SERVING THE UNION: THE GOVERNMENT-SPONSORED NETWORK IN EUROPEAN UNION EXTERNAL RELATIONS

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Introduction

Civil society organizations and businesses play an increasingly prominent role in world politics. In the current globalized international system, states “lose control” in the form of diminished sovereignty (Sassen, 1996) and legitimacy because of their inability to represent and serve their citizens as affectively as in the past (Castells, 1996). The changing role of the state in the global arena has given non-governmental actors new outlets for involvement in political decisions. They have new opportunities to work with governments for setting standards, solving problems or deciding and implementing policy. This paper examines the evolving relationship between governments, for-profit and non-profit actors, by concentrating on a particular type of interactions: through networks.

The study of networks in the world politics literature is by no means new. And even though there are scholars who have studied networks formed by states (Cao, 2010; Maoz, 2011), most of the relevant literature has concentrated on transnational networks, which connect actors inside states, such as governmental agencies and departments (Slaughter, 2000; Bach and Newman, 2010), businesses and corporation networks (Ernst and Kim, 2002) or civil society networks (Keck and Sikkink, 1998). Transnational
networks contribute to the transformation of international relations into what Keohane and Nye (1972) labeled as transnational relations.

This research project contributes to the literature on transnational networks, by examining a particular type of network, which we call the government-sponsored network (GSN). GSNs are composed of civil society organizations or businesses. But they are different from other transnational civil society and business networks, as they are created with the support and funding of governments. Hence, GSNs are not structures that spring spontaneously from the bottom up to influence government decisions, either through lobbying or through advocacy. Their main purpose is to help states accomplish policy objectives in a world environment where governance is as important as government. In other words, the need for GSNs emerges in decentralized global system, where decision-making and policy implementation necessitate the inclusion of a variety of different private and public stakeholders.

GSNs reverse the conventional relationship between governments and private actors in international and domestic politics. Typically it is private actors that pursue cooperative (through lobbying) or conflictual (through advocacy) relationships with governments, with a goal of exerting influence on government decisions. By contrast, in GSNs it is governments that deliberately reach out to private actors and seek their assistance in accomplishing policy objectives.

Governments are able to engage private actors through GSNs because the networks change those actors’ opportunity structures: they provide new channels for communication to governments and hence opportunities for more influence on government policy. Additionally, GSNs, just like other transnational networks, or indeed
networks more generally, help private organizations fulfill another need, which is getting access to information shared through the network (Keck and Sikkink, 1998; Slaughter, 2000). Therefore, while governments initiate the relationship, it is by no means a one-way deal. GSNs satisfy interests on both sides of this relationship.

Although they are not labeled as such, GSNs can be found in several guises and in different contexts. Conventionally, they have been studied in the context of domestic/national politics, where often they are labeled as policy networks. An edited volume by Rhodes and Marsh (1992) on British policy networks, which link various private and public actors associated with specific policies, was one of the ground breaking works on the subject. Since then numerous studies have examined relations between public and private actors in the US and Europe, either in the form of policy networks or public-private partnerships. (For example, see: Börzel, 1998; Goldsmith and Kettl, 2009; Feiock and Scholz, 2010) The literature on domestic business networks, particularly in East Asian capitalism, has further explored the relationships between firms and governments that account for firms’ success (Nolan et al., 2017).

In the world politics literature, however, GSNs have received limited attention, and most of the revenant studies are concentrated in the field of international development. The development literature routinely examines non-governmental organizations (NGOs) that act on behalf of donor governments as service providers in less developed countries (Chabott, 1999; Hermann et al., 2012; Ahmed and Potter, 2013). While development NGOs often form networks in order to achieve better outcomes (Fowler, 1997; Murdie, 2014), the exact role of governments or intergovernmental organizations (namely, their agency) in supporting those networks is
not always as clear. Hence, it is not always possible to conclude whether those networks are GSNs or some other type of transnational networks. There are two exceptions of networks that have been examined in the literature and can be clearly labeled as GSNs. Both are supported by the World Bank: the NGO Working Group which has been set up with the explicit purpose of providing policy advice to the bank’s officials (Yanacopoulos, 2001; 2005) and the Global Development Network, which facilitates the sharing of expertise and information among development think tanks in the Global North and South (Clarke and Squire, 2005; King, 2005). Beyond these scant references in the development literature, there is not a lot of research on GSNs out there. The literature on international business networks tends to focus on the properties of and relationships among the firms in a given region, remaining silent about their interactions with government institutions (Kamp, 2007).

This study aims to draw attention to GSNs in world politics, first by conceptualizing them and also by studying some of their main properties and role. In order to better understand GSNs, we ask two questions about their structure and function. First, what effect does the structure of those networks have on the outcomes they produce? We are particularly interested in the differences of the density and centralization of relations among the members of the two networks and the effect of those differences on outcomes. And, secondly, are there any systematic differences between business and civil society networks? In order to explore these questions, we concentrate empirically on two cases of GSNs established by the European Union institutions and the US government for strengthening their mutual economic relations, and more specifically the Transatlantic Business Council (TABC), which is composed of businesses from the
EU countries and the US, and the Transatlantic Consumer Dialogue (TACD), which is comprised of consumer advocacy groups from Europe and America.

Background: The Transatlantic Business Council and the Transatlantic Consumer Dialogue

The TABC\(^1\) and the TACD were created jointly by the EU and the US. They were part of the New Transatlantic Agenda between the EU and the US launched in the 1990s. A number of other important dialogues were established at the same time, including the Transatlantic Environmental Dialogue, the Transatlantic Labor Dialogue (Bignami and Charnovitz, 2001). However, only the TABC and the TACD have been credited with various successes since then while other dialogues have been not as influential (Bignami and Charnovitz, 2001; Farrell, 2005).

The TABD and the TACD can be understood as a result of policy spillover from the EU’s internal market (Steffenson, 2005). The overarching goal of the EU’s strategy is the externalization of the internal policies and their transfer. Establishing policy and private actor networks is seen by EU officials as a way to achieve this goal. Thus, the TABC and the TACD represent an important part in this toolkit of EU external governance mechanisms. At the same time, it is also a case of jointly sponsored government network where the EU efforts are also met by the US who also sometimes relies on the de-facto network approach in its external relations (Oehri, 2014). Hence, we should expect that these networks will not be as much of a conduit for diffusing EU norms and policies, as is often the case with other similar business and civil society networks sponsored by the EU in other parts of the world (Turkina and Postnikov, 2012;

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\(^1\) The TABC was previously known as the Transatlantic Business Dialogue (TABD)
2014; Kourtikakis and Turkina, 2015; Turkina and Kourtikakis, 2015) but rather a venue for coordinating regulatory agendas between the EU and the US. Regulatory coordination, as opposed to policy diffusion, is also more likely given the symmetrical relationship and equal weight of EU and US economies globally, or their respective market powers, as well as the difficulties the EU faces exporting its regulatory approach in the relations with wider world, outside the neighborhood, for example, through preferential trade agreements (Young, 2015). This joint network governance effort in transatlantic relations also needs to be seen against the backdrop of geo-economic competition in the global economy where the EU and the US compete with each other for access to new attractive markets (Sbragia, 2010).

Moreover, the TABC and the TACD should be seen as important venues where businesses and civil society organizations can exert pressure on policy-makers, setting the transatlantic economic agenda and directly participating in the governance of the transatlantic marketplace. It is also a clear case of network governance whereby private actors join forces together in a non-hierarchical fashion and link through various ways with policy-makers they try to influence.

**Hypotheses**

In this section, we articulate the hypotheses that will help us assess the role GSNs play in the relations between governments and non-governmental organizations. More specifically, we want to assess the effect of certain network properties (such as density and centralization) on the outcomes achieved by those networks. We will test those hypotheses using the tools of social network analysis in the next section. There are two
particular types of outcomes that we are interested in: outcomes for the governments that create and support the networks and outcomes for the for-profit and non-profit organizations that choose to participate in them.

We will start with a discussion of outcomes for businesses and civil society organizations. In the literature on transnational networks, it is clear that gaining access to information and accumulated knowledge is an important reason why organizations join those networks. This is the case for a variety of network types, such as advocacy coalition networks (Keck and Sikkink, 1998) and transgovernmental networks (Slaughter, 2000). We expect to find a similar dynamic in GSNs. More specifically, we hypothesize that as time goes by, the number of connections among organizations, and hence the sharing of information among them, will increase.

_Hypothesis 1: The sharing of information and cooperation in government-sponsored networks increases over time._

To test Hypothesis 1, we use network density as a measure of information sharing and cooperation. Hence, we expect to find that as time goes by the levels of density will increase. We will measure network density at two different time points.

A second outcome that non-governmental organizations expect to accomplish by participating in networks, which is of particular significance for GSNs, is access to the sponsoring government institutions. Opportunities for interaction with the government are important for civil society organizations both at the domestic level (Rucht, 1996; Tarrow, 1996) and at the international level (Tarrow, 2005). The same is also true for
businesses at both levels (Leech et al., 2005; Woll, 2008). Hence, in the case of the two networks that we examine in this paper, we expect to find that private organizations will be motivated to participate in the two networks because they will have direct access to the US government and the EU institutions. Consequently, we anticipate that the government institutions will play a significant role in those networks. We articulate this expectation in our second hypothesis:

_Hypothesis 2: Government sponsored networks are centralized around government institutions across time._

In Hypothesis 2, we use network centralization as a proxy of government significance. We expect to find that the networks are highly centralized, and that the most central nodes will be government institutions. This means that most communication in the network happens through one or two central nodes, to which all the other nodes seek to connect.

Now we would like to turn to the discussion of the relationship between outcomes for sponsoring governments and network properties. The main motivation for governments to create GSNs is to get better policy results. In the case of the two networks that we examine in this paper, EU institutions and the US government expect to get more and better economic policy coordination between the two sides of the Atlantic. The existing literature on the two networks clearly demonstrates that TABC has been more effective at policy coordination than TACD. In an overview of several transatlantic civil society networks, Bignami and Charnovitz (2001), Murphy and Yanacopoulos
and Levidow et al. (2007) have found that the consumer association network has been marred by ineffectiveness, even though it has fared a lot better than other similar transatlantic civil society networks.

The verdict on the TABC in the literature is strikingly different. Green Cowles (2001), Egan (2001), Steffenson (2005), and Murphy and Yanacopoulos (2005) have found that the business network has been pivotal for setting common standards on a variety of issues of transatlantic concern, and therefore it is perceived as successful.

One of the main achievements of the TABC has been the conclusion of several Mutual Recognition Agreements on standards and technical barriers to trade between the EU and the US that serve as liberalization tools for the new Transatlantic Marketplace (Egan, 2001; Steffenson, 2005). While these agreements did not lead to regulatory convergence, they nevertheless represent a deal acceptable to the businesses on both sides of the Atlantic. The TABC has played a key role in this process, playing a role of a powerful lobbyist while also offering technical expertise (Steffenson, 2005). The Safe Harbor and E-Commerce Agreements were also facilitated by the TABC which provided a venue for business interests mobilization and successful lobbied the American and European governments even despite the firms’ interest heterogeneity (Farrell, 2005). These successes should not be seen as surprising due to larger power of private firms have relative to other civic interests who might also attempt to organize transnationally but would experience difficulties due to the lack of material resources.

The recent success of the network can be seen in the negotiation of the Transatlantic Trade and Investment Partnership (TTIP). The agreement is an attempt to liberalize trade across the Atlantic further by cutting the red tape and improving
regulatory cooperation and perhaps even achieving a certain degree of regulatory harmonization between the EU and the US. The transatlantic business lobby has been particularly influential in shaping the agreement’s agenda and directly engaging with the American and European negotiators in the face of the United States Trade Representative (USTR) and the European Commission’s DG Trade respectively. In doing so, it, quite expectedly, obviated the national peak organizations as has been also the case with the previous EU-US agreements.

Hence, overall the TABC has been credited with much more success than the TACD. What explains this difference in performance between the two networks? The literature suggests that there is a historical explanation for this difference: traditionally, businesses have been very involved in transatlantic economic relations (Schaufelbuehl, 2016) than civil society groups, which tend to be more active at the national level (Bignami and Charnovitz, 2001; Tarrow, 2005). In addition, the degree of mobilization of member-organizations, internal policy harmony or disharmony, and access to governments has also been cited as reasons for the differences in performance of the two networks.

In the same vein, Young (2016), in an article about TTIP, points at a realignment of societal cleavages, whereby export-oriented producers from both sides of the Atlantic stop seeing each other as rivals and form a transnational alliance in order to influence the negotiations. This is in striking contrast with civic interests represented by NGOs defending consumer rights and labor and environmental standards. The reason behind this is the greater resourcefulness of business actors compared to civic associations. Thus, the TABC becomes the new institutional embodiment of the emerging transnational
cleavage. It is particularly relevant in a situation where the national peak organizations exist to represent the traditional trade policy coalitions, as has been the case with the “old” trade politics of tariff removal prior to the launch of the deep trade agenda. Young points at the economic reasons behind this emerging cleavage, particularly, the interpenetration of EU and US markets through foreign direct investment (FDI). Yet, without the establishment of the TABC in the first place it is doubtful that the new transnational cleavage would be as pronounced. Thus, the supply side of this network governance structure also needs to be accounted for to understand its durability and success.

In order to understand the difference in outcomes between the two networks, we would like to take a different approach from these previous studies, by exploring if the properties of the two networks can help us provide an alternative and more generalizable answer to this question. More specifically, we want to focus again on the centralization and the density values of the two networks over time. In his review of transnational actors for a handbook of international relations, Risse (2013) has remarked that the relationship between centralization and density, on the one hand, and transnational network outcomes, on the other, is not entirely clear in the literature. Some studies demonstrate that higher levels of density (namely, more direct connections among network nodes) leads to better outcomes, because dense networks are more decentralized (and therefore more flexible) and can adapt to challenges better. But other studies show the opposite: that a higher degree of centralization leads to better outcomes because central nodes, which play a leadership role, better coordinate the network.
We want to explore which of those two logics apply to GSNs. For this purpose, we want to explore hypotheses 3 and 4:

**Hypothesis 3:** The degree of centralization of government-sponsored networks correlates positively with policy outcomes.

**Hypothesis 4:** The degree of density of government-sponsored networks correlates positively with policy outcomes.

Lastly, we would like to examine if perhaps the difference in outcomes is not at all related to the leadership provided by government institutions (centralization) or the flexibility of the network (density) but other factors, such as the influence on the network of members with certain characteristics.

**Hypothesis 5:** A private organization’s significance on the network is correlated to its size and experience with international collaborations.

To test Hypothesis 5, we measure the local centrality of all the organizations in each network as a proxy of their relative significance in their respective network. Then, we explore whether this centrality is positively or negatively correlated with the organization’s size and experience and previous international experience. Under this scenario, the most central actor in the network could be a private actor that fits a certain profile rather than a government institution. Therefore, we can potentially conclude that
the network is not necessarily fulfilling the goals of the government or governments that supported its creation.

Methodology and Analysis

In this section, we test our hypotheses by conducting an empirical longitudinal analysis of the Transatlantic Business Council and the Transatlantic Consumer Dialogue networks. Formal social network analysis is the widely preferred method for assessing the evolution and effectiveness of cooperative partnerships: it provides statistical measures of different network properties such as density and centralization (Provan and Milward, 1995; Valente and Davis, 1999; Tanjasiri et al., 2007).

We use the web resources of both organizations (Transatlantic Business Council and the Transatlantic Consumer Dialogue) to collect information on the network nodes. There are 46 members of the Transatlantic Business Council and 77 members of the Transatlantic Consumer Dialogue). We also include a network node of EU institutions and a node of US institutions.

The relationship between two network nodes was measured by the number of interactions between them. The information on the number of interactions was collected through the resources of both organizations (TABC and TACD) such as focus groups, reports, etc., and also from all available information on the internet through search engines. For example, if two organizations participated in a forum, focus group, or another event, it was considered to be an interaction. Since the interactions were quite dense (which is not surprising given that all the network nodes are the members of TABS

2 [http://tacd.org/about-tacd/member-list/](http://tacd.org/about-tacd/member-list/) [https://www.transatlanticbusiness.org/about-us/member-companies/]
or TACD and have a specific framework for interaction), we imposed a threshold of 5 interactions: a network linkage was modeled only in the case of the existence of over 5 interactions between two network actors. This kind of approach to measuring network ties is common in the analysis of interorganizational networks (Dyer and Singh, 1998; Soh, 2003). Using this approach, we constructed the networks for two time periods consisting each of three years: 2013-2014 and 2015-2016. We used these time periods due to data availability and compatibility. While many TACD fora and focus groups were created in 2009 (e.g. The EU-U.S. Energy Council), the Transatlantic Business Council’s events first took place in January 2013. It is common in network analysis that the data are collected over several-year periods to capture more differences in network structure over time.

The relational matrixes were analyzed with UCINET and NETDRAW tools and techniques. For brevity, we provide network diagrams for both organizations for the latest time-period 2014-2016.

[Figure 1 about here]

[Figure 2 about here]

However, the information on the relevant network data for all the networks is summarized in table 1.

The centralization of a network is a measure of how central its most central node is in relation to how central all the other nodes are. Defined formally, if \( C_x(p_i) \) is a centrality score of node \( i \), if \( C_x(p_\ast) \) is the largest such measure in the network, and if

\[
\max_{j=1}^N C_x(p_\ast) - C_x(p_i)
\]

is the largest sum of differences in point centrality \( C_x \) for
any graph with the same number of nodes, then the centralization of the network is:

\[ C_x = \frac{\sum_{j=1}^{N} C_x(p_j) - C_x(p_i)}{\max \sum_{j=1}^{N} C_x(p_j) - C_x(p_i)} \]

As far as network density is concerned, it shows the general level of connectedness among network actors and measures the ratio of the number of existing links in the network to the number of possible links in the network (Scott, 2000).

[Table 1 about here]

The indexes of centralization and density indicate that both networks are highly centralized and rather dense. The density of both networks increases over time. These results support our first hypothesis. At the same time, the centralization of both networks decreases over time. Visual diagrams (figures 1 and 2) indicate that the most central network nodes are EU and US institutions. In order to verify this in statistically significant manner, we calculate Bonachich centrality indexes for all network nodes (Bonacich, 1987). This measure is based on the principle that the power of a given actor is an increasing function of the sum of all the centralities of all the actors with whom that actor is connected. The argument is that network nodes connected to many well-connected (central) nodes are more influential than those connected to an identical number of poorly connected actors. Most influential actors in the network initiate interactions and are able to impose their norms and ideas on the other members of the network. Bonacich power is formally defined as the principal eigenvector of the adjacency matrix defining the network. The defining equation of an eigenvector is \( A\mathbf{v} = \lambda \mathbf{v} \), where \( A \) is the adjacency matrix of the graph, \( \lambda \) is a constant (the eigenvalue) and
V is the eigenvector. The equation lends itself to the interpretation that a node with a high eigenvector score is one that is adjacent to nodes that are themselves high scorers.

To evaluate the EU and US institutions’ influence in interorganizational networks, we calculated Bonacich scores for all network actors normalized to the size of the network. The analysis indicates that the influence of government institutions in all the networks is much higher than that of any other actor (the difference in scores with the third most influential actor is 0.17 points). These results support our first hypothesis. In the TABC network, the EU institutions have a score of 0.40 in the first period and 0.36 in the second period. The US institutions have a score of 0.45 in the first period and 39 in the second period. As far as the TACD networks are concerned, the EU has a score of 0.48 in the first period and 0.43 in the second period. The US institutions have a score of 0.42 in the first time period and 0.37 in the second time period.

It is clear that governmental institutions play a higher coordinative role in the first time period and that the EU institutions are more eigenvector-central in the TACD network, while the US institutions are more eigenvector-central in the TABC network. Moreover, the visual diagrams indicate that the cooperative effort in the TACD network is more segmented into specific clusters, while interactions in TABC network are more hectic and less organized. Additionally, the structure of the two networks is quite different: in the TABS network the network is devised into two parts and each of the institutions plays a coordinative role in its respective cluster. At the same time, in the TACD network, the institutions are clearly in the center and the sub clusters revolve around institutions. Taken together, these findings support our Hypothesis 2.
It is also important to note that in each network there are some actors that have high local centrality (in their respective sub-clusters; they are green triangles on the diagrams). At the same time, in addition to the EU and US institutions, there are also some organizations (they are black squares on the diagrams) that perform the brokerage function by connecting network clusters (essentially these are organizations that participate in multiple focus groups and fora, e.g. Siemens in TABC network). It is important to note that if we take a look at group density, the TACD network shows higher density in network clusters than the TABC network (average group density over 0.6 versus 0.4, respectively). Cooperative effort in the TACD seems to be more focused and deeper than in the TABC.

**Policy influence**

In order to test our third and fourth hypotheses on the role of centralization and density on policy influence, we collected all the available information from the TABC and TADC resources on the network focus groups. For instance, TABC is a major stakeholder in a number of official forums held between the EU and U.S. governments which address policies in such areas as capital markets, energy, emerging technologies, ICT and IPR.\(^3\) TABC provides the platform and access for its member companies and interested stakeholders to formal and informal discussions between EU and U.S. government officials on a breadth of strategic and sectoral issues; its stakeholder events are held in conjunction with these official EU-U.S. dialogues and

\(^3\) http://www.aalep.eu/trans-atlantic-business-council-tabc
contribute policy recommendations as well as practical expert input which aid in policy development for the transatlantic market.\textsuperscript{4}

Second, we matched the focus groups with network topological groupings and then for each focus group we calculated the number of expert inputs, policy recommendations, etc., treating the number of policy-related initiatives as a proxy for policy influence. Next, we analyzed if there is a correlation between a group’s (cluster) network density and centralization (how centralized the group is) and the number of policy-related initiatives. In the case of group density, we found a strong and significant correlation (0.58***), at the same time, we did not find a statistically significant correlation in the case of group centralization (0.12, p value 0.524). These results confirm our Hypothesis 4 and indicate, that there is no evidence to support Hypothesis 3.

\textit{Organizational centrality}

To test our fifth hypothesis (if a private organization’s significance on the network is correlated to its size and experience with international collaborations), we have collected data on network members and we conduct multiple regression analysis using individual organization centralities calculated in UCINET as a dependent variable and organization size and the overall number of international collaborations as independent variables while controlling for organization’s age. The information on organization’ size, age, and the number of international collaborations was obtained from the organizations’ websites and other resources (Orbis database for corporations). We managed to obtain detailed information for most organizations in the networks, but for

\textsuperscript{4} http://www.aalep.eu/trans-atlantic-business-council-tabc
some organizations data were missing, and therefore we excluded them from the regression. We also control for any differences between the US and EU companies by using continent-level dummies (assigning 1 to EU organizations, and 0 to US organizations). Our final sample consists of 108 observations for the first time period and 117 observations for the second time period. Table 2 presents the results of the analysis. The results show strong support for our Hypothesis 5.

Conclusion

Our goal in this paper was to define and understand GSNs. More specifically, we defined GSNs as networks of private actors, which can be either for-profit or non-profit organizations, created as a result of government initiatives and funding. Then, we set out to explore the relationship between the structure of those networks (especially their levels of density and centralization), on the one hand, and the outcomes they produce for the participating private organizations and the participating governments, on the other. We paid special attention to the differences between for-profit and non-profit organization networks. What have we found out?

To begin with, in all the networks we examined, participating private organizations benefited in two ways. The first is by sharing information with their counterparts and the second by gaining increased access to the governments that sponsored the networks. Our analysis shows that over time density values, which we used to operationalize the sharing of information among network members, went up. Additionally, both networks were centralized around the government institutions participating in them, which means that the members of both networks had a high volume
of contacts with those institutions. Interestingly, however, the centralization of both networks, and hence the influence of the central role government institutions, decreases over time.

Moreover, we found that governments can get better outcomes from GSNs, in the form of better policy coordination, by encouraging increased density of horizontal contacts among members. Indeed, the business network in our study, which has been characterized as more successful in the literature, and by our own analysis, overall had higher levels of density and lower levels of centralization than the civil society network, which has enjoyed lower levels of policy success.

We can conclude then that successful GSNs need to balance two different tendencies. On the one hand, a GSN should allow private actors increased opportunities for contact with the participating governments, and hence it needs to have a certain degree of centralization. Relations among members can’t be completely egalitarian and horizontal, because that would decrease the incentive of private organizations to participate in the networks. On the other hand, a very high degree of centralization can be harmful for the policy effectiveness of the network, and therefore for the ability of governments to get the policy outcomes they want. That is why a successful GSNs need to encourage direct contact among their members. Resolving this conflict between more hierarchy and direct contacts is equal to balancing the expectations of government institutions and private organizations and seems to be the key for the success of a GSN.
Figures and Tables

Figure 1: Transatlantic Business Council Network. Red diamond: US institutions; yellow rounded square: EU institutions; green uptriangles: organizations having high local centrality; black squares: organizations that have high brokerage centrality.

Figure 2: Red diamond: US institutions; yellow rounded square: EU institutions; green uptriangles: organizations having high local centrality; black squares: organizations that have high brokerage centrality.
Table 1: Network density and centralization

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<thead>
<tr>
<th></th>
<th>Overall network density</th>
<th>Overall network centralization</th>
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<tbody>
<tr>
<td>TABC first period</td>
<td>0.19</td>
<td>0.57</td>
</tr>
<tr>
<td>TACD first period</td>
<td>0.12</td>
<td>0.73</td>
</tr>
<tr>
<td>TABC second period</td>
<td>0.36</td>
<td>0.41</td>
</tr>
<tr>
<td>TACD second period</td>
<td>0.24</td>
<td>0.62</td>
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Table 2: Centrality analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Org Centrality</th>
<th>Variables</th>
<th>Org Centrality</th>
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<tbody>
<tr>
<td></td>
<td>First period</td>
<td></td>
<td>Second period</td>
</tr>
<tr>
<td>Org size</td>
<td>0.43*** (0.008)</td>
<td>Org size</td>
<td>0.31*** (0.009)</td>
</tr>
<tr>
<td>International collaborations</td>
<td>0.62*** (0.003)</td>
<td>International collaborations</td>
<td>0.58*** (0.005)</td>
</tr>
<tr>
<td>Control: actor age</td>
<td>0.008* (0.008)</td>
<td>Org age</td>
<td>0.004 (0.006)</td>
</tr>
<tr>
<td>Control: continent –level dummies</td>
<td>0.011*** (0.001)</td>
<td>Control: continent –level dummies</td>
<td>0.015*** (0.001)</td>
</tr>
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N= 108; R-squared=0.20
*p <0.05, **p<0.01, ***p<0.001 (two-tailed)

N= 117; R-squared=0.22
*p <0.05, **p<0.01, ***p<0.001 (two-tailed)
References


25


