordham and Sarver 2001; Downes and Sechser 2012). Second, this approach does not inflate the number of observations by including all dyad years and then attempting to control away those that are not relevant to the analysis.

To operationalize mobility, I employ a new and comprehensive database of international flights. These data on aviation combine resources from the International Civil Aviation Organization (ICAO) – the United Nations Agency in charge of aviation cooperation – and the International Air Transport Association (IATA), a trade organization representing the vast majority of international carriers. 5

These data capture the number of annual flights and seats to and from every registered airport in the world. These are seats available rather than seats purchased, but airlines work assiduously to avoid excess capacity so this is a reasonable approximation of total flows. 6 For the analyses that follow, I collapse the information to the yearly seats to and from each state in the international system.

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5 Interestingly, the point that international aviation could have a pacifying effect on international politics is made in ICAO’s founding charter. The Convention on International Civil Aviation (1945), states that, “civil aviation can greatly help to create and preserve friendship and understanding among the nations and peoples of the world.”

6 As relayed in an interview with the director general and CEO of the International Air Transport Association (IATA), a trade association representing 240 international airlines.
Because these data capture air transit in terms of seats, they do not speak directly to layovers or indirect traffic. That is, a passenger who travels from Morocco to Vietnam but connects though Japan will appear in the data as a link between Morocco and Japan, and Japan and Vietnam (but not as a link between Morocco and Vietnam). This deficiency is not, however, overly distorting because airlines rapidly adjust to demand with direct flights if the volume exists to support them even occasionally (i.e., once a week or even biweekly). To take just one example, there is a once weekly direct flight from Boston to Cape Verde to serve the relatively small immigrant community in that area. I weight the air traffic between states by their joint population and then take the log of the result to account for skewedness and to minimize the undue influence of “hub” airports. In additional analyses I exclude major international hubs as well as dyads with no air transit between them and find comparable results to those that follow (reported in the Appendix).

A major advantage of the air transit data is completeness – the dataset covers 97 percent of scheduled traffic. Data on air transit enjoy this near total coverage because the need for regulation and international cooperation in order to maintain safety and prevent conflict over the skies was recognized and institutionalized almost immediately following the introduction of commercial aviation. This stands in stark contrast to data

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7 Relayed in an interview with director general of IATA. The prevalence of layovers in the international air transit system does, however, draw out the role of states with major “hub” airports. While the argument might be made that this through traffic is less meaningful given the mechanisms that I have outlined, a relationship between these globalized and well-connected states and peaceful international meaningful is noteworthy in that it is reminiscent of Rosecrance’s (1989) conception of trading states. Indeed, some of the largest international transit hubs are the very trading states Rosecrance identifies – Germany and Japan – again calling into question what dimensions of international exchange are the most transformative.

8 Summary statistics and correlations for all variables employed in this article can be found in the appendix. It is worth noting here, however, that the mobility measure is only loosely correlated with democracy (0.05) and trade (0.11).
on other indicators of international flows of individuals, be it immigration, visas, or international students. This operationalization of mobility is also attractive because it excludes several types of population flows that may have very different theoretical relationships with conflict. For example, cross-border movement under duress, especially refugee flows, is associated with the cause or spread of civil wars, particularly in poorer states (Salehyan and Gleditsch 2006).

There are, however, a few sources of minor but systematic bias in aviation data that should be acknowledged. First, while missing observations are relatively rare, they are non-random and are concentrated around poor and isolated states in the international system. Second, unscheduled and unrecorded flights are disproportionately concentrated among these same countries. Third, this measure systematically understates the degree of contact that occurs between proximate states where transit could be accomplished by other means such as rail or road. This issue of proximity is remedied in part with controls for contiguity and distance, discussions of which follow. However, even with this systematic underreporting of total mobility between proximate states, the overall volume of flights is still skewed toward proximate states – meaning that even when other modes of transit are available, substantial aviation occurs as well. As a result, this measure captures the phenomenon of interest and, if biased by proximity, is biased away from the hypothesized relationship.

A final concern with this measure is that that only countries that have diplomatic relations have direct air traffic between them. This has the potential to undermine the argument because this path to no mobility is endogenous to international conflict.
However, the findings that I present are hold when dyads without diplomatic relations are excluded from analysis (see Appendix).

A variety of potentially confounding variables are accounted for in the analyses. The democratic peace literature makes the case that joint democracy dramatically lowers, if not eliminates, the probability of war between potential adversaries. Indeed, it has been widely noted that this is the “closest thing that we have to a law in international relations” (Levy 1988, 661-2). On the other side of the equation, there is evidence to suggest that there is disproportionate population mobility between democracies. Because there is no variation in the United States Polity score for the initial use of force analyses, I only include the democracy score for the potential adversary in the H1 tests.

The relationship between trade and conflict has been widely documented in the literature, and trade presumably bears a relationship with mobility as well since some portion of the air transit data I present here is for business travel. To differentiate between contact and commerce in the models, I rely on Gleditsch’s (2002) trade data. I generate values for each state from the ratio of bilateral trade and GDP. This captures the degree to which trade is important relative to the overall size of the economy. I then assess the lower of the two trade dependence scores.

I also account for the primary measures of overlapping foreign policy preferences that are available in the literature: alliance portfolio similarity (Buena de Mesquita 1975), and United Nations voting records (Signorino and Ritter 1999; Voeten and Merdzanovic 2013). I do not account for military alliances (Singer 1966; Singer and
Small 1966) in this initial analysis (but do in later analyses) because there are no instances of the use of force given opportunity in the context of a standing alliance, which means that this variable would predict failure (0) perfectly.

Economic development is thought to have several, potentially contradictory, effects on conflict propensity as well as mobility. Conflict may be an inefficient way for rich states to obtain resources when compared to trade, enticement, and cooptation. At the other end of the spectrum, the poor states may not be able to project power beyond their borders. In response to these concerns, I control for the per capita GDP of the adversary using data from the World Bank.

It is generally thought that power differentials between adversaries have an important relationship with the emergence of conflict, but the precise nature of this relationship remains the subject of considerable debate. Some have suggested that points at parity or near parity (particularly when a transition is expected) are unstable (Organski 1958; Tammen 2000; Organski and Kugler 1977). Others argue that a strong preponderance of power provides an opportunity for violence or that declining power can motivate conflict (Levy 1987). I generate a control for relative capabilities with data adapted from the National Material Capabilities dataset, which contains annual values for total population, urban population, iron and steel production, energy consumption, military personnel, and military expenditures (Singer, 1972, 1987). I address the natural skewedness of capabilities and generate a measure of relative power by taking the log of the dyad’s larger capability score divided by the smaller.
For conflict to occur, states must have an issue of contention, but they must also be geographically proximate enough (relative to the ability to project power) for hostilities to actually take place. To address this spatial dimension of conflict and mobility, I include a control for distance, which is the log of the capital-to-capital distance to account for the rapid decay of the ability to project power and influence as distance increases.

Finally, the focus in these initial analyses on opportunities and the United States has the additional advantage that it allows for statistical control of a series of alternative explanations arising from the domestic situation of the conflict initiator, which are unavailable for models that include all country dyads. I account for presidential approval rating and whether there is unified government. I also account for whether there is an election in the upcoming year, unemployment, and inflation, which allow for an assessment of the extent to which the resort to the use of force responds to diversionary incentives (Oneal and Tir 2006; Pickering and Kisangani 2005; Fordham 2005).

I present the resulting logistic models in Table 1. Model 1 is limited to the system level variables while Model 2 brings in the new variables characterizing the domestic economic situation in the United States.
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<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
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<tbody>
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<td><strong>Mobility</strong>t-1</td>
<td>-1.76e+04***</td>
<td>-1.98e+04**</td>
<td>-1.52e+04**</td>
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<td></td>
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<td>(6594.100)</td>
<td>(5230.270)</td>
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<td><strong>Alliance Portfolio</strong></td>
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<td>-7.847***</td>
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<td></td>
<td>(1.544)</td>
<td>(1.768)</td>
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<td>1.261**</td>
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<td>(0.397)</td>
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<td>(0.796)</td>
<td>(0.653)</td>
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<td><strong>Trade</strong>t-1</td>
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<td>0.202*</td>
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<td>(0.068)</td>
<td>(0.081)</td>
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<td><strong>GDP per Capita</strong></td>
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<td>0.111***</td>
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<td></td>
<td>(0.011)</td>
<td>(0.021)</td>
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<td><strong>Relative Power</strong></td>
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<td>(0.158)</td>
<td>(0.168)</td>
<td></td>
</tr>
<tr>
<td><strong>Distance</strong></td>
<td>0.947</td>
<td>0.932</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.776)</td>
<td>(0.731)</td>
<td></td>
</tr>
<tr>
<td><strong>Presidential Approval</strong></td>
<td></td>
<td>0.068**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.024)</td>
<td></td>
</tr>
<tr>
<td><strong>Unified Government</strong></td>
<td>0.080</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.756)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Election</strong></td>
<td>-0.890</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.778)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Unemployment</strong></td>
<td>-0.309</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.389)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CPI</strong></td>
<td>0.017</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| N                              | 1435             | 918              | 918              |

*p<0.05, **p<0.01, ***p<0.001

Note: Table entries are maximum likelihood coefficients obtained from a logit model. The opportunity for force is the unit of analysis. Robust standard errors in are parentheses.
Mobility has a strong negative influence on the probability of the use of force given the opportunity in both models. The effect varies from a 12 percent probability of the use of force given opportunity when there is no mobility between the states to less than one percent at the mean. This represents an almost complete collapse in the use of force in relationships where there is substantial mobility.

The alliance portfolio measure is negative and significant, as anticipated. However, the UN voting measure is positive, which stands in contrast to most of the literature in this area. This likely owes to the fact that this sample is limited to the United States, though a conclusive answer to this question is beyond the scope of this paper. That uncertainty aside, the fact that these measures are substantively and statistically significant suggests that the mobility is a complement rather than a replacement for these indicators. This is intuitive since these were conceived of as indicators of overlapping foreign policy preferences, while mobility captures something else entirely.

Democracy is negative in this formulation, but is statistically insignificant, likely owing to the decreased period of analysis and number of dyads compared to the models that typically give rise to findings supportive of the democratic peace proposition. In contrast, trade dependence is positive, though only significant at the .10 level. Larger power differentials are negatively associated with the use of force, while distance is positively associated with it. This latter effect is likely related to the United States’ unparalleled ability to project force. Finally, higher presidential approval ratings
are associated with greater use of force, confirming one aspect of Howell and Pevehouse’s (2008) finding on the constraints on presidential foreign policy power.

**Generalizing the Finding**

To assess the second hypothesis, I test for a relationship between mobility as operationalized by the previously described data on all international air traffic, and international conflict across the entire international system from 1988-2001.\(^9\) I rely on the dyadic year as the unit of analysis (though findings are robust for models limited to politically relevant dyads) and estimate the regression equations with logit models with robust standard errors clustered on the dyad. Logistic regression requires that both events and non-events be independent. This requirement is almost certainly violated by conflict, which is associated with future conflict, and peace, which is associated with future peace. Beck, Katz and Tucker (1998) advise controlling for this potential source of bias by adding a variable for peace years and a set of natural cubic spline variables derived from it. I apply this recommendation in the analyses that follow.\(^{10}\) As an alternative, I also explored the corrections suggested by Carter and Signorino (2010). The results are substantively identical to those presented here and are available in the Appendix.

In order to increase confidence in the robustness of any findings on the hypothesized relationship between mobility and international conflict and minimize the

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\(^9\) This is a significantly shorter period of analysis than commonly investigated in studies of the democratic peace and economic interdependence, but is necessitated by the limits of the air traffic data.

\(^{10}\) Available evidence indicates that this solves the problem. The Durban-Watson \(d\)-statistic goes from approximately .3 without the correction to approximately 2, indicating no autocorrelation in the residuals.
potential influence of problems with any single data series, I employ three operationalizations of conflict.

First, I rely on Maoz’s (2005) dyadic militarized interstate dispute (MID) dataset, which codes “1” on the first year of a MID within a dyad and “0” otherwise (Models 1 and 2). The Correlates of War (COW) project defines a MID as “a set of interactions between or among states involving threats to use military force, displays of military force, or actual uses of military force... these acts must be explicit, overt, non-accidental, and government sanctioned” (Gochman and Maoz 1984). Thus, a MID is defined at the bottom end by any overt act of militarization, and at the top end by 1,000 battle deaths.

For a stricter test of the relationship with militarized disputes, I restrict Model 3 to fatal MIDs, or disputes in which at least one battle casualty is reported. Since the vast majority of MIDs involve no violence at all, it is worth establishing whether the findings hold at this threshold or are driven by the less consequential MIDs.

I further test the robustness of the findings by turning to an entirely distinct formulation of the dependent variable – “international crisis” from the International Crisis Behavior Project (Model 4). The ICB project specifies two defining conditions for an international crisis: (1) a change in type and/or an increase in intensity of disruptive, that is, hostile verbal or physical, interactions between two or more states, with a heightened probability of military hostilities; that, in turn, (2) destabilizes their relationship and challenges the structure of an international system – global, dominant, or subsystem (Brecher and Ben-Yehuda 1985).
These global models require additional controls for variables that are potentially confounded with both the independent and dependent variables in the analysis. I alter the democracy measure slightly by capturing each state’s regime type using the Polity IV scores as follows: \( (\text{DEMOC}_i - \text{AUTOC}_i + 10)/2 \), (where \( i \in [A,B] \)). I then include the value for the lower ranked state in the dyad.

Major powers are, by definition, states with significant capabilities and wide-ranging interests in the international system. It stands to reason then that dyads containing at least one major power differ in their conflict behavior in important ways from those that do not. They are also disproportionately common travel destinations even when GDP and population are accounted for. To address these issues I include a dichotomous variable indicating the presence of the US, UK, USSR/Russia, China, or France in each dyad.

Finally, in the analyses of all dyads, I consider a broader array of spatial dimensions of conflict. I include the measure of distance described in the context to the preceding analysis, but also include a measure of contiguity (Gleditsch and Singer 1975; Henderson 1997; Schampel 1993). There is also well-documented regional variability in the dynamics of interstate conflict (Bennett and Stam 1999) and mobility (Heleniak 2012). To account for this I include regional dummy variables in the model that are coded as “1” if both states are in that region.

Findings
Table 2 presents the findings from four logistic models. Model 1 is a regression on the incidence of MIDs but excludes the mobility measure and provides a baseline for comparison. Model 2 incorporates the key measure of mobility measured in terms of air traffic. Models 3 and 4 extend the analysis to fatal MIDs and international crises.
### Table 2 – Mobility and Conflict: MIDs, Fatal MIDs, and Crises

<table>
<thead>
<tr>
<th></th>
<th>Model 1 MID</th>
<th>Model 2 MID</th>
<th>Model 3 Fatal MID</th>
<th>Model 4 Crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta$/($SE$)</td>
<td>$\beta$/($SE$)</td>
<td>$\beta$/($SE$)</td>
<td>$\beta$/($SE$)</td>
</tr>
<tr>
<td>Mobility$_{t-1}$</td>
<td>-</td>
<td>-35.372*</td>
<td>-135.298**</td>
<td>-132.905**</td>
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<tr>
<td></td>
<td>(18.560)</td>
<td>(47.735)</td>
<td>(41.996)</td>
<td></td>
</tr>
<tr>
<td>Alliances</td>
<td>-0.225</td>
<td>-0.081</td>
<td>0.244</td>
<td>0.592*</td>
</tr>
<tr>
<td></td>
<td>(0.173)</td>
<td>(0.191)</td>
<td>(0.255)</td>
<td>(0.245)</td>
</tr>
<tr>
<td>Alliance Portfolio</td>
<td>-1.435*</td>
<td>-1.313*</td>
<td>-1.615+</td>
<td>-0.874</td>
</tr>
<tr>
<td></td>
<td>(0.634)</td>
<td>(0.630)</td>
<td>(0.981)</td>
<td>(1.028)</td>
</tr>
<tr>
<td>UN Voting</td>
<td>-0.592</td>
<td>-0.471</td>
<td>-1.348</td>
<td>-1.159*</td>
</tr>
<tr>
<td></td>
<td>(0.629)</td>
<td>(0.671)</td>
<td>(1.295)</td>
<td>(0.526)</td>
</tr>
<tr>
<td>Democracy Low</td>
<td>-0.082+</td>
<td>-0.062</td>
<td>-0.015</td>
<td>-0.466**</td>
</tr>
<tr>
<td></td>
<td>(0.044)</td>
<td>(0.043)</td>
<td>(0.073)</td>
<td>(0.172)</td>
</tr>
<tr>
<td>Trade$_{t-1}$</td>
<td>-5.790</td>
<td>-1.781</td>
<td>-15.911</td>
<td>3.677</td>
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<tr>
<td></td>
<td>(6.086)</td>
<td>(7.436)</td>
<td>(22.451)</td>
<td>(4.422)</td>
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<tr>
<td>Relative Power</td>
<td>-0.240***</td>
<td>-0.289***</td>
<td>-0.343***</td>
<td>-0.482**</td>
</tr>
<tr>
<td></td>
<td>(0.061)</td>
<td>(0.062)</td>
<td>(0.103)</td>
<td>(0.174)</td>
</tr>
<tr>
<td>Major Power</td>
<td>1.573***</td>
<td>1.845***</td>
<td>0.760</td>
<td>1.948**</td>
</tr>
<tr>
<td></td>
<td>(0.343)</td>
<td>(0.340)</td>
<td>(0.555)</td>
<td>(0.692)</td>
</tr>
<tr>
<td>GDP per Capita</td>
<td>0.039+</td>
<td>0.055**</td>
<td>0.036</td>
<td>0.119***</td>
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<td></td>
<td>(0.022)</td>
<td>(0.021)</td>
<td>(0.046)</td>
<td>(0.016)</td>
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<td>Contiguity</td>
<td>2.830***</td>
<td>2.824***</td>
<td>3.459***</td>
<td>0.699</td>
</tr>
<tr>
<td></td>
<td>(0.407)</td>
<td>(0.400)</td>
<td>(0.785)</td>
<td>(0.548)</td>
</tr>
<tr>
<td>Distance</td>
<td>-0.673***</td>
<td>-0.735***</td>
<td>-0.774***</td>
<td>-0.489*</td>
</tr>
<tr>
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<td>(0.167)</td>
<td>(0.164)</td>
<td>(0.219)</td>
<td>(0.234)</td>
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<td>Africa</td>
<td>0.186</td>
<td>0.104</td>
<td>-0.299</td>
<td>-</td>
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<tr>
<td></td>
<td>(0.413)</td>
<td>(0.427)</td>
<td>(0.794)</td>
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<tr>
<td>Americas</td>
<td>0.598</td>
<td>0.634</td>
<td>-1.875</td>
<td>0.508</td>
</tr>
<tr>
<td></td>
<td>(0.556)</td>
<td>(0.560)</td>
<td>(1.315)</td>
<td>(1.199)</td>
</tr>
<tr>
<td>Asia</td>
<td>1.222**</td>
<td>1.165**</td>
<td>1.575*</td>
<td>1.001</td>
</tr>
<tr>
<td></td>
<td>(0.411)</td>
<td>(0.414)</td>
<td>(0.691)</td>
<td>(0.633)</td>
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<tr>
<td>Middle East</td>
<td>0.227</td>
<td>0.319</td>
<td>-0.551</td>
<td>1.484***</td>
</tr>
<tr>
<td></td>
<td>(0.622)</td>
<td>(0.601)</td>
<td>(1.008)</td>
<td>(0.424)</td>
</tr>
<tr>
<td>Europe</td>
<td>0.307</td>
<td>0.133</td>
<td>-0.316</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(0.563)</td>
<td>(0.560)</td>
<td>(0.878)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>84,652</td>
<td>84,652</td>
<td>84,652</td>
<td>84,652</td>
</tr>
</tbody>
</table>

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Note: Table entries are maximum likelihood coefficients obtained from a logit model. The dyad year is the unit of analysis. Robust standard errors (clustered by dyad) in are parentheses. Constants and estimates for temporal spline variables are suppressed.
Despite the abbreviated period of analysis, the Model 1 coefficients convey much of the inherited wisdom from the extant literature on the liberal peace. The notable departure is the trade interdependence indicator, which is insignificant throughout. As suggested by Model 1, this distinction stems from the limited period of analysis rather than the introduction of the mobility measure. To confirm this, I replicated Russett and Oneal’s (2001) widely cited models that report significant findings for the trade interdependence for this limited time series and found null results there as well. For this reason, the findings I present here should not be read as “debunking” existing arguments about interdependence, but rather as a supplement to them. That said, the observed effect for mobility is both larger and more consistent than those observed elsewhere in the literature for trade and democracy and the substantive effects for these measures are smaller than those generally reported, likely owing to the improved control for the underlying affinities between states.

In Models 2-5 there are consistent negative findings for the air transit measure. Figure 1 provides an indication of the substantive impact of mobility on the probability if militarized interstate dispute (Model 2) as mobility increases from its minimum to its maximum observed value.
While the values are small due to the overall rarity of disputes in a sample of all dyad years, the percentage change is substantial. The probability declines from approximately .004% (CI .003, .005) in a given dyad year at the minimum of bilateral mobility to zero at the maximum.\textsuperscript{11}

Above a relatively low threshold of mobility there is actually no observed conflict in the data at all. This bears important similarities to the better-documented observation

\textsuperscript{11} In addition to the multiple models reported this far, additional robustness checks can be found in the appendix. These include additional approaches to dealing with time dependence, truncations of the sample to exclude dyads that include international air transit hubs as well as dyads in which there was no transit at all, as well as alternative formulations of the mobility variable.
of peace among states above a certain threshold of democracy (typically a “7” in the Polity IV democracy score). For mobility, this threshold is approximately 2% of joint population per year. Figure 2 presents all dyads that are above this threshold.

**Figure 2 - High Mobility (2% Joint Population) Dyads, 2001**

Figure 2 has a number of noteworthy attributes. First, the overall density of the figures indicates that this threshold is frequently crossed. As one might anticipate, there are clear indications of regional clustering in Northern and Western Europe, North America, Asia and even the Middle East that evoke Deutsch’s (1957) concept of
“security communities.” However, there are also important linkages across regions such as the link between Japan and the United States. The links are also not just between developed democracies, but also include a number of stable (and wealthy) autocracies such as Bahrain, the United Arab Emirates, and Singapore, as well as developing but stable countries such as Honduras and El Salvador. While this figure is certainly not dispositive, the mix of countries is considerably more nuanced that the usual democracy/autocracy dichotomy, and diverges in ways have a certain amount of apparent face validity. For example, “soft-autocratic” countries such as Singapore have long puzzled scholars of the democratic peace (e.g. Ray 1995) and the possibility that they can be incorporated into our understanding is promising.

Conclusion

The preceding analysis indicates a substantial negative relationship between mobility measured with air traffic and both the resort to force by the United States and multiple measures of dyadic conflict. Like early work on the democratic peace, however, this initial finding is subject to the critique that the empirical tests highlight the outcome rather than the mechanism that gives rise to it (Rosato 2003). That said, while I have posited the mechanism and tested only its implications, the link between mobility and peace is at least as theoretically plausible as that between democracy and peace or trade and peace. Where the literature on the democratic peace typically resorts to complex mechanisms based on shared norms of conflict resolution or domestic

12 Substantial traffic between the United States and Japan involves the popular island leisure destinations of Saipan, Guam, and Hawaii. However, the volume exceeds 2% of joint population even when these destinations are excluded.
audience costs, the fact that one can turn to literatures in bargaining and social psychology for the micro-foundations of an argument about the effects of mobility gives reason for hope that there is something real here. This remains an invitation for future research on the relationship between societal interaction and conflict rather than the last word on the subject. If nothing else, it should shake up the rote acceptance of a simple linear additive relationship between extant “liberal” indicators and international conflict.

Earlier generations of scholars were more comfortable with the idea that a wide array of interactions between states, including mobility, shapes their predisposition toward conflict (e.g. Keohane and Nye 1977; Deutsch et al. 1957). In light of the multitude of changes wrought by globalization, it is increasingly important that we reassess those instincts empirically. The rapid rise of democratization and the reemergence of international trade since the end of World War II have been accompanied by important changes in the nature of international integration and connectivity. Whereas the levels of trade interdependence observed in some parts of Europe prior to World War I have only been surpassed relatively recently (Gartzke and Lupu 2012), there have been entirely novel shifts in the way that individuals interact across borders including the rise of mobility explored here.

This points to a number of other areas ripe for future work. First and foremost, the air transit measure that I employ is just one way to conceive of the extent of interpersonal connections between states. Future work would do well to explore other features of personal contact in the form of migration, diaspora populations, student
exchanges, and visas. In addition, the mechanisms I identified here could also function, though perhaps to a lessened extent, through long distance communication in the form of telecommunication technology. Finally, this analysis has assessed the mitigation of conflict, but the argument also implies that interaction should contribute to positive relationships. Additional research could also assess the relationship between mobility and positive interactions such as cooperation in trade, international institutions, treaties, and alliances.

References


