Dependence Networks and the Diffusion of Democracy

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Introduction

How and to what extent do states influence the level of democracy in other states? While scholars have made some progress in answering this question, two central problems persist. The most important problem is that scholars lack information on which states are likely to influence which other states and on the mechanisms of influence. Quantitative studies focusing on international factors have demonstrated, beginning with O’Laughlin et al. (1998), that regime transitions (both to and from democracy) tend to cluster in space and time in a pattern that suggests institutional transfer or diffusion. As a result, prominent recent studies have focused on geographical proximity as an important international factor facilitating the spread of regime types. Geographic proximity offers a useful first cut, yet even its proponents have recognized that democracy may spread among states in other kinds of spatial and temporal patterns (Brinks and Coppedge 2006, 471; Beck, Gleditsch and Beardsley 2006). To solve this problem, we need theoretical arguments regarding which states are likely to wield influence and how, and we need to test the implications of those arguments against geographic proximity.

A secondary problem is that most quantitative studies explaining domestic regime type have focused on either international or domestic variables and have only rarely tested them in robust fashion against each other. The most prominent scholarly articles on the link between economic development and democracy (Przeworski et al. 2000; Boix and Stokes 2003; Epstein et al. 2006), for example, do not include many international variables in their models. This absence is problematic because of the accumulating evidence of international influence, as summarized by Gleditsch and Ward (2006, 930): “Democratization cannot be seen exclusively as a result of functionally similar processes unfolding independently within each country.” Internationally
oriented studies, for their part, typically include a few domestic variables, but could do so in a more robust fashion (Gleditsch and Ward 2006; Brinks and Coppedge 2006).

We argue in this paper that states exist internationally in dependence networks with each other and that those networks provide pathways for influence. For any given state, a dependence network is a set of partner states with whom it regularly engages in exchanges of valued goods, where those exchanges would be costly to break. We measure three dependence networks for any given state by examining that state’s trade partners, alliance partners, and international organization (IO) partners. We weight partners by their material capabilities (e.g., GDP) in order to capture their differing potential for influence. We thus recognize, for example, that Chile is less likely to influence the United States than the United States is Chile within their respective dependence networks.

States in dependence networks are likely to influence each other’s political institutions via three mechanisms. In any given case, one, two or all three mechanisms could be present. Due to equifinality, the results from cases where one mechanism is present would be quite similar to the results from cases where a different mechanism is present. First, some states offer rewards and punishments for increasing or decreasing democracy (Hyde 2007; Hyde and Marinov 2007; Finkel, Pérez-Liñán and Seligson 2007) and can use their security, trade and diplomatic ties to implement those rewards and punishments, to spread credible perceptions that they are able to do so, or to magnify the importance of the rewards or punishments. Those rewards and punishments are sometimes explicit, as with European Union (EU) requirements that candidate countries be democratic, and sometimes implicit, as when the United States bailed Mexico out of financial difficulties in the mid-1990s at the same time Mexico was liberalizing its political system. Where
no explicit rewards are punishments are offered, governments might still develop expectations of rewards or punishments and alter their domestic institutions in anticipation.

Second, qualitative research on democratization has increasingly emphasized intermestic ties among domestic social groups and foreign states as a key causal mechanism (Jacoby 2007). States promoting their favored political systems actively support domestic groups in other countries with similar political preferences and seek to constrain domestic groups abroad who have different preferences. Where states interact frequently in dependence networks, it is relatively easier for foreign officials to form contacts and alliances with domestic groups in other states and it is more likely the domestic groups will want to curry favor with the foreign state.

Third, states are likely to learn from other influential states in their dependence networks. Elites facing domestic difficulties are likely to examine political institutions in other states to identify potential solutions. The literature on state learning suggests that the availability of information (availability heuristic) influences state decision-making (Weyland 2005). Dependence networks bring states into routine contact and hence network partners offer readily available information that is likely to influence the nature of their political institutions.

Our theoretical approach intersects with the democratization literature in important ways that advance rich theoretical debates in that literature. By focusing on the actions of foreign states and the reactions of domestic elites, our framework seeks to incorporate international variables without neglecting domestic factors. The second and third causal pathways (learning and intermestic interaction) explicitly identify domestic nonstate actors, problems and processes as important elements. We thus address one of the major axes of debate in democratization theory—the relative importance of domestic and international factors—by suggesting a sophisticated relationship between the two domains. Democracy does not just diffuse from one
country to the next; rather, real domestic actors with significant international interests and ties are attracted by rewards or models offered abroad. In highlighting international networks and the choices of domestic elites, we address another major axis in the democratization literature: the relative role of structures and agents. In our approach, states are located within international structures—dependence networks—but, unlike dependency theory, those structures are not determinative. Domestic actors still evaluate and choose how to respond to the rewards, punishments, and information offered by foreign states. International actors add a new dimension to the domestic bargaining game that characterizes much democratization research cites.

We find that as a state’s network partners become more democratic, that state becomes more democratic as well, even controlling for geographic proximity.

**Democracy Diffusion: The State of the Art**

Scholars in recent years have increasingly documented the spatial and temporal connections in the spread of democracy and autocracy (O’Laughlin et al. 1998; Kopstein and Reilly 2000; Przeworski et al. 2000; Gleditsch and Ward 2006; Brinks and Coppedge 2006). This growing body of evidence suggests that regime transitions are not completely the result of domestic factors but rather are subjected to important external influences. Gleditsch and Ward (2006) found that a country’s proportion of democratic neighbors, transitions in a neighboring country, a peaceful regional context and the global proportion of democracies all have positive effects on democracy in a given country, either by decreasing the chances of democratic breakdown, increasing the chances of autocratic breakdown, or both. Brinks and Coppedge (2006) found that a country’s proportion of democratic neighbors, the global proportion of democracies and location near the United States all had a positive effect on democracy.
This focus on geography is perhaps somewhat surprising given the relative absence of geography as an important explanatory variable generally in international relations (outside of geopolitics) and the relative paucity of theories of geography. Brinks and Coppedge (2006, 471) explicitly but briefly acknowledged this shortcoming in their article, leaving the problem to future research. Beck, Gleditsch and Beardsley (2006) made the same point in extended fashion, arguing that “space is more than geography”; in other words, scholars should incorporate political and social connections between states into their analyses. The importance of geography is only lightly theorized in these articles. O’Laughlin et al (1998, 563) succinctly captured much of the theoretical argument: “Geographical proximity increases the number of interactions that can promote democracy or authoritarianism between countries; the closer countries are to each other, the greater the number of possible linkages through which democracy can be promoted or spread.” By focusing only on linkages, this argument neglects fundamental forces in international affairs like power resources and relative capabilities.

In contrast, recent theoretical work on the international diffusion of ideas and practices does not centralize geography. Simmons, Dobbin and Garrett (2006) identify four causal mechanisms by which diffusion occurs. In coercion, resource-rich states and ideological hegemons influence others to adopt their preferred policies. The competition mechanism suggests that states must adapt to each other’s innovations in order to remain competitive in a global marketplace. The third causal mechanism, learning, involves exposure to new ideas, evidence, or behaviors that alter the ways in which actors think about their methods or goals. Fourth, actors adopt the behavior of others in an emulative process that relies on shared understandings of problems, solutions, and appropriate behaviors. None of these processes clearly signals that geographically proximate actors should be the most important external
influences on a state. States might be coerced, compete with, learn from, and emulate either geographically close or distant neighbors.

Likewise, the qualitative literature on the spread of democracy does not suggest that geographically proximate states are the most important influences on democratizers. Jacoby’s (2007) review of the literature on postcommunist transformations focuses on both international organizations and states with substantial resources and prestige. He argues that external influences are unlikely to make much difference unless they can interact productively with domestic actors and processes. While geographic proximity might facilitate such interaction, so might a variety of other factors, including power, prestige, trade ties, shared alliances and shared values. A detailed process-tracing case study of democratization in Chile, for example, suggests that the United States and European states had the greatest influence there due to their power and prestige and obviously not to geographic proximity (Hawkins 2002b).

In short, a substantial disconnect exists between diffusion theories and qualitative studies of international effects on democracy, on the one hand, and quantitative studies of democratic diffusion on the other. To their credit, scholars examining geographical proximity as a predictor of democracy have critiqued their own work and have urged others to focus on other types of ties among states (Brinks and Coppelgedge 2006, 470; Beck, Gleditsch and Beardsley 2006). We now turn to that task.

**Dependence Networks**

**Theorizing Dependence Networks**

From one perspective, we should not expect foreign states to have much influence on domestic political institutions. Government officials seeking to hold on to power are likely to have strong preferences over the nature of their country’s political institutions and hence to be
resistant to outside influences. Changing domestic institutions can be a costly, cumbersome process fraught with uncertainty. In practice, domestic actors and forces are frequently the most proximate causes of most regime changes, as revealed by a vast case study literature.

Nevertheless, most governments do not rely solely on domestic social groups for support, resources and power. They are also at least partly dependent on foreign states for aid, trade, recognition, foreign policy goals, and security. Moreover, some domestic nongovernmental groups also depend on foreign states to achieve their goals, as when businesses need access to foreign markets or military leaders need foreign training and information. These dependencies create the possibility of influence from foreign states, a fact that states subject to such influence routinely recognize and typically fear because such dependence reduces their ability to make choices unilaterally. Most of the literature on the topic suggests that economic interdependence constrains a state’s ability or willingness to go to war, for example (Mansfield and Pollins 2001). If dependence can alter security choices, it seems likely it can potentially influence domestic political institutions. By focusing on dependence, we move beyond the literature’s attention to geography and the number of potential connections between states. We focus instead on the relative importance of different states and the non-geographical ways in which they are connected.

We define dependence as the value that actors place on the goods they can obtain through an exchange relation, taking into account their alternative sources of those goods (Emerson 1962, 1972; Molm 1997; Keohane and Nye 1989). This definition of dependence is quite similar to the notion of “interdependence” in international relations, as long as that term is defined in classic terms as “need fulfillment that would be costly to forgo” (Baldwin 1980, 476). States are likely to be influenced by others on whom they depend because they value access to the goods held by
those partners (Baldwin 1980; Keohane and Nye 1989). We generally expect that states, like
dividuals in experimental settings, will try to maintain good relations with the partners on
whom they depend and behave in ways that produce positive rather than neutral or negative
reactions from them (Horne 2004, 2007).

Our central refinement of the scholarly work on interdependence is to conceptualize
dependence as existing within a network. Most existing studies either measure interdependence
dyadically or omnidirectionally. Examples of the dyadic approach abound in the literature on
international conflict, where common measures of interdependence include the ratio of bilateral
trade to GDP and the real value of bilateral trade (Russett and Oneal 2001, 140-141; Mansfield
and Pevehouse 2000, 784-795). Others conceptualize dependence omnidirectionally (recalling
the dependency approach to development in the 1970s), as when Domke (1988) measured the
dependence of each state by examining exports as a proportion of GNP, the change in exports as
a proportion of GNP, and exports as a proportion of GNP corrected by economic size.

Dyadic and omnidirectional approaches to dependence are sensible for some issues, but
they also obscure a key question: On which set of states is a state most dependent? States
assessing whether to go to war with another may be chiefly interested in their dependence on
their prospective opponent. But states assessing the need to alter their domestic political
institutions are likely to be interested in the preferences and practices of a range of states rather
than on a single state or on all states. Some states are likely to matter more than others, a reality
best captured by the concept of a network.

We identify three pathways by which foreign states in a dependence network are likely to
influence domestic political institutions in a given state. First, states, especially powerful states,
link valued goods like aid, trade, security guarantees or cooperation on foreign policy initiatives
to the nature of domestic political institutions and domestic governments who value those goods act rationally to ensure their continued access to them by altering domestic political institutions. Schimmelfennig (2005) has labeled this pathway “intergovernmental reinforcement” because it treats governments as relatively unified, rational actors. Western democracies especially have engaged in this practice since the end of the Cold War (Carothers 1999; Burnell 2000; Pevehouse 2005). Yet it would be a mistake to think that only democracies attempt to influence domestic institutions or that state efforts are a post-Cold War phenomenon. As realists have long recognized, states routinely attempt to project their own political systems and values on others (Carr 1964, 80-88). Such behavior, after all, was at the heart of the Cold War. Of course, states sometimes satisfice, as the United States did during the Cold War, accepting less-than-democratic states as long as they were not Communist or utterly authoritarian (sometimes having only a thin veneer of more democratic practices). Still, the end of Cold War changed the world in profound ways and so we test below for a Cold War effect. We expect dependence networks to have a greater effect after 1990 because weaker states have fewer alternatives to the influence of powerful states.

Rewards and punishments may be explicit, implicit (intended but not specifically stated) or anticipated (by the dependent state). The EU’s insistence on democracy in Eastern Europe as a condition of membership is a clear example of explicit rewards. Other times, the preferences and consequences are more implicit but widely understood, as in the case of the United States easing Mexico toward democracy in the 1990s through trade deals and financial backing. In still other cases, the links between behavior and rewards or punishment may be even more tenuous, but dependent states still reasonably believe they could materialize. Sociological research has shown that actors alter their behavior when they believe their partners want them to, and they use their
partners’ behavior as clues to what they should do (Centola, Willer and Macy 2005; Posner 2000). Change occurs through a process of anticipation. Observing other states’ rewards for democratic behavior or punishment for nondemocratic actions, states might reasonably infer that they could also benefit by adopting the desired regime type, or at least tweaking their institutions in the right direction.

Second, states that possess valued goods can influence other governments by strengthening domestic actors already committed to their approach, by winning new domestic adherents for their priorities and by preventing antagonistic or agnostic domestic actors from obstructing change (Jacoby 2007). In this causal pathway, labeled “intermestic influence,” governments are conceptualized not as unitary actors responding to external incentives but rather as competing and cooperative coalitions influenced by the interests and efforts of various domestic groups. Foreign states have a variety of tools to strengthen their favored domestic actors and weaken opponents, including funding, information, advice and training, and rhetorical strategies that justify friends and delegitimize enemies. Where existing ties facilitate the exchange of these goods and relative capabilities make the foreign states important, external actors are likely to find their task of building insider-outsider coalitions much easier. In the wake of the 1973 coup in Chile, for example, the first opposition movements formed around churches with well-established transnational ties (Hawkins 2002a). Later, political parties benefitted immensely from their ties to European and US governments and parties, eventually mounting a campaign, with significant aid from foreign states, that restored democracy (Hawkins 2002b).

While powerful states are the most important players in intergovernmental reinforcement, a wide variety of states and social groups can and do try their hand at intermestic influence. Much of the democracy-building literature has focused on the efforts of the United States, since
it is has the most resources and has often made the greatest effort, especially since 1990. Finkel et al. (2007) found that USAID’s efforts to promote democracy by funding domestic groups in other countries have had a substantial positive impact on the level of democracy in those countries. Qualitative case studies of US efforts to promote democracy have stressed the importance of adapting successfully to different domestic political situations and finding the appropriate domestic allies (Carothers). At the same time, the United States is scarcely the only player here and in fact comes with significant disadvantages due to deep suspicion about its agenda and motives. In post-Communist states from 2000-06, democratic revolutions that hopped from one country to the next were fostered by civil society groups who had successfully promoted democratic change within their own countries. Optor, a student group in Serbia, has become a “‘modern type of mercenary,’ traveling around the world” to “train local groups in how to organize a democratic revolution” (Beissenger 2007, 261). It is important to note that even transnational ties like these often have a significant governmental presence; Optor, for example, receives significant funding and encouragement from the United States. While these intermestic ties can occur anywhere, we expect dependence networks to both facilitate those ties and magnify their importance. Government officials can more easily come to know domestic groups abroad through trade, security, and IO ties and are likely to attach increased importance to altering domestic institutions in countries where those ties are prominent. Domestic groups and governments in the targeted state, in turn, are more likely to take note of the preferences and activities of foreign governments if they depend on them.

Third, governments facing domestic political problems are likely to look abroad to learn from others who have faced and resolved similar problems. Where do they look? Cognitive approaches to learning suggest the importance of an “availability heuristic,” which refers to
people's tendencies to place excessive importance on information that is especially immediate and striking (Kahneman, Slovic and Tversky 1982; Weyland 2005). Once they have focused on that information, its relevance tends to be reinforced by the “representative heuristic” in which people to draw “excessively clear, confident, and firm inferences from a precarious base of data” (Weyland 2005, 284). Finally, an “anchoring heuristic” gives excessive importance to the first information that people learn with respect to a particular problem, thereby further reinforcing the most immediately available information. The number of connections in a dependence network facilitates the passage of information from one government and society to another, making that information more immediately available. The fact that those connections are significant to the dependent state is likely to make that information more striking and worthy of note. Unlike the first two mechanisms, learning does not require any effort from the states on whom others are dependent. Thus, Guatemala might learn from Honduras, for example, how to adjust political institutions in the face of domestic pressures and US demands without Honduras proselytizing on behalf of its solution.

Given the equifinality that often exists in world politics, these different causal mechanisms may be at play in different cases; given the complexity of the social world, it is possible that all three are at play in some cases. None of these three pathways suggests that governments will adopt a particular regime type just because their network partners want them to. States engage in exchange all the time while holding different views, especially on such fundamental questions of regime type. Nevertheless, all three causal pathways suggest that the more states interact with each other and the more leverage exists in a particular direction (toward or away from democracy), the more likely states are to nudge each other in those directions.
To be clear, we are not suggesting that dependence networks exert determinative or even very large influence on domestic political institutions. In fact, given the stakes in play with core domestic political institutions and the many forces exerting pressure on them, we expect the influence of dependence networks to be rather limited, in two ways. First, we expect that a number of other forces identified by the regime change literature will be at work; we include many of those factors as control variables. Second, we expect that the magnitude of changes induced by dependence networks will be relatively small. Regime change, according to much of the literature, is the result of elite choices in the face of dramatic events such as economic crisis, the defection of powerful allies like military leaders, or mass demonstrations. Yet the transitions literature has also focused on smaller changes in domestic institutions that preceed or follow dramatic shifts in regime type; these changes go by labels such as liberalization and consolidation. We expect dependence networks to contribute directly to small changes in the nature of political institutions as elites adjust to international efforts and examples. Hence, we focus on the level of democracy or autocracy rather than on transitions.

**Measuring Dependence Networks**

We attempt to capture different dimensions of state exchange—and hence, what states value—by examining security alliances, trade relations, and shared memberships in international organizations.\(^1\) States value alliance and trade partners for obvious reasons. We argue that they value IO partners because states have a variety of foreign policy goals, many of which require international cooperation to achieve and in practice are often achieved through IOs. States

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\(^1\) Since dependence is stronger when it exists in multiple domains, we experimented by creating a Dependence Network Index that is the unweighted average of these three factors. However, we wish to emphasize how different networks matter at different times, and thus keep the networks separate in the analyses that follow.
seeking to improve education and health care in developing countries, for example, often work through regional and functional organizations and rely on other states in those organizations to support their priorities through budget contributions and political backing for their preferred rules, mandates, and staffing decisions.

We measure Security Networks by examining formal alliances. Where State A is in an alliance to come to the defensive aid of State B, we call this a security partnership that creates mutual dependence. We then calculate the average Polity Score of all security partners, weighted by their capabilities (CINC). This produces the Security Network score for a given country in a given year. For Trade Networks, we calculate the average Polity Score of all states that trade (imports and exports) with a given state, weighted by the volume of trade.

For IO Networks we examine IOs with a significant bureaucratic apparatus whose functions are either multi-purpose, security provision, or oriented to general economic welfare. This excludes less institutionalized IOs that are little more than arenas for state meetings and IOs that deal with issues of lesser importance to states such as industry-specific agreements, education and research institutions or standard-setting organizations. In other words, we include only the most important IOs where dependence is likely to occur. For each state, we total the number of memberships it shares with every other state in all of these IOs (where the same dyad could be counted multiple times for shared memberships in multiple IOs). As with other measures, we then calculate the average Polity Score of all IO partners, weighted by the number of IOs a state has with each partner.

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2 We use the data from the Alliance Treaty Obligations and Provisions Project (Leeds et al. 2002).
3 We use the IMF’s Direction of Trade Statistics (International Monetary Fund 2005).
4 We use data from Ingram, Robinson, and Busch (2005).
For all of the dependence measures, we do not expect that a state will be able to react instantaneously to the actions of its network partners. Indeed, different domestic institutions may mean that there is some variance in the reaction times. Thus, we will lag the dependence measures by one year.5

**Dependent and Control Variables**

Our dependent variable is the *Polity Score* (Marshall and Jaggers 2006, modified by Gleditsch 2007). Consistent with the theoretical logic above, we are not measuring regime transition (sudden, large changes in domestic institutions), but rather the level of democracy or autocracy and predicted changes in those levels. We expect it is difficult for Polity to pick up small changes in the nature of domestic institutions and that such changes are underreported, creating a difficult test for our argument. Of our 3534 country-year observations, only 11 percent involve a change in Polity Score. The average absolute change for all observations is 0.46. The average change in level among the 11 percent who do change is 4.13, the median is 3, and the mode is 1. We are not examining either democratic or autocratic states in isolation, but rather both because our theoretical reasoning suggests that any kind of state (autocratic, democratic or in between) may exert influence on others. Examining the level of democracy (as opposed to change in level, or regime transition) is most similar to the approach of Finkel et al. (2006). However, the fixed effects model used below generally estimates changes of the dependent variable within a country.

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5 In Beck, Gleditsch, and Beardsley’s (2006) terms, we are using a spatial autoregressive model, where the weighting is by dependence (or region). We also experimented by using the average of the last five years for the network scores (and diffusion variables). The estimated effects are not as strong, especially after 1990.
Our most important control variable is geographical proximity, a factor that been a significant predictor in every study of democratic diffusion that we have identified and is by far the most important variable to influence changes in democracy scores in the most complete model utilized by Finkel et al. (2006, 57). For Regional Diffusion, we use a “gravity model” where states we take the average Polity Score of states in the region, weighted (inversely) by distance.6 For Global Diffusion, we use the average Polity Score of all other states. Similar to the network variables, we do not expect that a state will be able to react instantaneously to the positions of its regional and global peers. And if they could, we would be worried about reverse causality. Thus, we will lag the diffusion measures by one year.

While recent studies have focused on international influences, it would of course be foolish to ignore domestic explanations. Previous studies of democratic diffusion recognize this fact, but have tended to be a bit thin in their inclusion of domestic control variables. Gleditsch and Ward (2006) included only per capita GDP, civil war and economic growth while Brinks and Coppedge included only per capita GDP, a presidential system, and colonial heritage (a quasi-international variable). By contrast, the list of domestic factors identified by comparativists that are thought to contribute to democracy is much longer (Diamond and Linz 1989; Przeworski et al. 2000, 78-141; Mainwaring and Pérez-Liñán 2005). Finkel et al. (2006, 47-48) utilized 12 clearly domestic factors (even more, if a more expansive definition of “domestic” were invoked) in their study of the effect of US aid on democracy. Curiously, most comparativists engaged in the debate over whether development produces democracy have mostly ignored international factors (Boix and Stokes 2003; Epstein et al. 2006), an omission that could clearly bias their results given the robust and substantively important evidence for democratic diffusion.

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6 We use states that are within 1000 km. We use data from Gleditsch and Ward (2001).
By focusing on variables that are well-grounded in existing theory and have been statistically significant in previous studies, we identify a middle-range set of five domestic control variables (see Mainwaring and Pérez-Liñán 2005 for a similar approach). The most important of these is economic development, measured as per capita GDP (logged). Since Lipset (1959) first advanced his seminal thesis that economic development leads to democracy, scholars have produced substantial evidence to support this claim (SEE citations in M and P-L on p. 22). Others have challenged and qualified the argument, but without vanquishing it entirely. In their influential study, Przeworski and Limongi (1997, 177) concluded the “emergence of democracy is not a by-product of economic development,” but that “the chances for the survival of democracy are greater when the country is richer.” We examine the hypothesis that the higher the level of development, the larger the changes in the level of democracy.

Economic performance is also commonly associated with regime transition (Diamond and Linz 1989, 46-48; Haggard and Kaufmann 1995). At its most fundamental level, the logic is quite simple: the worse the economic performance, the greater the demands for change and hence the greater the likelihood of change. Following Mainwaring and Pérez-Liñán (2005, 23), we use two measures of economic performance: economic growth, measured as yearly change in per capita GDP, and inflation, or annual percentage change in the consumer price index (logged). To capture both short-term and cumulative effects we include both the previous year and a ten-year moving average for both indicators. All four indicators apply to the probability of regime transition and not to level of democracy. The worse the economic performance (high inflation,

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8 We use the World Development Indicators (2007) from the World Bank for inflation. We cannot take the logarithm of negative inflation, and set those values to –5.
negative “growth”), the higher the probability of regime transition. When level of democracy is the dependent variable, poor economic performance is likely to lead to either higher or lower democracy scores, depending on the starting point, and these changes are likely to cancel each other out.9

As a result of data availability, our dataset consists of 154 countries from 1972 to 2001.

Method

We need to take into account the structure of the time-series–cross-sectional data we are using. A standard approach in the literature is to use panel-corrected standard errors (Beck and Katz 1995) to correct for panel heteroskedasticity and cross-sectional correlation. However, in a Monte Carlo study, Kristensen and Wawro (2003) found that Arellano’s (1987) fixed effects estimator outperforms PCSEs for our data configuration \(N > T\), strong temporal autocorrelation, large unit effects). Arellano’s estimator obtains the same coefficients as any other fixed effects estimator, but uses different standard errors. Therefore, we use Arellano’s method, and include a lagged dependent variable to control for temporal autocorrelation, as suggested by Kristensen and Wawro (2003).10

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9 We also experimented with variables for income inequality (percentage share of income received the top 20 percent of the population), and ethnic fragmentation (average of Annett and Fearon indices) from the Finkel et al. (2006) data set. Since these do not change across time, they cannot be estimated by fixed effects models. In the random coefficients model, they were statistically insignificant.

10 We also checked the results using PCSEs with fixed effects (with a lagged dependent variable or Prais-Winston transformation). The coefficients are the same as the Arellano model (since they are both fixed effects models). The standard errors are generally smaller than the Arellano model. Thus, the results we report are more conservative.
Time-series–cross-section data are a kind of hierarchical data, in that the multiple observations over time can be grouped by country. Instead of attempting to control for unobserved fixed effects (heterogeneity in intercepts), one can instead allow the effects of variables to vary across countries (heterogeneity in slopes). One such model that estimates this is the Random Coefficients model. Although not frequently used in political science, Beck and Katz (2007) find that the model performs well, even in less-than-ideal conditions. This is our second model.

The effects of different networks may be qualitatively different before and after the Cold War. Therefore, we test this by dividing our data into two time periods: 1972-1990, and 1991-2001. As seen below, there are differences in the results across the two time periods.

Findings

In Table 1, we present the results for our two models for 1972-1990. In the first column, we use the Arellano fixed effects model. In the second column, we use the Random Coefficients Model. In Table 2, we present the results for the same two models for 1991-2001. The results

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11 A Hausman test rejects a random effects (i.e. random intercept) model compared to a fixed effects model ($p < 0.0001$).

12 We estimate this model in R using the excellent lme4 package of Bates and Sarkar (2007). We use a diagonal variance-covariance matrix for the random effects, which assumes that the random effects are independent, but may have different variances. Less restrictive variance-covariance matrices did not change the substantive results (and did not improve model fit for 1972-1991 using the Akaike Information Criterion).
are qualitatively similar across the two models, which is an indication of their robustness. In the discussion below, we concentrate on the Arellano fixed effects model.\textsuperscript{13}

In 1972-1990 (Table 1), \textit{IO Network} has a statistically significant effect on democratization. Thus, as one’s IO partners become more democratic, that country will also become more democratic, holding the other variables constant in 1972-1990. In 1991-2001 (Table 2), \textit{Trade Network} has a statistically significant effect on democratization. Thus, as one’s trade partners become more democratic, that country will also become more democratic, holding the other variables constant in 1991-2001. This shows that different networks mattered during and after the Cold War.

Finding statistically and substantively significant results is especially impressive given that we have included fixed effects and a lagged dependent variable, two specifications which have been criticized for absorbing “too much” of the substantive effect of interest (Beck and Katz 2001; and Achen 2000, respectively). And the network variables are still significant after controlling for regional and global diffusion.

In addition to the network variables, some of the control variables are significant as well. Similar to previous findings, \textit{Regional Diffusion} is statistically significant in 1972-1990. As a state’s geographic neighbors become more democratic, the state becomes more democratic as well. However, it is no longer significant in 1991-2001. This may be picking up the geographic networks of the Cold War. In contrast to previous studies, \textit{Global Diffusion} is not significant. When we drop the network variables (not shown), \textit{Global Diffusion} is statistically significant in

\textsuperscript{13} According to the Akaike Information Criterion (where smaller numbers indicate a better fit), the Random Coefficients model fits better in 1972-1990, and the Arellano fixed effects model fits better in 1991-2001.
the expected direction in 1972-1990. This implies that *Global Diffusion* was proxying for the network variables, but has no direct effect.

Of the economic indicators, only *Long-term Growth* approaches statistical significance, and only in 1991-2001. This indicates that as a country has more growth (over the last ten years), it becomes more democratic, as expected. It also suggests that economics factors, like *Trade Network*, matter more after 1991.¹⁴

There is strong temporal persistence in the data, as demonstrated by the strong coefficient (0.76 and 0.61 in 1972-1990 and 1991-2001, respectively) on the lagged dependent variable (and its statistical significance). A state that is democratic this year is likely to continue to be democratic next year. And finally, the fixed effects are jointly significant, demonstrating strong heterogeneity across countries.

To compare the substantive effects of the independent variables, we use the estimates from the Arellano fixed effects model to predict the change in the Polity Score for changes in the independent variable. These are presented in Table 3. We increase each independent variable by two standard deviations, holding all other variables constant. We use the variation within countries to measure standard deviation. In general the overall standard deviation is greater, so the results would be substantively larger if we used those instead. We also report the confidence interval of the predicted changes.

In 1972-1991, the largest predicted changes come from *IO Network* and *Regional Diffusion*, which were also the only statistically significant variables. Their effects are roughly the same size. For example, in 1972-1990, increasing a country’s *IO Network* score by two

¹⁴ In the Random Coefficients model, *GDP/capita* is significant in 1972-1991, suggesting that as a country becomes more rich, it is more likely to be democratic.
standard deviations (an increase of 0.73) increases that country’s predicted Polity Score by 0.57, with a 95% confidence interval of (0.19, 0.95). In 1991-2001, the largest predicted change comes from Trade Network, which was statistically significant as well. However, its predicted change (+0.26) is about half the size of the IO Network and Regional Diffusion change in the earlier time period. This is generally a result of the shorter time period, in which the standard deviation is about 1/3 the size of the earlier time period.

**Future Work**

Add prior democratic backslides.

Try different models including change in levels (Brinks and Coppedge), hierarchical (Finkel et al.), transitions (Gleditsch and Ward, Epstein et al.). Also examine absolute value of change.
Bibliography


Bates, Douglas, and Deepayan Sarkar. 2007. lme4: Linear mixed-effects models using S4 classes. R package version 0.99875-0.


Finkel, Steven E., Mitchell Seligson, and Dinorah Azpuru. 2006. Effects of US foreign assistance on democracy building: Results of a cross-national quantitative study: USAID, Vanderbilt University, and the University of Pittsburgh.


Table 1: Influences on Democracy, 1972-1990

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Coefficient</th>
<th>s.e.</th>
<th>p-value</th>
<th>Coefficient</th>
<th>s.e.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security Network (1 year lag)</td>
<td>0.351</td>
<td>0.607</td>
<td>0.565</td>
<td>0.272</td>
<td>0.191</td>
<td>0.156</td>
</tr>
<tr>
<td>Trade Network (1 year lag)</td>
<td>0.023</td>
<td>0.023</td>
<td>0.320</td>
<td>0.009</td>
<td>0.019</td>
<td>0.638</td>
</tr>
<tr>
<td>IO Network (1 year lag)</td>
<td><strong>0.786</strong></td>
<td>0.264</td>
<td>0.004</td>
<td><strong>0.521</strong></td>
<td>0.158</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Geographic Diffusion Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional Diffusion (1 year lag)</td>
<td><strong>0.182</strong></td>
<td>(0.047)</td>
<td>0.000</td>
<td><strong>0.081</strong></td>
<td>(0.017)</td>
<td>0.000</td>
</tr>
<tr>
<td>Global Diffusion (1 year lag)</td>
<td>−0.288</td>
<td>(0.234)</td>
<td>0.220</td>
<td>−0.122</td>
<td>(0.161)</td>
<td>0.447</td>
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<tr>
<td><strong>Economic Development Variable</strong></td>
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<td></td>
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</tr>
<tr>
<td>GDP/capita (logged)</td>
<td>0.115</td>
<td>(0.518)</td>
<td>0.824</td>
<td><strong>0.255</strong></td>
<td>(0.072)</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Economic Performance Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Short-term Inflation (logged, 1 year lag)</td>
<td>0.029</td>
<td>(0.026)</td>
<td>0.261</td>
<td>0.041</td>
<td>(0.033)</td>
<td>0.219</td>
</tr>
<tr>
<td>Long-term Inflation (logged, 10 year average)</td>
<td>−0.016</td>
<td>(0.081)</td>
<td>0.845</td>
<td>−0.021</td>
<td>(0.057)</td>
<td>0.711</td>
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<tr>
<td>Short-term Growth GDP/capita (1 year lag)</td>
<td>−0.172</td>
<td>(0.224)</td>
<td>0.443</td>
<td>−1.028</td>
<td>(0.881)</td>
<td>0.242</td>
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<tr>
<td>Long-term Growth GDP/capita (10 year avg.)</td>
<td>0.621</td>
<td>(1.138)</td>
<td>0.586</td>
<td>2.039</td>
<td>(2.478)</td>
<td>0.412</td>
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<tr>
<td><strong>Persistence Variable</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Polity Score (1 year lag)</td>
<td><strong>0.762</strong></td>
<td>(0.024)</td>
<td>0.000</td>
<td><strong>0.892</strong></td>
<td>(0.011)</td>
<td>0.000</td>
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<tr>
<td><strong>Unit-level Variables</strong></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Fixed Effects</td>
<td>a</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other Variable</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Constant</td>
<td>−5.239</td>
<td>(4.802)</td>
<td>0.277</td>
<td>−4.861</td>
<td>(1.200)</td>
<td>0.000</td>
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</tbody>
</table>

| Number of Observations | 2007 | 2007 |
| Number of Countries    | 126   | 126  |
| R² (without fixed effects) | 0.949 | (0.648) | 0.000 |
| Log-likelihood         | −4006 | −4162 |
| Akaike Information Criterion | 8447 | 8369 |

Notes: Dependent variable is Polity Score, 1972-1990. Coefficients are least squares estimates, with fixed effects included but not reported. Standard errors in first column are Arellano robust errors (clustered by country) in parentheses; p-values are for two tails. Statistically significant coefficients (p < 0.05, two-tailed) are in **bold**.

a Fixed effects included, but not reported. The p-value is for a joint significance test.
Table 2: Influences on Democracy, 1991-2001

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Arellano Robust Fixed Effects</th>
<th>Random Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>s.e.</td>
</tr>
<tr>
<td><strong>Network Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security Network (1 year lag)</td>
<td>0.057</td>
<td>(0.183)</td>
</tr>
<tr>
<td>Trade Network (1 year lag)</td>
<td><strong>0.148</strong></td>
<td>(0.074)</td>
</tr>
<tr>
<td>IO Network (1 year lag)</td>
<td>0.047</td>
<td>(0.542)</td>
</tr>
<tr>
<td><strong>Geographic Diffusion Variables</strong></td>
<td></td>
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</tr>
<tr>
<td>Regional Diffusion (1 year lag)</td>
<td>−0.019</td>
<td>(0.059)</td>
</tr>
<tr>
<td>Global Diffusion (1 year lag)</td>
<td>0.081</td>
<td>(0.116)</td>
</tr>
<tr>
<td><strong>Economic Development Variable</strong></td>
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</tr>
<tr>
<td>GDP/capita (logged)</td>
<td>−0.053</td>
<td>(0.107)</td>
</tr>
<tr>
<td><strong>Economic Performance Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short-term Inflation (logged, 1 year lag)</td>
<td>−0.027</td>
<td>(0.038)</td>
</tr>
<tr>
<td>Long-term Inflation (logged, 10 year average)</td>
<td>−0.148</td>
<td>(0.115)</td>
</tr>
<tr>
<td>Short-term Growth GDP/capita (1 year lag)</td>
<td>0.180</td>
<td>(1.257)</td>
</tr>
<tr>
<td>Long-term Growth GDP/capita (10 year avg.)</td>
<td>3.880</td>
<td>(2.141)</td>
</tr>
<tr>
<td><strong>Persistence Variable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polity Score (1 year lag)</td>
<td><strong>0.605</strong></td>
<td>(0.041)</td>
</tr>
<tr>
<td><strong>Unit-level Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Effects</td>
<td></td>
<td>a</td>
</tr>
<tr>
<td><strong>Other Variable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.681</td>
<td>(3.940)</td>
</tr>
<tr>
<td>Number of Observations</td>
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</tr>
<tr>
<td>Number of Countries</td>
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</tr>
<tr>
<td>$R^2$ (without fixed effects)</td>
<td>0.949</td>
<td>(0.465)</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>−2802</td>
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</tr>
<tr>
<td>Akaike Information Criterion</td>
<td>6038</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Dependent variable is Polity Score, 1991-2001. Coefficients are least squares estimates, with fixed effects included but not reported. Standard errors in first column are Arellano robust errors (clustered by country) in parentheses; p-values are for two tails. Statistically significant coefficients (p < 0.05, two-tailed) are in **bold**.

a Fixed effects included, but not reported. The p-value is for a joint significance test.
Table 3: Predicted Changes in Polity Score

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Predicted Change in Polity Score</td>
<td>95% Confidence Interval of Change</td>
<td>Predicted Change in Polity Score</td>
<td>95% Confidence Interval of Change</td>
</tr>
<tr>
<td>Security Network</td>
<td>+0.10</td>
<td>(−0.23, 0.43)</td>
<td>+0.01</td>
<td>(−0.03, 0.04)</td>
</tr>
<tr>
<td>Trade Network</td>
<td>+0.15</td>
<td>(−0.14, 0.45)</td>
<td>+0.26</td>
<td>( 0.01, 0.52)</td>
</tr>
<tr>
<td>IO Network</td>
<td>+0.57</td>
<td>( 0.19, 0.95)</td>
<td>+0.01</td>
<td>(−0.23, 0.25)</td>
</tr>
<tr>
<td>Regional Diffusion</td>
<td>+0.61</td>
<td>( 0.30, 0.91)</td>
<td>−0.04</td>
<td>(−0.32, 0.23)</td>
</tr>
<tr>
<td>Global Diffusion</td>
<td>−0.29</td>
<td>(−0.76, 0.17)</td>
<td>+0.10</td>
<td>(−0.18, 0.37)</td>
</tr>
<tr>
<td>GDP/capita</td>
<td>+0.03</td>
<td>(−0.26, 0.32)</td>
<td>−0.03</td>
<td>(−0.15, 0.09)</td>
</tr>
<tr>
<td>Short-term Inflation</td>
<td>+0.08</td>
<td>(−0.06, 0.23)</td>
<td>−0.09</td>
<td>(−0.33, 0.15)</td>
</tr>
<tr>
<td>Long-term Inflation</td>
<td>−0.02</td>
<td>(−0.26, 0.21)</td>
<td>−0.17</td>
<td>(−0.42, 0.09)</td>
</tr>
<tr>
<td>Short-term Growth</td>
<td>−0.04</td>
<td>(−0.13, 0.06)</td>
<td>+0.02</td>
<td>(−0.23, 0.26)</td>
</tr>
<tr>
<td>Long-term Growth</td>
<td>+0.04</td>
<td>(−0.09, 0.16)</td>
<td>+0.20</td>
<td>(−0.02, 0.42)</td>
</tr>
</tbody>
</table>

Notes: Predicted change in Polity Score is calculated from the Arellano Robust Fixed Effects coefficients in Tables 1 and 2. The change in the independent variable is an increase of two standard deviations (measured within countries). Where the confidence interval includes zero, the predicted effect is not statistically significant different than zero at a 0.05 level. Predicted effects that are statistically significant are in **bold**.

Example: Increasing a country’s IO Network score by two standard deviations increases that country’s predicted Polity Score by 0.57, with a 95% confidence interval of (0.19, 0.95).