BIT by BIT: How Bilateral Investment Treaty Network Shapes Foreign Direct Investment[*]

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Abstract

Do bilateral investment treaties (BITs) have broader effects beyond the signatory states? We posit that the network formed by the collection of BITs transmits information about countries' domestic investment environment, such as the quality of their legal institutions, to other states within the network, which shapes the flow of foreign direct investment (FDI) and facilitates new treaty negotiations. To test this claim, we formalize a novel causal network estimator and tailor its application to a comprehensive dataset of dyadic investment flows between states from 1975 to 2012. We find that when two countries become indirectly connected by BITs through an intermediate country, the FDI flow between the pair increases by an additional 4-6% relative to the unconnected country pairs. Additionally, indirectly connected country pairs become 1-2% more likely to form a new BIT between them. To examine whether the information transmission mechanism facilitates this process, we further investigate heterogeneous treatment effects based on the quality of domestic legal institutions. As country pairs' legal differences widen, treatment effects decrease for FDI flows. Our findings highlight network spillover as a substantial component of the overall effect of BITs: For states within the BIT network, ratifying investment treaties not only strengthens economic ties with its new partner, but also helps transmit investment information to many others.

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1 Introduction

For more than half a century, over 3,000 pairs of countries have ratified bilateral investment treaties (BITs) that set the terms for how investments from one country are treated in the other's jurisdiction (Alschner, Elsig and Polanco, 2021). These treaties frequently take on similar language, principles, and structures, deriving from what is often referred to as the "model" or "boilerplate" treaties (Vandevelde, 2011; Poulsen and Waibel, 2021). Taken together, these bilateral treaties collectively form a multilateral network of international investment regimes, extending the regulatory power of each individual BIT beyond its direct signatories. In this article, we argue that the network structure of BITs gives rise to investment behaviors that no single treaty within this network cannot fully explain, and provide a first systematic examination of the political and economic consequences of the BITs network.

We develop an information-based theory that embeds bilateral investment flow and treaty formation into the more extensive network of the international investment regime. We argue that in addition to the direct *material* effect BITs may have on the signatories, which has been the predominant focus of the existing literature of BITs, the patterns of international investment are also shaped by the indirect *informational* effect generated from the network formed by the treaty ties countries negotiated with one another. Both the government and investors evaluate the suitability of the investment environment in a foreign country – such as the market risks, financial prospects, and legal protections – not only by the framework of international treaties, but also through the experience of their peers within the network.

By showing that the BIT network helps to facilitate investment flows between country pairs even if they are not directly connected by an enforceable treaty, we argue that the role of investment agreements in shaping the cross-national flow of investment has been underestimated in the existing literature. Moreover, the informational effect of the BIT network not only facilitates investment flows but also shapes countries' decisions in future treaty formation. Recent studies show that states are more likely to form BITs with partners that can help them access more potential investment destinations (Tomashevskiy, 2022). We build on this insight by further examining the role of the BIT network in helping governments identify which other countries are more likely to be a suitable treaty partner.

We also find evidence of treatment heterogeneity based on the quality of domestic legal institutions. A key information countries seek to evaluate in potential investment destinations is how their outflowing property will be treated and protected in a foreign location. We identify two sources for the legal protection of investor properties: domestic rule of law and international arbitration, such as investor-state dispute settlements (ISDS). We find that the effect of indirect BIT connections is most pronounced where the quality of domestic legal institutions is similar between country dyads, which suggests that the ease with which investors can adapt to foreign destinations' legal institutions is a crucial component of the learning mechanism within the investment treaty network. In contrast, the onset of ISDS around a country pair's neighboring network has a limited impact on the volume of dyadic investment flows, as these arbitration cases are highly salient and visible, and thus constitute informational shock to the entire network. These results show that cross-national learning is a mechanism distinct from the formal enforcement power of investor-state dispute settlement. While ISDS may help host countries to assuage and attract potential investors through credible hands-tying, the larger BITs network further shapes investment flows by channeling information about the investment environment of a host country to other investors, even if they are not under the direct legal protection of a treaty.

The contributions of this paper are twofold. First, we show that the informational effect of BITs significantly promotes the flow of foreign investments, even between countries without formal protections. Existing research arguing for the effectiveness of BITs often points to the legal costs and policy constraints BITs impose on host governments (Allee and Peinhardt, 2011; Pelc, 2017). Countries that choose to enter into BITs can either use the treaty as a credible *commitment* to solve hold-up problems for the protected investors or to *signal* to all potential investors, protected or unprotected, that they have laws and policies in place that protect foreign investment (Tobin and Rose-Ackerman, 2011). Our paper identifies an alternative channel and shows that a country's investment flow can also be shaped by other countries' decisions to enter BITs. We formalize and apply a causal network estimator on a comprehensive dataset that records the level of foreign direct investment (FDI) deposits at the dyad level from 1975-2012 among 148 countries. Using dyadic data that map out how FDIs are distributed across country nodes, we find that when two countries become indirectly connected in the BIT network,[1] FDI flows between the pair increase 4-6% faster than unconnected pairs. These effects occur as countries observe and learn from the interactions of their treaty partners with third-party states, leading to a substantial increase in investment flows.

Second, in addition to economic spillover, information diffusion also serves an important channel for bilateral treaty networks to generate multilateral political consequences. Current literature identifies economic competition and social emulation as two main drivers in the diffusion process of investment treaties (Elkins, Guzman and Simmons, 2006; Jandhyala, Henisz and Mansfield, 2011; Poulsen, 2014). Our qualitative and archival evidence, however, suggest that these factors cannot adequately explain why countries with competition or emulation incentives at times do not initiate treaty negotiations, but are contacted by potential partner countries instead. We contribute to the policy diffusion literature by offering an account of positional learning in the BIT network, through which countries identify suitable treaty partners based on their relative network positions. Our result shows that when the BIT network indirectly connects a pair of countries, their dyadic investment flow increases, which then also increases the likelihood of the subsequent conclusion of a direct BIT by 1-2%, resulting from increased investment interactions through the indirect connection (Johns and Wellhausen, 2016). The formation of new treaties, in turn, connects more countries to the BIT network, thereby supercharging the investment spillover and policy diffusion process.

In sum, this paper highlights the empirical importance to account for potential network effects when studying the effects of BITs, both politically and economically. Ignoring network externalities systematically underestimates the influence of BITs and mischaracterizes their role in shaping global capital flows. Several recent studies argued that the volume of FDIs attracted by BITs is marginal and decreases over time (Brada, Drabek and Iwasaki, 2021; Betz, Pond and Yin, 2021; Kerner and Pelc, 2022). We argue that one potential explanation for these patterns is the omission of the effect of the BIT network, which may precede the effect of a direct BIT ratification.[2] More generally, our findings

[1] We provide the formal definition of indirect connection in Section 3.

[2] Specifically, if prior to the ratification of a direct BIT between two countries, their investment flow has already been

have wider implications for how scholars measure the institutional effectiveness of bilateral agreements other than BITs. Bilateral agreements such as double tax treaties and bilateral labor agreements also form multilateral networks in which political and market actors can learn from the interactions between their treaty partners and third parties (Arel-Bundock, 2017; Chilton and Woda, 2022). Moreover, as countries increasingly turn from multilateral organizations to bilateral negotiations on issues such as trade, our theory also helps to assess the strategic value of such policy choices.

The paper proceeds as follows. In Section 2, we develop a novel theory of how the BIT network shapes the pattern of both international investment and institution formation. We generate several observable implications of our theory in Section 3, and describe the data and estimation strategies we deploy. We then present the main results in Section 4. Section 5 further explores our theoretical mechanism by evaluating evidence on treatment heterogeneity. Section 6 concludes by discussing the scope conditions of our findings and describing avenues for future research.

2 BITs, and the Network of BITs

Bilateral investment treaties are intergovernmental agreements that "grant extensive rights to foreign investors, including protection of contractual rights and the right to international arbitration in the event of an investment dispute" (Elkins, Guzman and Simmons, 2006, p.811). As an increasing number of states adopt BITs, these treaties have become recognized as the most important international legal mechanism to promote and protect international investment in the absence of a multilateral institution regulating FDI (Elkins, Guzman and Simmons, 2006; Jandhyala, Henisz and Mansfield, 2011; Poulsen and Aisbett, 2013). We add to this discussion by demonstrating that BITs, in fact, generate multilateral consequences by connecting countries into a network governed by treaties designed similarly to address a single issue: providing protection to international investments (Bonnitcha, Poulsen and Waibel, 2017).

As an empirical point of departure, we document a stylized fact on the relationship between network distance and countries' foreign investment flows: the closer two countries are within the BIT

affected by their indirect connections in the BIT network, then comparing exclusively the level of FDI activities before and after treaty ratification would only capture a partial effect of BITs.

network, the larger the FDI volume exists between them.[3] We run a reduced-form analysis by regressing the bilateral FDI stock between country pairs on the distance between them within the BIT network, measured by the shortest path that connects them in the network, and document the regression results in Appendix B. To further inform the causal relations between the BIT network and countries' foreign investment behaviors, we develop in the rest of this section a network-based theory that considers the spillover effects of treaty formation on non-signatory states.

2.1 BITs, what are they good for?

Before discussing the network effects created by the investment treaty regime, it is necessary to first understand how individual BITs may shape investment. Despite mixed empirical results, past research has consistently agreed on the theoretical mechanisms through which BITs may affect FDI. In particular, BITs provide a legal framework for investment protection. In the following, we categorize these arguments into two camps: one that sees BITs as *dyadic* credible commitments, and one that sees them as *monadic* signaling devices (Tobin and Rose-Ackerman, 2011; Bonnitcha, Poulsen and Waibel, 2017).

First, BITs may tie the hands of signatory states by imposing legal costs on their contract-breaking behaviors. By granting recourse to international arbitration, BITs can help foreign investors circumvent potentially hostile judicial environments in the host countries and increase the prospect of receiving compensation. Moreover, BITs also grant investors from signatory countries legal rights that are not available to competitors of other nationalities (Aisbett, Karp and McAusland, 2010; Bonnitcha, Poulsen and Waibel, 2017). As a result, BITs can deter host countries from interfering with foreign assets (Poulsen, 2014) and attract investment from assured partners (Blanton and Blanton, 2012; Zeng and Lu, 2016). Conversely, when countries break their treaty obligations and infringe on foreign property, they are often punished financially and experience a marked decrease in foreign investment (Haftel, 2010).

Second, BITs are also conceptualized as signaling devices by other scholars: When a country en-

[3] Details of the data can be found in Section 3.

ters a BIT, it signals to all foreign countries, regardless of whether there exists a BIT between the dyad, that its domestic legal and financial institutions are adequate to protect foreign investment (Büthe and Milner, 2008; Kerner, 2009; Colen, Persyn and Guariso, 2016). Compared to the commitment theory of BITs, the signaling theory suggests that countries that enter into BITs are able to attract investments not only from treaty partners to whom they extended legal protections, but also from investment-exporting countries in general. Furthermore, the intensity of the signal reflects the underlying quality of the domestic institutions of the host country. Thus, as an observable implication, researchers have shown that the more BITs a country concludes with other states, the more likely it will experience increases in FDI inflow (Tobin and Rose-Ackerman, 2011; Kerner and Lawrence, 2014).

In sum, theories of BITs draw on the institution's ability to provide legal and political information about the states choosing to participate in it (Dai, 2002). Who learns from BITs, however, separates the two arguments from each other: Either the information is only received by the partner countries entering the bilateral treaty, or it reveals the monadic features about the host country which are then observable to all states.

In the rest of this section, we provide a theoretical middle ground by turning to the multilateral network formed by each individual bilateral investment treaty. We argue that the extent to which states can extract information about the treatment of their investors depends on their embeddedness in the regime of investment treaties. States do not only care about countries with which they share a direct treaty commitment, but they also do not obtain information about others' investment signals indiscriminately. The amount of information a country receives about the investment environment in foreign markets is shaped by the network of investment treaties in which it is embedded in two steps. First, both the government and the investors in the signatory countries obtain investment information about each other through the process of direct treaty formation. Then, such information is transmitted to other countries with which the signatories are already connected through official exchange or peer consultation on the market. In the remainder of this section, we elaborate how each of these steps unfolds.

2.2 Learning through the BIT Network

How do countries embedded in a treaty network learn about each other? Theorists of international institutions have long stressed the social relations encoded in international treaties when it comes to cooperation. Regardless of their width or depth, international treaties usually impose limits on states' sovereignty through policy intervention. As states actively choose to enter into treaties, therefore, they "self-categorize into a group of states defined by their shared legal commitments" (Schmidt, 2023, p.3). In other words, treaties constitute inherently social contracts that reflect states' willingness to cooperate on an issue or a set of issues.[4] In a similar vein, recent research finds that "like-minded" states, either geopolitical or ideological, are more likely to cooperate and communicate with each other through international institutions (Voeten, 2021; Davis and Wilf, 2017; Davis, 2023). Thus, compared to countries outside the network, countries positioned within the same regime network share more distributional, relational, and epistemological commonalities which incentivize them to further obtain information about other members' level of willingness and commitment for cooperation. Moreover, we argue that such incentives should be particularly pronounced between countries that are positioned closely to one another within the network, as this structural proximity helps inform countries which of their peers are more likely to share similar goals with them.

While how information transmission across the network generates additional consequences has been studied in other types of treaties,[5] the exact role the network plays in BITs requires further clarification: What do BITs help countries learn about each other? Although we do not claim that learning occurs exclusively within the BIT network, two features of BITs make this network a particularly attractive forum. First, compared to other international treaties, BITs provide particular opportunities and incentives for ratifying countries to learn about their partners' domestic institutions that may affect the treatment of their outgoing investment. Second, the BIT network helps to transmit such

[4]Particular to economic cooperation such as trade and investment, Büthe and Milner (2009) refer to this "willingness to cooperate" as states' epistemological commitment to liberal economic policies.

[5]For example, in the context of double tax treaties (DTT), Hong (2018) found that the position of the countries in the DTT network significantly shapes their competitiveness in attracting firm investment. Similarly, Arel-Bundock (2017) and Qian (2023) note that the decisions of other countries to adopt the DTT further affect the likelihood that the home country ratifies a DTT, as well as the design of the treaty. In other words, information on possible outside options in the DTT network generates a negative externality of tax evasion and provides countries with backdoor access.

knowledge to the second-order partners of the ratifying countries. We discuss these features as a two-step process in the following:

To begin with, BIT signatories obtain information about their partner's domestic investment environment through both public and private channels. States evaluate the degree to which their partner is sincere about creating favorable environment for foreign investments, as well as their resolve to protect foreign properties during negotiation over the design of investment treaties. For example, while negotiating its first proposed investment promotion and protection agreement with Mozambique in 1993, UK negotiators expressed frustration in Zimbabwe's reluctance to clearly stipulate national treatment and most-favored-nation treatment in the proposed treaty, raising concerns that Zimbabwe's behavior "may do nothing to give fresh life to the process".[6] Such worry was only dispersed when Mugabe met with British companies and officials during his state visit to the UK in 1994 and explicitly expressed confidence that Zimbabwe would enforce these standards of treatment.[7] Moreover, compared to treaties in other issue areas, BITs negotiated by the same leading country often share similar templates and formulations for investment provisions (Brown, 2013; Clark and Pratt, 2023). Thus, countries that have adopted a particular BIT framework can accumulate training in negotiating the particular type of treaties they signed, knowledge of the implications of its legal technicalities, and experience of how such treaties are applied (Poulsen, 2015, Ch.3). This common experience, in turn, leads to an increased propensity for countries that have signed similar BITs to further initiate interactions with each other as they share similar technocratic expertise.

The expansion of the BIT network also motivates private investors, who make up the bulk of foreign investment decisions, to seek further information about potential investment destinations. For example, investors may be concerned about specific barriers to operating businesses in a foreign country. Many of these barriers, moreover, are hard to evaluate ex ante or even anticipate their existence: whether foreign firms are more likely to be audited, whether they can sponsor work visas

[6] "UK/Zimbabwe Investment Promotion and Protection Agreement (IPPA)", in *British Investment in Zimbabwe* (Dossier No. FCO 169/1049), accessed at The National Archive, April 24 2025.

[7] "Fourth Report of Trade with Southern Africa by the Trade and Investment Committee submitted to the House of Common (Session 1993-1994)" in *Trade, Investment, and Enterprise Development in South Africa* (Dossier No. OD 137/309), accessed at The National Archive, April 24 2025.

for home country workers, whether local business is monopolized by a kinship network, etc. As a result, they often group to communicate location-specific experience in engaging local businesses and government. In the case of the US, Thrall (2024) finds that US-led BITs are a predictor of US businesses establishing an American Chambers of Commerce in the host country, which consults business activities for American firms and lobbies US diplomats. More generally, companies along value chains often communicate and organize among themselves to protect against property rights violations in the host country (Johns and Wellhausen, 2016). In sum, from negotiation to enforcement, BITs drive both governments and investors to accumulate knowledge about their partner, particularly in relation to how their partner's domestic politics may interact with their own investment goals.

Next, having accrued knowledge about states they are directly connected to via a BIT, countries within the treaty network are also incentivized to learn about those that are structurally proximate to them. The proximity in their relative position within the BIT network indicates to the home government which other countries are the suitable partners in future cooperation. Empirically, states' incentives to gain deeper access to the investment treaty network are well documented in the global diffusion of BITs. For example, Elkins, Guzman and Simmons (2006) argue that competition to attract capital between developing countries with similar trade partners is a major determinant explaining why countries choose to ratify BITs. The authors found that potential hosts are more likely to sign BITs when their competitors have done so. Jandhyala, Henisz and Mansfield (2011) confirm similar dynamics, but further identify a period during which joining BITs was seen as an appropriate act for countries to engage with similar peer states. More generally, we argue that BITs act as social ties that bring countries under a multilateral network that regulates investment behavior. Through this network created by each individual BIT, countries can identify other structurally proximate states as potential peers or partners (Gray, 2013), and obtain information about their investment environment and domestic institutions from their existing BIT partners.

Similarly, private investors nested in these countries also frequently face decisions regarding the placement of their foreign investments. Previous research has noted that outgoing investments from their home country are often channeled to locales with whom the investors' home countries do not have formal investment treaties, and therefore lack direct means of contract enforcement (Antràs, 2015, esp. Ch.1). Such decisions may be caused by economic constraints such as factor co-specificity (Nunn, 2007; Iversen and Soskice, 2019), inter-subsidiary competition (Chaney, 2014; Antràs and De Gortari, 2020), or geopolitical concerns (Malesky and Mosley, 2021; Alfaro and Chor, 2023). Thus, faced with uncertainties over how their properties will be treated in foreign host countries, private investors also need to identify potential host countries with suitable investment opportunities and safe investment environments. A common strategy for investors to obtain this relevant knowledge for their decision-making is to consult with the decisions and experiences of their peers (Dobbin, Simmons and Garrett, 2007; Ruggie, 2014; Davis, Li and Miyano, 2024). When searching for potential destinations to situate their investment, therefore, investors may use the BIT network as institutional heuristics that inform investors which destinations their peers have invested in and therefore have knowledge about their investment environment.

In sum, we argue that countries embedded in a treaty network learn about each other by first obtaining knowledge of their direct treaty partners regarding their resolution and domestic institutions. Then, such knowledge is then transmitted to the neighboring countries within the network, as governments and investors use the proximity of other countries to identify a larger set of potential partners. To offer a concrete example of this iterative dynamic, we examine the case of South Africa, which ratified its first BIT and became connected to the global BIT network in 1994.

2.3 South Africa: An Illustrative Case

The experience of South Africa with international investments post-apartheid illustrates how the BIT network shapes both the public and private actors' engagement with treaty negotiations and investments. Around the country's the first multi-racial elections in 1994, the African National Congress endeavored to assure foreign investors that they would not be subjected to expropriation or nationalization.[8] Such promise, however, was met with widespread skepticism and uncertainties from international investors, as South Africa was in the midst of a series of constitutional debates related to

[8] "Mandela Pleads for Investment in South Africa", *The Times*, October 13, 1993. See also Schlemmer (2016).

racial relations and land rights (Poulsen, 2014).

Faced with institutional uncertainties in South Africa, the British government, whose investors had a substantive presence in South Africa at the time, initiated a BIT negotiation with the newly elected South African government (Gelb and Black, 2004). A major driver that pushed for the negotiation was the British mining industry, whose operation in South Africa relied heavily on the country's land policy. Viewing the ANC policy makers as "bit of a loose cannon" and "anti-British mining houses", major multinational firms, such as British Petroleum and Lonrho, lobbied the British government to take active measures to protect their investments.[9] Within a few months, the new South African government, led by the ANC, quickly accepted "a six-page standard European BIT-model" proposed by their British counterparts in 1994 (Poulsen, 2014, p.7).

Following South Africa's signature of its first BIT with the UK, two patterns quickly emerge. First, South Africa began to attract an increasing amount of investment from foreign multinationals, reversing the trend where companies exited the country *en masse*, for fear of rising political instabilities, in previous years (Gelb and Black, 2004). Particular to our argument, locations that see the highest amount of capital inflows to South Africa are found among countries that have close investment ties to the UK or share a formal investment agreement with the UK.[10] This goes beyond traditional investor states in Europe and North America but also includes countries like Korea, China, Egypt, which became indirectly connected to South Africa via their BITs with the UK and later established substantive investments in South Africa. In many of these instances, investors from major businesses either participated directly in the negotiation process,[11] or received frequent updates about the negotiation and treaty.[12] Moreover, many countries with BIT ties to the UK also started negotiating and concluding investment treaties directly with South Africa, frequently borrowing from the experience and insight of the British negotiators and "did not depart significantly from the British text" (Poulsen, 2014, p.8).

[9] "ANC's Mining and Minerals Policy", in *Mining in South Africa* (Dossier No. FCO 169/1664), accessed at The National Archive, April 24 2025.

[10] For a list of top investors in South Africa, see UNCTAD (2005); Peterson (2006); Poulsen (2015).

[11] "South Africa: Belgian Delegation Arrives In South Africa", *Panafrican News Agency*, November 9, 1998; "South Africa and Uganda extend their co-operation", *Business Day*, May 9, 2000.

[12] "Zimbabwe: Impala Platinum Seeks Zim Govt Protection", *Zimbabwe Standard*, September 5, 2004

Second, the outward FDI originating from South Africa was also shaped by the country's initial connection to the BIT network via its agreement with the UK. At the same time as post-Apartheid South Africa has sought to reassure foreign investors, South African companies, as well as foreign firms' subsidiaries based in South Africa, were also expanding their outward investment activities.[13] This outward foreign investment is most concentrated in the Southern African region, with South African companies making their largest foreign investments in countries such as Zimbabwe (UNCTAD, 2005; Schlemmer, 2016), which also underwent BIT negotiation and ratification with the UK in 1995. The increasing investment ties between South Africa and Zimbabwe, in turn, led several South African companies to explicitly call for treaties to be in place before considering further investments in Zimbabwe.[14] Furthermore, other African countries with which South Africa concluded BITs, such as Mozambique, were later approached by the UK, seeking to initiate treaty negotiations. Similarly to the negotiations with South Africa, the mining industry featured heavily in the trade and investment discussion that led to the ratification of the treaty with Mozambique. However, unlike the South Africa case, in which mining firms' participation was spurred on by political uncertainty, the campaign to promote investment cooperation between the UK and Mozambique was driven largely by the British officials and British subsidiaries in South Africa,[15] advocating that the economic complementarities between South Africa and Mozambique, along with Mozambique's domestic institutions after its democratic transition, would help "build up hospitable investment environment around South Africa".[16]

The triadic relationship between the UK, South Africa, and Mozambique, interestingly, constituted an investment dynamic contrary to the theoretical expectation of both economic competition

[13] A decade after ratifying its first BIT with the UK, the country's total inward FDI stocks stood at $46.3 Billion (US), while outward FDI stocks reached $28.8 Billion (US) in 2004 (Peterson, 2006; UNCTAD, 2005).

[14] "Fourth Report of Trade with Southern Africa by the Trade and Investment Committee submitted to the House of Common (Session 1993-1994)" in *Trade, Investment, and Enterprise Development in South Africa* (Dossier No. OD 137/309), accessed at The National Archive, April 24 2025. See also "Zimbabwe: Impala Platinum Seeks Zim Govt Protection", *Zimbabwe Standard*, September 5, 2004; "South Africa: DA Lashes Delayed SA-Harare Accord", *Business Day*, February 11, 2005.

[15] "South African Firms Head North, Providing Largest Share of Foreign Direct Investment on the Continent", *Business Today*, July 3, 2003; "Gold Fields Increases Stake in UK AFR", *Mineweb (Johannesburg)*, May 21, 2003.

[16] "UK/South Africa Trade and Investment Campaign", in *Trade, Investment, and Enterprise Development in South Africa* (Dossier No. OD 137/309); "Outcome of President of Board of Trade's South Africa Visit" in *Trade, Investment, and Enterprise Development in South Africa* (Dossier No. OD 137/309), accessed at The National Archive, April 24 2025.

(Elkins, Guzman and Simmons, 2006) and social emulation (Jandhyala, Henisz and Mansfield, 2011). Instead of Mozambique reaching out to the UK – either to remain competitive in attracting FDI or to engage in peer-like behaviors – it was in fact the UK that actively sought to expand their investment and treaty network, based on both the British government and investors' experience from engaging with South Africa. While there is little doubt that competition and emulation still play an influential role in the expansion of the BIT network, the case of South Africa illustrates the dynamic of our theory: The BIT network facilitates economic and political exchange between governments and businesses. Of course, our ability to extract causal interpretations from this single case is limited. Thus, in the next section, we introduce how we measure structural proximity within the BIT network and state the testable hypotheses derived from the theoretical discussion in this section. Then, we describe our treatment assignment process and formalize our causal assumption and estimator that we used to identify the network effect of BITs.

3 Research Design

3.1 Treatment Assignment Process

To measure the effect of the BIT network connecting two structurally proximate countries, we examine a crucial feature in network analysis: the existence of an indirect connection between two country nodes (Hafner-Burton, Kahler and Montgomery, 2009; Kinne, 2013) – a network structure which we call *treaty bridging*. Specifically, we define a treaty bridge as a network structure formed by at least three nodes (A, B, C). A and C are considered indirectly connected – that is, bridged – if there exists an edge between A and B and an edge between B and C. B is considered as the intermediate node.[17] Using the ratification history of BITs from the Electronic Database of Investment Treaties (EDIT) compiled by Alschner, Elsig and Polanco (2021), we visualize in Figure 1 the overtime growth of direct connection and indirect connection within the BIT network since the 1970s. As the

[17] For conceptual and measurement clarity, we restrict our definition of indirect connection to one degree of separation (i.e., the path from A to C is of length 2), but it is possible to extend our framework to longer pathways. Furthermore, the results in Appendix section B show that the effect of indirect connections decreases as the path between two country nodes elongates.

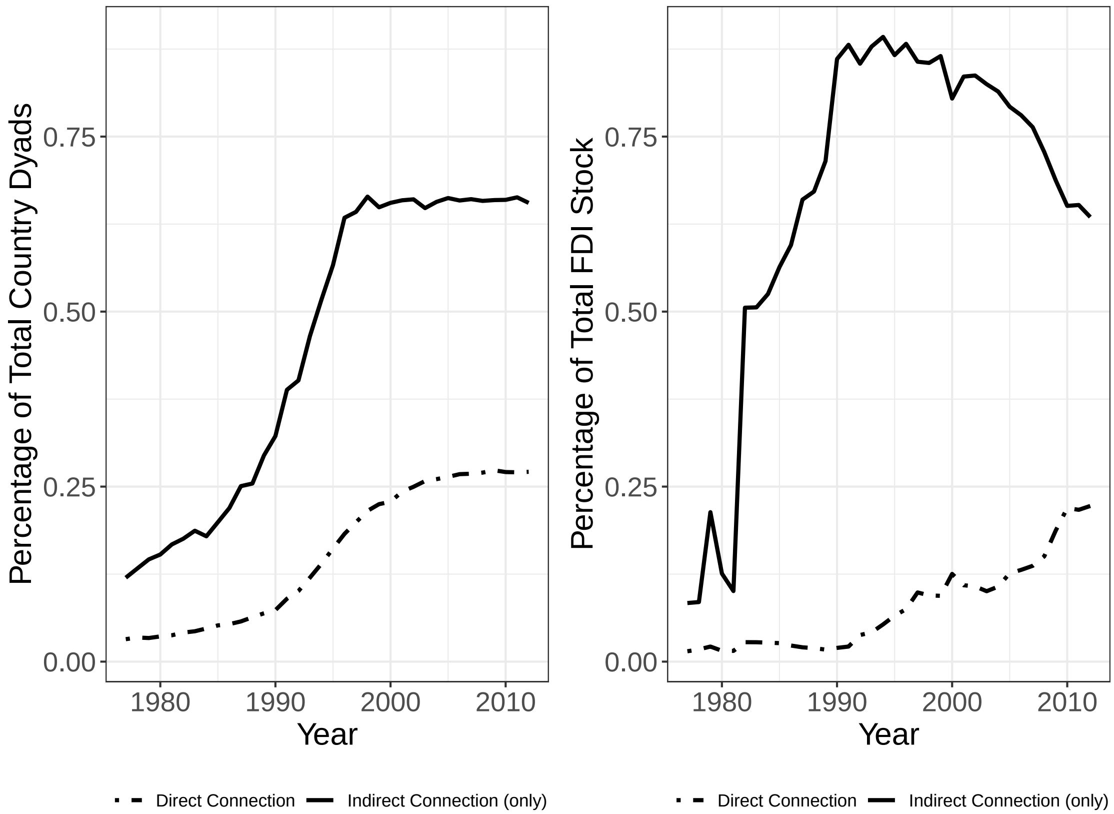
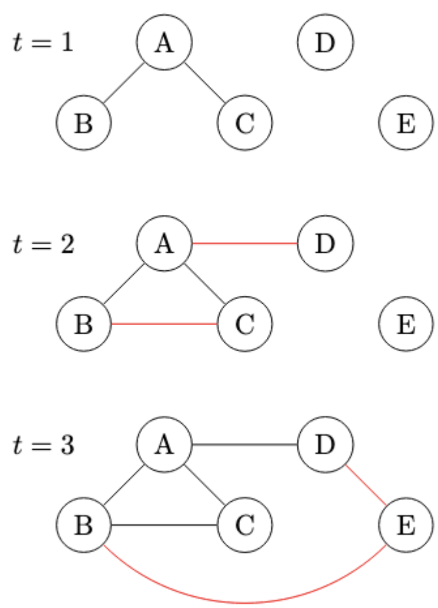


Figure 1: Evolution of the BIT network between 1975-2012. The left panel plots the ratio of country dyads that are directly (dashed) and only indirectly (solid) connected within the BIT network. The right panel plots the percentage of global FDI stock that exists among country dyads that are directly (dashed) and only indirectly (solid) connected within the BIT network.

BIT network involves more states and becomes denser over time, the number of indirect connections increases exponentially faster than the direction connections in the BIT network. Moreover, the absolute volume of FDI among countries indirectly connected by BITs also consistently exceeds the volume of FDI among countries with direct BITs. At least descriptively, therefore, we note that ignoring the network feature comprised by the universe of BITs may result in a partial evaluation of their effect.

Figure 2 provides a stylized illustration of how BIT bridge as the treatment is assigned to country dyads using five states ($A - E$) as nodes and BITs as edges. At the beginning of period $t = 1$, country pair AB and AC are connected by their respective treaties, while country D and E remain outside the BIT network. As a result, there exists only one BIT bridge, which connects the country pair BC. In $t = 2$, two new investment treaties are concluded between A and D and between B and C. Thus, as the BIT network expands, country pairs AB, AC, BD, and CD become treated during this period. Finally, in $t = 3$, two more investment treaties are concluded between B and E, and between D and E, creating two more BIT bridges between AE and CE.

Importantly, establishing a causal relationship between BIT bridge and FDI requires us to disentangle the treatment effect of a direct BIT tie, as direct BITs not only affect FDI, but also define the BIT network from which BIT bridges are derived. Direct BIT and BIT bridge are thus two interdependent treatments that jointly determine FDI as the outcome of interest. To address this issue, we formalize a causal assumption in the setting of BIT network. In addition, we focus on identifying and estimating the effect of BIT bridge on FDI for country dyads that do not have direct BIT.



	$t=1$	$t=2$	$t=3$
AB	0	1	1
AC	0	1	1
AD	0	0	0
AE	0	0	1
BC	1	1	1
BD	0	1	1
BE	0	0	0
CD	0	1	1
CE	0	0	1
DE	0	0	0

Figure 2: Illustration of research design. On the left panel, node A-E represent countries, and the edges represent BIT ties. Black edges indicate the BIT was formed in previous periods, and red edges indicate newly formed BITs. On the right panel, 1 indicates there exist at least one BIT bridge that indirectly connects the country pair; and 0 otherwise.

3.2 Testable Hypotheses

Based on our theoretical arguments, when a pair of countries become treated, that is, when there exist any BIT bridges between them, they receive more information about the other's investment environment and legal institutions. As a result, we expect the dyadic flow of FDI will increase as such information alleviates the fear of investment hold-up. Moreover, the existence of a BIT bridge brings the pair of countries closer in the treaty network, which further shapes states' decision to ratify BITs. As such, we propose the first set of testable hypotheses for our theoretical arguments:

H_1: *The existence of a BIT bridge between two countries that* ***do not have*** *BIT increases the direct investment flow between them.*

H_2: *The existence of a BIT bridge between two countries increases the likelihood of them directly forming a BIT.*

Importantly, we note that for H_1, we restrict our attention to the subset of country dyads that have never ratified a BIT during the period of our data. As mentioned previously, an important caveat of our proposed information mechanism is that, if there already existed a direct BIT between a country pair, then being indirectly connected by a BIT bridge at a later time would provide little additional information. Moreover, even if two countries have not concluded a direct BIT by the time they become treated, the increased investment flow between the pair may result from the higher likelihood of a post-treatment BIT formation, rather than the treatment of a BIT bridge itself. For these reasons, our main analysis of H_1 focuses on dyads that have never formed direct BITs. To ensure that our findings are robust to different data structures and alternative counterfactuals, we also fit the full panel data, which includes country dyads that formed direct BITs with a novel event-study estimator (Liu, Wang and Xu, 2024) in Appendix F, which yielded similar results.

We also derive two differentiating hypotheses on treatment heterogeneity that help to provide further support for our proposed mechanism of learning through the BIT network (Blackwell, Ma and Opacic, 2024). Focusing on the effect of BIT bridges on investment flows, our theoretical arguments rely on the assumption that countries learn about the domestic institutions of the countries with whom they share a BIT bridge. This information, which countries that are further apart in the BIT network have either less access or less incentive to obtain, determines the degree to which investors from a home country can update their belief of the host country's investment environment in a favorable direction.

A relevant domestic institution that shapes the perception of investors about how well their property will be protected, for example, is the quality of the host country's rule of law (Staats and Biglaiser, 2012). Existing research shows that countries with similar legal institutions find it easier to learn about and adjust to their partners' legal and judicial processes, and therefore are more likely to invest in each other (Shleifer and Vishny, 1997; Porta, Lopez-de Silanes and Shleifer, 2008; Beazer and Blake, 2018). Therefore, compared to country pairs with larger gaps in their legal institutions, we expect that those with similar levels of rule of law will experience a larger increase in FDI through the BIT network. In comparison, we expect the alternative channel of legal protection – international arbitration through ISDS – to have little effect through the specific bridges *within the BIT network*. This is because ISDS cases are salient, visible events that represent system-level shock to the entire network, and are therefore observed by both treated and controlled country dyads. Therefore, while ISDS may reduce the overall FDI inflow to the recalcitrant country (Allee and Peinhardt, 2011), our theory predicts that the effect of ISDS should not vary between the treated and controlled groups, resulting in a small and insignificant estimate. Thus, we formulate two hypotheses about the mechanism:

H_3: *The effect of a BIT bridge on FDI flow is greater when countries connected by a treaty bridge have similar levels of rule of law.*

H_4: *The effect of a BIT bridge on FDI flow does not change when countries connected by a treaty bridge experience an ISDS episode.*

We proceed to empirically test for our hypotheses in groups. For H_1 and H_2, the remainder of this section formally presents our causal assumptions for identifying the treatment effects of treaty bridging on FDI flows and direct treaty formation. We present the empirical evidence in support of these hypotheses in section 4. To evaluate H_3 and H_4, we adopt a treatment effect heterogeneity approach and present the evidence in section 5.

3.3 Key Assumption: Local Network Unconfoundedness

A central challenge in empirically assessing our hypotheses is how to account for network spillovers among BITs. Because of the co-existence of direct BIT and BIT bridges, the whole BIT network defines the potential outcome of each dyad. Formally, we denote $\mathbf{W}_t$ as the BIT network for all states in year t, where entry $W_{ij,t} = 1$ if there exists a direct BIT between country pair i and j in year t and $W_{ij,t} = 0$ otherwise. Without loss of generality, we consider i as the lead state and j as the following state. Denote X_{it} as a vector of country-level network measures for country i in year t, and $Z_{ij,t}$ a vector of dyad-level covariates. Using these notation, we first state a typical identification assumption used in network settings where violations to the stable unit treatment value assumption (SUTVA) are common, which we will later tailor and relax under our specific empirical setting:

Assumption 1 (Global Network Unconfoundedness)**.** *For all country dyads, their potential outcome $Y_{ij,t}(\cdot)$ is independent of treatment assignment, defined as a function of the BIT network $\mathbf{W}_t$, given country-level confounders as well as dyad-level confounders. That is,*

$$\{Y_{ij,t}(g(\mathbf{w}'_t))\} \perp\!\!\!\perp g(\mathbf{W}_t) | X_{it}, X_{jt}, Z_{ij,t}, U_{ij,t}, \tag{1}$$

where $\mathbf{w}'_t$ is a realization of BIT network and $U_{ij,t}$ are some dyad level time-varying unobserved confounders.

Assumption 1 states that, conditioned on country-level network characteristics as well as other country-level and dyadic covariates, the whole structure of BIT network is as if "randomly" formed, and then the existence of BIT bridge as the treatment of interest, is unconfounded. This assumption is commonly adopted in the existing literature assessing the spillover effects in political networks.[18]

[18]For example, existing literature investigates the effect of democracy on attracting FDI (Jensen, 2012) and on the formation of bilateral investment treaties (BITs). In a given country dyad (i, j), the political regime of country i influences both the FDI inflow from j to i (the outcome) and the likelihood of BIT formation between country i and any third country k, which in turn establishes a BIT bridge between i and j (the treatment). Once country-level and dyadic covariates are controlled for, the setup effectively resembles a dyadic link formation model (Fafchamps and Gubert, 2007), an approach commonly used in the study of political behavior (e.g., Battaglini, Sciabolazza and Patacchini, 2020). Assuming

However, in the context of International Relations, the assumption of independent dyadic link formation is often unrealistic due to the complex interdependence among countries (Chaudoin, Milner and Pang, 2015). This interdependence can violate the standard conditional ignorability assumption and lead to biased estimates. Thus, we include country-level network metrics, such as degree, centrality, and clustering, denoted by X_{it} and X_{jt}, as covariates to account for the endogenous interdependence of BIT bridges across dyads derived from the broader BIT network.[19] Recent studies in political methodology show that the inclusion of network measures at the country level alleviates potential confounding in our setting, where treatments are interdependent (Arpino, De Benedictis and Mattei, 2017; Zhang and Imai, 2023). The inclusion of the network feature of BITs as sufficient statistics, therefore, improves the plausibility of our identification assumption.

Of course, even after controlling for network characteristics, one may still question the validity of the “as-if" randomization of the entire BIT network, given its rapid expansion through states' strategic ratifications over time (Jandhyala, Henisz and Mansfield, 2011). To further relax this assumption, we introduce the function $g(\cdot)$, known as the “exposure mapping" function (Aronow and Samii, 2017). This function maps the BIT network $\mathbf{W}_t$ to a vector of effective treatment. The effective treatment is thus a low-dimensional representation of the BIT network.[20] In the main analysis, we focus on a binary indicator for whether there exists a BIT bridge between country i and j and define:

$$g(\mathbf{W}_t) = (W_{ij,t}, \mathbb{1}\{\sum_{k=1}^{N} W_{ik,t}W_{kj,t} > 0\}) = (W_{ij,t}, D_{ij,t}), \tag{2}$$

where $W_{ij,t}$ specifies the existence of direct BIT between country dyad ij. As we mentioned above, the existence of direct BIT complicates the identification of effect of BIT bridge on FDI, as the evolving of BIT network implies formation of both BIT bridges and direct BITs. Therefore, we focus on country

such a model implies that treatment assignment is independent across country dyads; under the standard conditional ignorability assumption, controlling for dyadic-level covariates alone is deemed sufficient to address confounding.

[19]We state the formal definition of these network measurements and discuss their substantive significance in Appendix C.

[20]While introduced in network experiment studies, the concept of “exposure mapping” is implicitly adopted in many observational IR research concerning networks. For example, Kinne (2012) investigates the effect of a country's position in the global trade network on conflicts. In this study, the effective treatment defined by exposure mapping is a measure of centrality in the trade network

dyads that do not have direct BIT, i.e., $W_{ijt} \equiv 0$. For these dyads, Assumption 1 can be reformulated as:

Assumption 2 (Local Network Unconfoundedness)**.** *For country dyads that do not have direct BIT, the potential outcome $Y_{ij,t}(0, d')$ is independent of BIT bridge, treatment assignment defined as a function of the BIT network around i and j, given their country and dyad level confounders. That is,*

$$\{Y_{ij,t}(0, d')\} \perp\!\!\!\perp D_{ij,t} | X_{it}, X_{jt}, Z_{ij,t}, U_{ij,t}, W_{ijt} = 0. \tag{3}$$

Assumption 2 states that, under our choice of exposure mapping, we can identify the effect of BIT bridge on FDI for country dyads do not have direct BIT even when the BIT network $\mathbf{W}_t$ varies over time, as long as the local BIT network around i and j is not affected by additional confounders after controlling for the country and dyad level covariates as well as country level network measures. As the BIT network expanded rapidly during the period of our analysis, the local version of network unconfoundedness assumption is much more probable. Therefore, under Assumption 2, along with the standard assumptions of consistency and positivity, we can identify the effect of the BIT bridge. In Appendix D, we formally state the assumption of consistency and the assumption of positivity, as well as the results of the identification. Finally, we note that unit of analysis in this paper is undirected dyad. Without loss of generality, within each country pair ij, we define the country with the higher level of average GDP during the period of study to be the leading state (i), and the country with a lower level of GDP to be the following state (j).

4 Empirical Findings

4.1 Data and Estimation Strategy

We obtain data on the existence of BITs from the EDIT dataset (Alschner, Elsig and Polanco, 2021), which we also use as the outcome variable for H_2.[21] Under Assumption 2, we estimate the treatment effect of BIT bridging by fitting the following regression model:

[21]We exclude other types of investment agreements, such as preferential trade agreements that include investment chapters, from our main analysis. Theoretically, the variation in the investment chapters nested in PTAs is much larger than that of BITs both in design and in enforcement, making them less comparable treaties (Baccini and Dür, 2015). Methodologically, PTAs often connect more than two countries, which resemble hyperlinks that connect multiple nodes

$$Y_{ijt} = \tau \cdot D_{ijt} + Z'_{ijt}\beta + X'_{it}\beta_l + X'_{jt}\beta_f + \alpha_{ij} + \xi_t + \varepsilon_{ijt}, \quad (4)$$

where D_{ijt} is a binary indicator for the existence of any BIT bridges between the leading state i and the following state j in year t. Z_{ijt} is a vector of dyadic-level covariates. X_{it} and X_{jt} include country-level summary statistics of the BIT network discussed above for leading and following states, with β_l and β_f their corresponding coefficients. α_{ij} is the fixed effect for country dyad ij, and ξ_t is the fixed effect for year t. ε_{ijt} is a random shock with mean zero.

The outcome variable for H_1 is the bilateral FDI stock, which is defined as the total level of direct cross-border investment over time. We include a lagged dependent variable so that the model captures yearly changes of FDI stock (i.e., FDI flows) between the country pair (Schoeneman, Zhu and Desmarais, 2022). For H_2, the outcome variable is a binary indicator of whether a country dyad has a BIT. We compile these data using several sources that use UNCTAD bilateral FDI stock data from different time periods (Barthel, Busse and Neumayer, 2010; Schoeneman, Zhu and Desmarais, 2022).[22] In total, our compiled data cover the time period from 1975 to 2012.[23] Substantively, this period represents the mature expansion phase of BITs, before widespread contestation since the mid-2010s.[24] Furthermore, to increase the comparability between country pairs that are indirectly connected and those that are not, we further include several control variables. Drawing from previous literature, we include three sets of covariates in the model:

First, within each country pair ij, we control for a set of measures in gaps in institutional quality, including absolute differences V-Dem scores as a measure of the levels of democracy and the rule

within the network at the same time. This makes applying the definition of indirect connection impractical, as the network quickly becomes fully connected. Instead, as a robustness check, we control for the potential effect of multilateral agreements by including in our regression a control variable indicating whether a country dyad has a PTA with investment provision in place.

[22] We examine the validity of these data by calculating the correlation whenever the time periods overlap. The overlapped data appear to be fairly consistent with $r > 0.91$. We further take the average of overlapped data to reduce possible noises from each individual source. Following common practice, we take the natural log of the FDI stock variable (adding 0.1 before logging) to account for the extreme outliers present in FDI stock data.

[23] These papers cover different sub-periods between 1965-2012. We further remove data from the early period between 1965-1974 due to the sparsity of observations and concerns about data quality (Schoeneman, Zhu and Desmarais, 2022).

[24] Currently, no public data is available for bilateral investment flows after 2012. The time period covered in this study therefore misses some recent phenomena in BITs and FDIs, such as the backlashes against the investment regime. We discuss the implication of our findings and their scope conditions in the conclusion section.

of law index. The second set of variables considers the dyadic relationship between i and j. We include gravity measurements such as contiguity, geographic distance, and trade volume. We also record whether the country pair has any share memberships in other international institutions such as PTAs, WTO, OECD, and EU, in order to control for information sharing through these channels (Davis, 2023). Next, we control for a set of monadic covariates for the lead and following states separately, including economic size measures such as GDP and GDP per capita. Importantly, the monadic covariates also include the BIT network measures for both leading and following states – degree, centrality, and clustering – to address the confounding due to the interdependence in BIT bridges across country dyads.[25] Finally, we also include dyad fix effects to account for dyad-specific features such as common legal origins, languages, and colonial histories (Ahern, Daminelli and Fracassi, 2015), and year-fixed effects to account for unobserved temporal trends.

For model fitting, we lag the treatment and other control variables for one year. In addition, we also include the lagged outcome variable to address serial correlations and endogeneity caused by simultaneity and omitted variable bias. To account for within-dyad correlations, we calculate robust standard error clustered at the dyad level. The results are reported as follows.

4.2 Empirical Results

We first examine whether the existence of BIT bridge increases FDI for a country dyad. For this analysis, according to Assumption 2, we use all country dyads that do not have direct BIT throughout the periods in the data sample. We fit two-way fixed effects (TWFE) regression models, and the results are presented as column (1) and column (2) in Table 1. For the first model specification, we only

[25]We include the formal definition of these network statistics in Appendix C. Controlling for these network characteristics helps to address potential confounders that may generate shocks through augmenting the BIT network. For example, suppose we are interested in estimating the effect of a BIT bridge between country A and B through an intermediary country C Suppose further that A and C have a direct BIT. One concern is that country B may become an attractive investment destination due to an exogenous shock, leading to C signing a BIT with B and A increasing its investment in B. In this case, then, the correlation between a BIT bridge and the increase in investment flow between A and B is spurious. Controlling for the characteristic of the network of B, therefore, helps preclude this situation, as the higher level of attractiveness of B would lead to an increase in its degree and centrality. Similarly, suppose that instead of B, country C suddenly becomes attractive to investors, which leads to B to ratify a BIT with C and A extending its investment to B to supplement its value chain in service of C. In this case, the correlation between a BIT bridge and the increase in investment flow between A and B will also be spurious. Controlling for A's clustering coefficient, therefore, helps account for this possibility.

include lagged outcome, dyad and year fixed effects. For the second model specification, we also control the dyadic and monadic variables mentioned above. Recall that, as we included the lagged FDI flow as a control variable, the interpretation for the outcome therefore becomes the treatment effect on FDI flows: among dyads without direct BIT, the first model specification suggests that the presence of a BIT bridge induces a 5.5% increase in FDI flow. When additional control variables are included, the estimated effect remains positive, although its magnitude marginally decreases to 3.5%. For both model specifications, the estimates are statistically significant at the 0.05 level. The estimation results indicate that the BIT network generates positive spillover effects, in the form of BIT bridges, on attracting FDI, in addition to the direct effect of BIT. The magnitude of such a spillover effect is substantial. According to the Coordinated Direct Investment Survey (CDIS) conducted by the IMF, In 2023, direct investment among Global North countries grew by approximately 3.6%, while investment from the Global North to the Global South increased by about 7.6%.

Next, we investigate the effect of BIT bridge on the formation of direct BIT. For this analysis, we include all the dyads. We also consider two model specifications, one with only lagged outcome and two-way fixed effects, and another one with control variables included. Estimation results are reported as column (3) and column (4) in Table 1. According to the first model specification, the existence of BIT bridge leads to an increase of 1.6% in the probability of signing a direct BIT. When we include additional covariates, the increase in probability of signing a direct BIT reduces to around 0.7%. For both model specifications, the estimates are statistically significant at the 0.05 level. The results illustrate BIT bridge, in fact, induces the dynamic evolution of the BIT network over years. As demonstrated in the South African case, BIT bridge as a mechanism of information helps the formation of new investment treaties.

4.3 Robustness and Sensitivity

We perform several robustness checks on our results. First, we may be concerned that our results are primarily driven by pairs of developed countries. These country dyads often engage in economic co-operation through multiple channels outside of the BIT network. To account for this possibility, we

Table 1: The Effects of BIT bridging on FDI and BIT formation

Dependent Variable:	LOG FDI IN STOCK		BIT FORMATION	
Model:	(1)	(2)	(3)	(4)
Variables				
BIT BRIDGE	0.055***	0.035**	0.016***	0.007***
	(0.014)	(0.016)	(0.001)	(0.001)
Monadic Controls	No	Yes	No	Yes
Dyadic Controls	No	Yes	No	Yes
Network Controls	No	Yes	No	Yes
Fixed-effects				
Dyad	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	115,025	113,150	186,206	181,470
R^2	0.88752	0.88803	0.94147	0.94183
Within R^2	0.62227	0.62563	0.79620	0.79741

Clustered (dyad) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

proxy countries' level of development with their membership status in the OECD (Davis, 2023) and fit our models on the subset of country dyads in which at least one country is a non-OECD member. Second, to ensure that our results are not distorted by tax havens, we also fit our models to the subset of country dyads in which neither country is classified as tax havens.[26] Third, to control for protection of foreign investment via other forms of international treaties, we recoded the control variable of PTA using a more stringent measurement, in which the variable equals one only if the two coun-

[26]We adopt two definitions of tax haven countries: First, we adopt a narrow definition in which we follow the EU's list of non-cooperative tax jurisdictions. This list includes The list includes 11 countries and territories: American Samoa, Anguilla, Fiji, Guam, Palau, Panama, Russia, Samoa, Trinidad and Tobago, U.S. Virgin Islands, and Vanuatu. We then also adopt a broader definition of tax havens in which we follow the list maintained by the Congressional Research Service (Gravelle, 2009). This includes 27 countries and territories: Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, British Virgin Islands, Cayman Islands, Dominica, Grenada, Montserrat, Netherlands Antilles (till 2010), St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Turks and Caicos, U.S. Virgin Islands, Belize, Costa Rica, Panama, Hong Kong, Macau, Singapore, Andorra, Channel Islands (Guernsey and Jersey), Cyprus, Gibraltar, Isle of Man, Ireland, Liechtenstein, Luxembourg, Malta, Monaco, San Marino, Switzerland, Maldives, Mauritius, Seychelles, Bahrain, Jordan, Lebanon, Bermuda, Cook Islands, Marshall Islands, Samoa, Nauru, Niue, Tonga, Vanuatu, and Liberia.

tries share a PTA that includes a provision on investment protection (Dür, Baccini and Elsig, 2014). Finally, as estimating spillover effects in the network depends on the specification of the exposure mapping function, we consider two additional measures of the BIT bridge. The first is the number of BIT bridges, and our treatment variable becomes $D_{ij,t} = \sum_{k=1}^{N} W_{ik,t} W_{kj,t}$. And the second one is log number of BIT bridges.[27] As the distribution of the number of BIT bridges is left-skewed, we winsorize this variable at the 95th percentile. We then fit the TWFE models with these two alternative measures of BIT bridges. The results of these additional analyses show similar pattern as the ones documented in Table 1 and can be found in Appendix E.1- E.4.

Next, we conduct a set of sensitivity analyses to address concerns about unobserved confounders. We adopt an omitted variable bias framework proposed by Cinelli and Hazlett (2020) and use the GDP of the leading countries within the dyad, which is one of the strongest and most statistically significant predictors of FDI flows, as a benchmark to test how robust our results are to omitted variables. The results in Appendix E.5 indicate that for both FDI flows and direct BIT formation, the effect of BIT bridge as a binary indicator remains positive and statistically significant at the 5% level after accounting for unobserved confounders that are 10 times stronger than the effect of leading country GDP.

4.4 Alternative Explanations

Finally, we address several potential alternative explanations for our results. As we aggregate investment data on the country-level, our main results may not be able to distinguish the actual actors that are increasing their investment flow post-treatment. Thus, one may worry that these patterns are driven primary by large, multinational companies rearranging their global value chains to utilize international legal protection (Wellhausen, 2015; Betz, Pond and Yin, 2021; Moehlecke, Thrall and Wellhausen, 2023) or streamline production (Alfaro et al., 2019), instead of new investors entering bridged destinations once more information about their investment environment becomes available. We discuss these two scenarios in turn.

[27] We add 1 and then take the logarithmic transformation, i.e., $D_{ij,t} = \log(\sum_{k=1}^{N} W_{ik,t} W_{kj,t} + 1)$.

First, an increasing amount of anecdotal evidence indicates that large firms are strategically positioning their foreign subsidiaries or engaging in forum shopping to gain access to the international arbitration process for their investment. For example, in 2011, Philip Morris, a US multinational tobacco company, sued the Australian government for passing the Tobacco Plain Packaging Act. Notably, the claim arises not from Philip Morris' headquarter in the US, as the US and Australia have not ratified any binding investment treaties. Instead, it comes from the company's subsidiary in Hong Kong, a region with which Australia concluded a BIT back in 1993. While there is little doubt that such strategic behaviors exist, we argue that this phenomenon would only lead to an underestimation of our main results, as it only occurs when the home country does not have a BIT connection with the defendant country (i.e., the US and Australia), and would therefore fall under the controlled condition. Thus, upticks in the investment flow between country pairs where multinationals seek transnational legal shelters would create a downward bias for the effect of BIT bridges on treated country pairs.

Second, in addition to seeking legal shelter, multinationals may also drive the results we observe by incorporating the country to which they are bridged into their production chain. As historical intra-firm investment data are scarce, our more limited goal here is to explore whether *trade* behaviors between country dyads become systematically different before and after treatment. To do so, we look at the number of product between a pair of countries, measured as the count of products with non-zero trade flows between the two countries. If our findings can be explained by global value chain adjustments, then we would expect the number of products traded between the pair of countries to remain relatively stable, assuming that on average, the range of products produced and traded by multinational companies does not change suddenly. In contrast, if more companies begin to engage in transnational economic activities post-treatment, then we are more likely to see an increase of the number of traded goods over time. To test for these rival explanations, we collected country-dyad trade data between 1975-2012 using the SITC product classification scheme at the 4-digit level from the Atlas of Economic Complexity Project.[28] Using an event study design, we find that after a pair of

[28]The Growth Lab at Harvard University. (2019). "Growth Projections and Complexity Rankings Data Set, Version 2". https://doi.org/10.7910/dvn/xtaqmc

country becomes indirectly connect by a BIT bridge, the number of sectors they trade in significantly and persistently increases. These results, which can be found in Appendix G, suggest that the network provides firms in different sectors with information about investment opportunities. The extension of the value chain, therefore, also does not appear to be the primary driver of our main results.

5 Mechanism and Heterogeneous Treatment Effects

5.1 Legal Gap Hinders Positive Information Learning

Having established the overall effects of BIT bridges on investment flows and direct treaty formation, we now turn to evaluating our proposed mechanism of information transmission. We focus on the heterogeneous effects of the BIT bridge on FDI flow with respect to the country dyad's legal institutions. We hypothesized that the BIT network affects investment behavior by lowering hurdles to information learning between two bridged countries seeking to learn about each other's domestic investment environment. Thus, if the results we observed above are indeed driven by the information mechanism, then the magnitude of the network effects should differ based on the ease with which information learning can happen. In addition, information about inadequate domestic institutions in potential destination countries should also reduce the incentive to invest.

We examine the empirical evidence for these theoretical implications in the context of legal institution, which is a crucial determinant in foreign investments (Porta et al., 1998; Büthe and Milner, 2009; Staats and Biglaiser, 2012). In particular, we argue that when a pair of bridged countries have a large gap in their levels of rule of law, the treatment effect of treaty bridging would be mitigated. On the one hand, practical knowledge of how to operate in a foreign country – such as how to navigate the local administrative and court systems, the degree of formalism in judicial procedures, and the attitudes towards transparency (or corruption) in the legal system – is often technical and idiosyncratic in nature. A similar level of rule of law, therefore, makes it easier for investors to develop "institutionally appropriate strategies" (Beazer and Blake, 2018) for their business in a foreign environment by drawing on their domestic experience and skills, therefore reducing the hurdle to information learning. Conversely, therefore, this means that as legal institutions become increasingly different, investors would have more difficulties adapting to the foreign investment environment. On the other hand, rule of law entails the independence and competence of multiple levels of the judiciary branch, the openness and transparency of laws, citizens' ability to redress rights violations through courts, the predictability of enforcement, etc. (Allen, 2023). Thus, a widening gap in the level of rule of law also increases the likelihood of negative learning, in which investors from countries with stronger legal institutions may become deterred by learning about weak institutions in countries they are bridged to.

Operationally, we use the Rule of Law Index from the Varieties of Democracy Project (V-Dem) to measure the quality of legal institutions (Coppedge et al., 2024). Since our analysis is at the undirected dyad level, we generate a variable that equals the absolute difference between two countries' rule of law index (LEGAL GAP). Moreover, we include additional control variables and fit two-way fixed effects regression models with interactions between the variables above and BIT bridge as key independent variables. For regression, we consider all three exposure mappings of BIT bridge: the number of BIT bridges between country pairs, the logged number of BIT bridges, and a binary indicator of the existence of BIT bridge.

We present the treatment heterogeneous effects with respect to legal gap on FDI stocks in the first two columns in Table 2. For model specifications with and without additional control variables, estimated coefficient for the interaction term between BIT bridge and legal gap is negative and statistically significant at the 5% level. The conditional marginal effect of BIT bridge with respect to rule of law gap is shown in Figure 3. It shows that a one-unit increase in the legal gap causes a 2.2% decrease in FDI flow. Furthermore, we conduct the heterogeneous effect analysis on three subsets of country pairs: north-north, north-south, and south-south. Following our classification scheme in the main analysis, we define OECD members as the global north, and non-OECD members as the global south. In line with our argument, we find that the moderating effect of the legal gap is the largest among the north-south country dyads, in which the legal differences are most pronounced. Among these dyads, a one-unit increase in the legal gap causes a 3.4% decrease in FDI flow. In comparison, the effect of legal gap is muted among north-north and south-south country dyads. The results of these subgroup

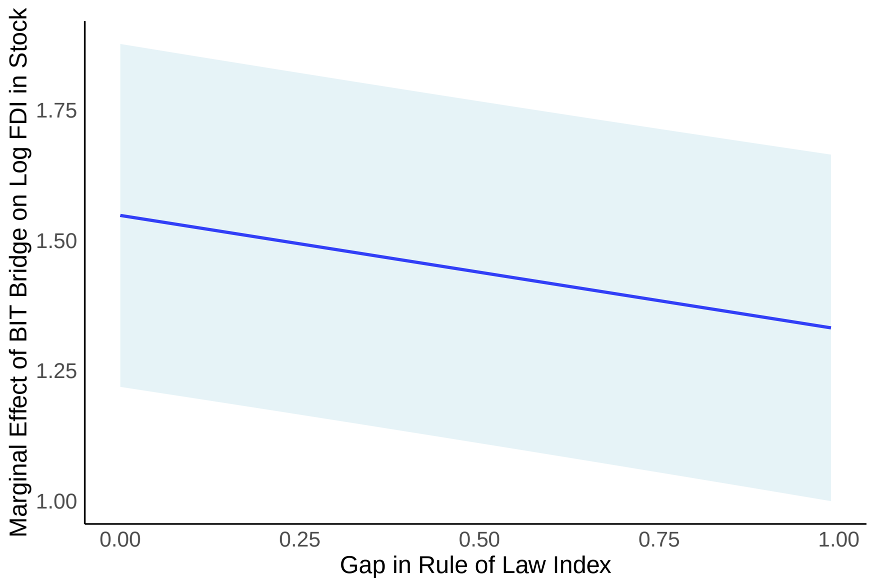


Figure 3: Marginal Effect of BIT Bridge on FDI across varying levels of Legal Gap. The shaded area indicates 95% confidence interval.

analyses can be found in Appendix I.

In sum, the heterogeneous effects of BIT bridging based on countries' legal differences provide suggestive evidence that the magnitude of spillover effect of BIT bridge is larger when pair of countries share similar levels of rule of law, and are thus consistent with our proposed mechanism of information transmission for indirect learning on BITs network. Finally, to probe whether the information relevant to investment decision making is indeed transmitted through the network of BITs, we further compare our mechanism with a non-network-based process: learning through ISDS events.

5.2 Alternative Mechanism: Learning about ISDS events

ISDS is frequently credited as the crucial enforcement mechanism in BITs that grants treaties their credibility in protecting property rights. These cases, especially their outcomes, are highly visible events observed by both existing and potential investors (Arias, Hollyer and Rosendorff, 2018). Thus, they transmit network-level information that is observed by all nodes within the BIT network. As a result, while ISDS may monadically reduce the aggregated inflow of FDI to the defendant country (Allee and Peinhardt, 2011) – particularly during our period of observation (Kerner and Pelc, 2022) –

Table 2: The Heterogenous Effects of BIT bridging on FDI

Dependent Variable:	LOG FDI IN STOCK			
Model:	(1)	(2)	(3)	(4)
Variables				
BIT BRIDGE	1.507***	1.548***	0.055***	0.035**
	(0.168)	(0.168)	(0.014)	(0.016)
BIT BRIDGE × LEGAL GAP	-0.292***	-0.218***		
	(0.035)	(0.044)		
BIT BRIDGE × ISDS CASE			0.101	0.446
			(0.082)	(0.726)
Monadic Controls	No	Yes	No	Yes
Dyadic Controls	No	Yes	No	Yes
Network Controls	No	Yes	No	Yes
Fixed-effects				
Dyad	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	113,475	113,150	115,025	113,150
R^2	0.88791	0.88832	0.88753	0.88804
Within R^2	0.62246	0.62660	0.62227	0.62564

Clustered (dyad) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

our theory predicts that the indirect informational effect of ISDS do not significantly vary between treated and controlled groups, since the information on ISDS is not transmitted through the treaty edges. Following existing practice in the literature, we create a binary variable that indicates whether any edge bridging the dyad has been invoked in an ISDS case in the previous year to examine the impact of the disputes (Allee and Peinhardt, 2011; Kerner and Pelc, 2022). We then interact the variable with our main treatment to detect whether the treatment effect varies based on the occurrence of ISDS along the BIT bridge.

The results are reported in column (3) and column (4) in Table 2. We find no significant interactive effects between our main treatment of BIT bridging and exposure to ISDS across model specifications. For robustness, we also re-run the regression models using two alternative measures of BIT bridges to test the mechanisms. Additionally, due to concerns about the quality of ISDS data, such as missing values in early years, we re-run the analysis for ISDS events using observations from 1980 onward. The estimation results, along with the complete estimation results for the model specifications reported in Table 2, are presented in Appendix H in the online appendix.

Lastly, can we attribute the null findings to the heterogeneity of ISDS salience across features like case outcomes (Pelc, 2017) or claimants' nationality (Wellhausen, 2015)? To address the former, we rerun our analysis using the subsample of ISDS cases that are decided in favor of investor and find similar patterns. Next, while the lack of cross-national investment data at the firm level makes directly evaluating the nationality argument challenging, we note that our analysis have already removed dyads with direct BITs, in which investment disruptions are most severe due to the large presence of compatriot investors. Thus, we conclude that the network effect of BITs operates primarily by learning about the specific domestic information of countries that are structurally proximate.[29]

6 Conclusion

In this paper, we present novel theoretical arguments and empirical evidence that network characteristics are crucial in evaluating the effects of bilateral investment treaties. By learning about the investment environment of a destination country via indirect paths, investors can circumvent potential hold-up problems and engage in FDI even without a formal legal treaty. In addition, such learned information further drives the formation of direct bilateral treaties. Finally, these effects are moderated by the quality of countries' domestic rule of law, which contains crucial information transmitted by the BIT network. In summary, our findings suggest that the position of countries within the BIT network shapes the extent to which they can benefit from the fundamental function of international institutions: information provision (Keohane, 1984; Dai, 2002; Guzman, 2008).

[29] Additionally, while we focus on comparing the network versus non-network mechanism using FDI outcome in this section and do not explicit hypothesize the heterogeneous treatment effect of BIT bridging on direct BIT formation, we also conduct exploratory analysis and find that as the legal gap between a pair of countries grows larger, the effect of BIT bridging on direct BIT formation also becomes greater, which speaks to the need of formal protection investors have when faced with divergent (and potentially weak) legal environment. We present these additional pieces of evidence in Appendix H.

We conclude by discussing the scope conditions of our results and identifying several avenues for future research. First, we posit that information learning is crucial in understanding the behavior of international investors. A key component of this, as observed by recent literature, is firms' decisions on value chain position, such as the placement of subsidiaries (Alfaro et al., 2019; Antràs and De Gortari, 2020; Betz, Pond and Yin, 2021). Our study abstracted away from firm-level analysis, as our theory suggests that both government and firm actors embedded within the BIT network share a congruent set of political and economic incentives. Moreover, the statistics of FDI cover financial actors beyond firms and measure loans, equity, and reinvested earnings contributed by the investor to a foreign entity in general. Nevertheless, the granularity of firm-level investment data could further elucidate the process of information diffusion across different firms and within different locations of a firm.

Second, the issue of international investment is a most likely case to exhibit multilateral effects of bilateral treaties. The lack of a corresponding multilateral institution makes BITs the building blocks with which governments use to construct regulatory frameworks for international investment. Moreover, the similar legal structures that BITs adopt from a common set of model treaties further reduce the attrition that occurs during informational learning. Another issue area which shares these institutional features is cross-national taxation, in which scholars have also highlighted the prevalence of network spillovers. Future research may examine whether such dynamic carries over to issue areas that are governed by multilateral institutions (e.g., trade), or in which the legal structure of regulations is much more fragmented (e.g., environment).

Lastly, recent scholarship has become increasingly aware of the backlash against and withdrawal from BITs (Peinhardt and Wellhausen, 2016; Brutger and Strezhnev, 2022), citing often states' negative experience with the ISDS and their attempts to augment the design of investment treaties to carve out more space for policy autonomy (Pelc, 2017; Thompson, Broude and Haftel, 2019; Moehlecke, 2020). More generally, withdrawals from multilateral treaties and international organizations have been shown to damage the reputation of the withdrawing country in the eyes of other member states, and reduce their willingness to cooperate with the withdrawing state in the future (Schmidt, 2023;

von Borzyskowski and Vabulas, 2024). Although our paper does not directly speak to the legal backlashes against BITs, our theory indicates that the dissolution of BIT bridges are also informative to countries and investors beyond just the signatories. On average, the effect of BIT terminations and withdrawals is likely to be substantively small, as by 2012 most country dyads that are treated have more than one connecting bridge. Nevertheless, in cases where a country (e.g., India) withdraws from multiple BITs simultaneously, leading to the dissolution of a greater number of BITs and even reverse the binary treatment status, the informational effect of the BIT network may be mitigated or even generate negative spillovers (Hartmann and Spruk, 2023). In sum, we caution that studies that examine the consequence of backlash against BITs should also address the architectural structure of treaties more explicitly and rigorously. Evaluating outcomes solely by focusing on what happens after two countries sign or terminate a BIT misses a significant portion of its effect derived from the overall treaty network. In light of the spillover effects of treaties, identifying the full range of political and economic implications of bilateral treaties is important not only as the institutions proliferate, but also as they (potentially) unravel.

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Supplemental Materials (to appear online)

A Summary Statistics

Table SM.3: Summary Statistics

Variable (Source)	Number of Obs.	Mean	Median	S.E.	Min	Max
BIT (Alschner, Elsig and Polanco, 2021)	204903	0.18	0	0.39	0	1
BIT Bridge (binary) (Authors' own calculation)	204903	0.69	1	0.46	0	1
BIT Bridge (count) (Authors' own calculation)	204903	6.7	3	9.8	0	91
FDI Stock (logged) (Barthel, Busse and Neumayer, 2010; Schoeneman, Zhu and Desmarais, 2022)	303737	-1.5	-2.3	2.4	-2.3	14
Political gap (Coppedge et al., 2024)	204903	0.35	0.31	0.25	0	0.9
Distance (logged, in kms) Gurevich et al. (2018)	204903	8.6	8.8	0.81	4.8	9.9
Rule of law gap (Coppedge et al., 2024)	204903	0.39	0.35	0.27	0	0.99
Trade volume (logged) (Gurevich et al., 2018)	204903	17	17	2.9	11	27
Joint membership in WTO (Davis, 2023)	314849	0.56	1	0.5	0	1
Joint membership in EU (Davis, 2023)	331547	0.012	0	0.11	0	1
Joint membership in OECD (Davis, 2023)	328014	0.033	0	0.18	0	1
FTA Tie (binary) Gurevich et al. (2018)	204903	0.13	0	0.33	0	1
Leader degree (Authors' own calculation)	337134	0.13	0.064	0.16	0	0.77
Leader centrality (Authors' own calculation)	337134	0.32	0.26	0.28	0	1
Leader clustering coefficent (Authors' own calculation)	337134	0.3	0.3	0.27	0	1
Follower degree (Authors' own calculation)	337134	0.063	0.02	0.095	0	0.77
Follower centrality (Authors' own calculation)	337134	0.17	0.11	0.19	0	1
Follower clustering coefficient (Authors' own calculation)	337134	0.3	0.22	0.32	0	1
Leader GDP per capita (logged) (Gurevich et al., 2018)	204903	9.4	9.7	1	6.1	12
Follower GDP per capita (logged) (Gurevich et al., 2018)	204903	8.6	8.5	1.2	5.4	12
Leader GDP (in millions, 2011 constant US$) (Gurevich et al., 2018)	204903	1012306	328335	2056537	851	15930069
Follower GDP (in millions, 2011 constant US$) (Gurevich et al., 2018)	204903	100607	29681	240244	370	14639761

B Stylized Facts on Network Distance and FDI volume

To provide a stylized fact documenting the correlation between the network structure of BITs and investment flows across countries, we run the following regression model with dyad and year fixed effects:

$$Y_{ij,t} = \beta g(distance_{ij,t}) + \alpha_{ij} + \xi_t + \varepsilon_{ij,t}, \tag{5}$$

where $g(distance_{ij,t})$ decreases with respect to $distance_{ij,t}$. We consider two specifications of the function $g(\cdot)$ typical in the international economics literature (for a discussion, see Chaney, 2014), and the results are reported in Table SM.4. These results indicate that there exists a positive correlation between countries' structure proximity within the BIT network and the amount of investment activities they engage in.

Table SM.4: Distance on BIT Network and Log FDI in Stock

Dependent Variable:	log FDI in stock	
Model:	(1)	(2)
Variables		
Distance: $1/dist_{ij,t}$	0.943***	
	(0.050)	
Distance: $e^{-dist_{ij,t}}$		3.616***
		(0.161)
Controls	No	No
Fixed-effects		
dyad	Yes	Yes
year	Yes	Yes
Fit statistics		
Observations	474,916	474,916
R^2	0.603689	0.607768
Within R^2	0.012833	0.022993

Clustered (dyad) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

C Details on Network Measurements

- Degree: The degree of a node v in an undirected network is the number of edges connected to it. Mathematically, if A is the adjacency matrix of the network, the degree k_v of node v is given by:

$$k_v = \sum_u A_{vu} \tag{6}$$

  Degree represents the immediate connectivity of a node, high-degree nodes might be critical hubs. By controlling for countries' degree of connectivity, therefore, we may prevent countries with more treaties from disproportionately affecting outcomes.

- Eigenvector Centrality: Eigenvector centrality measures a node's importance based on the importance of its neighbors. It assigns each node v a centrality score x_v proportional to the sum of the centralities of its neighbors:

$$x_v = \frac{1}{\lambda} \sum_u A_{vu} x_u \tag{7}$$

  where λ is the largest eigenvalue of the adjacency matrix A. The centrality scores are obtained from the eigenvector corresponding to λ. Eigenvector centrality extends degree centrality by considering not just how many connections a node has but how influential those connections are. Controlling for eigenvector centrality allows us to isolate local effects and ensures that effects are not just driven by pre-existing structural advantages.

- Clustering Coefficient: the clustering coefficient measures the tendency of a node's neighbors to form connections among themselves. The clustering coefficient for a node v is given by:

$$C_v = \frac{2T_v}{k_v(k_v - 1)} \tag{8}$$

  where T_v is the number of triangles (fully connected triplets) involving v, and k_v is its degree. A high local clustering coefficient suggests that a node is embedded in a tightly knit community where its neighbors are interconnected. Controlling for clustering helps us ensure that observed effects are not just due to a country being embedded in a club of countries with high levels of FDI activities.

D Causal Assumptions and Quantity of Interest

In this section, we formally state the full set of causal assumptions required to derive our quantity of interest, treatment effect of BIT bridge on FDI for country dyads without direct BIT. We denote this quantity as $\tau = \mathbb{E}[Y_{ij,t}(0,1) - Y_{ijt,}(0,0)|W_{ij,t} = 0]$. We impose the following two additional assumptions for identification

Assumption 3 (a). *[Consistency]*

$$Y_{ij,t}(W, D) = Y_{ij,t}, \text{ almost surely.} \tag{9}$$

Assumption 4 (a). *[Positivity]*

$$\text{For some } \epsilon > 0, \mathbb{P}(W_{ijt} = 0, D_{ijt} = 1 \mid X_{it}, X_{jt}, Z_{ijt}, U_{ijt}) \in [\epsilon, 1-\epsilon], \text{ almost surely.} \tag{10}$$

Under Assumption (2) - (4), It can be shown that:

$$\begin{aligned}
\tau =& \mathbb{E}[Y_{ij,t}(0,1) - Y_{ijt,}(0,0)|W_{ij,t} = 0] \\
=& \mathbb{E}[\mathbb{E}[Y_{ij,t}(0,1)|X_{it}, X_{jt}, Z_{ij,t}, U_{ij,t}, W_{ij,t} = 0]] \\
&- \mathbb{E}[\mathbb{E}[Y_{ij,t}(0,0)|X_{it}, X_{jt}, Z_{ij,t}, U_{ij,t}, W_{ij,t} = 0]] \\
=& \mathbb{E}[\mathbb{E}[Y_{ij,t}(0,1)|X_{it}, X_{jt}, Z_{ij,t}, U_{ij,t}, W_{ijt} = 0, D_{ijt} = 1]] \\
&- \mathbb{E}[\mathbb{E}[Y_{ij,t}(0,0)|X_{it}, X_{jt}, Z_{ij,t}, U_{ij,t}, W_{ijt} = 0, D_{ijt} = 0]] \\
=& \mathbb{E}[\mathbb{E}[Y_{ij,t}|X_{it}, X_{jt}, Z_{ij,t}, U_{ij,t}, W_{ijt} = 0, D_{ijt} = 1]] \\
&- \mathbb{E}[\mathbb{E}[Y_{ij,t}|X_{it}, X_{jt}, Z_{ij,t}, U_{ij,t}, W_{ijt} = 0, D_{ijt} = 0]],
\end{aligned} \tag{11}$$

where the second equality follows from the law of total expectation, and the third equality holds under Assumption 2, the local network unconfoundedness assumption. The identification result (11) suggests that the observed outcome can be modeled as a function of dyadic covariates $Z_{ij,t}$, monadic covariates X_{it} and X_{jt}, and fixed effects that capture the unobserved confounder $U_{ij,t}$. This motivates our TWFE model specification on page 20.

E H1 and H2: Results, Robustness, and Sensitivity

E.1 Full Results

Table SM.5: The effect of BIT bridging: baseline

Dependent Variable:			log FDI in stock						BIT Formation			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Variables												
Lagged log FDI in stock	0.796***	0.799***	0.801***	0.777***	0.777***	0.777***						
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)						
Lagged BIT							0.877***	0.874***	0.885***	0.867***	0.867***	0.867***
							(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
BIT bridge (number)	0.016***			0.004			0.001***			0.000*		
	(0.002)			(0.002)			(0.000)			(0.000)		
BIT bridge (log number)		0.076***			0.013			0.017***			0.008***	
		(0.011)			(0.013)			(0.001)			(0.001)	
BIT bridge (binary)			0.055***			0.035**			0.016***			0.007***
			(0.014)			(0.016)			(0.001)			(0.001)
Democratic gap				-0.111***	-0.107***	-0.102***				-0.007**	-0.009***	-0.007**
				(0.033)	(0.033)	(0.033)				(0.003)	(0.003)	(0.003)
Log distance				-5.423**	-5.454**	-5.528**				0.028	0.061	0.036
				(2.338)	(2.333)	(2.325)				(0.133)	(0.132)	(0.132)
Legal gap				-0.106***	-0.107***	-0.109***				-0.003	-0.004	-0.004
				(0.036)	(0.036)	(0.036)				(0.004)	(0.004)	(0.004)
Log trade volume				0.010***	0.010***	0.010***				0.001***	0.001**	0.001***
				(0.003)	(0.003)	(0.003)				(0.000)	(0.000)	(0.000)
Democratic dyad				-0.055***	-0.055***	-0.055***				0.000	0.000	0.000
				(0.012)	(0.012)	(0.012)				(0.001)	(0.001)	(0.001)
Joint WTO				-0.087***	-0.087***	-0.086***				0.002*	0.002*	0.002*
				(0.014)	(0.014)	(0.014)				(0.001)	(0.001)	(0.001)
Joint OECD				0.256***	0.254***	0.252***				0.001	0.002	0.002
				(0.088)	(0.088)	(0.088)				(0.005)	(0.005)	(0.005)
Joint EU				0.695***	0.703***	0.704***				-0.033***	-0.031***	-0.033***
				(0.076)	(0.076)	(0.076)				(0.003)	(0.003)	(0.003)
FTA				0.115***	0.116***	0.115***				0.002	0.001	0.002
				(0.021)	(0.021)	(0.021)				(0.002)	(0.002)	(0.002)
Leader degree				0.110	0.159	0.189*				0.044***	0.030***	0.040***
				(0.110)	(0.106)	(0.108)				(0.007)	(0.007)	(0.007)
Leader centrality				0.037	0.032	0.019				0.050***	0.040***	0.045***
				(0.050)	(0.053)	(0.053)				(0.005)	(0.005)	(0.005)
Leader clustering				-0.104***	-0.105***	-0.110***				-0.003	-0.006**	-0.005**
				(0.025)	(0.025)	(0.025)				(0.002)	(0.002)	(0.002)
Follower degree				0.260	0.377**	0.450**				-0.005	-0.029***	-0.009
				(0.197)	(0.180)	(0.183)				(0.012)	(0.011)	(0.011)
Follower centrality				0.246***	0.237***	0.222***				0.072***	0.053***	0.063***
				(0.080)	(0.086)	(0.083)				(0.007)	(0.007)	(0.007)
Follower clustering				-0.074***	-0.077***	-0.082***				0.008***	0.005***	0.006***
				(0.018)	(0.017)	(0.018)				(0.002)	(0.002)	(0.002)
Leader GDP per capita				0.030*	0.031*	0.033*				0.008***	0.008***	0.009***
				(0.018)	(0.018)	(0.018)				(0.002)	(0.002)	(0.002)
Leader GDP				0.000***	0.000***	0.000***				0.000***	0.000**	0.000***
				(0.000)	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)
Follower GDP per capita				0.106***	0.106***	0.105***				0.005***	0.004***	0.005***
				(0.018)	(0.018)	(0.018)				(0.001)	(0.001)	(0.001)
Follower GDP				0.000***	0.000***	0.000***				0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)
Fixed-effects												
ids	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics												
Observations	115,025	115,025	115,025	113,150	113,150	113,150	186,206	186,206	186,206	181,470	181,470	181,470
R^2	0.88776	0.88763	0.88752	0.88803	0.88803	0.88803	0.94151	0.94171	0.94147	0.94182	0.94185	0.94183
Within R^2	0.62306	0.62261	0.62227	0.62562	0.62561	0.62563	0.79634	0.79705	0.79620	0.79737	0.79747	0.79741

Clustered (ids) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

E.2 Full Results: controlling for investment chapter in PTA

Table SM.6: The effect of BIT bridging: controlling for investment chapter

Dependent Variable:	log FDI in stock			BIT Formation		
Model:	(7)	(8)	(9)	(7)	(8)	(9)
Variables						
Lagged log FDI in stock	0.777***	0.777***	0.777***			
	(0.006)	(0.006)	(0.006)			
Lagged BIT				0.867***	0.867***	0.867***
				(0.002)	(0.002)	(0.002)
BIT bridge (number)	0.004			0.000*		
	(0.002)			(0.000)		
BIT bridge (log number)		0.013			0.008***	
		(0.013)			(0.001)	
BIT bridge (binary)			0.035**			0.007***
			(0.016)			(0.001)
Democratic gap	-0.111***	-0.107***	-0.102***	-0.007**	-0.009***	-0.007**
	(0.033)	(0.033)	(0.033)	(0.003)	(0.003)	(0.003)
Log distance	-5.377**	-5.408**	-5.483**	0.029	0.062	0.036
	(2.335)	(2.330)	(2.322)	(0.133)	(0.132)	(0.133)
Legal gap	-0.105***	-0.107***	-0.109***	-0.003	-0.004	-0.004
	(0.036)	(0.036)	(0.036)	(0.004)	(0.004)	(0.004)
Log trade volume	0.010***	0.010***	0.010***	0.001***	0.001**	0.001***
	(0.003)	(0.003)	(0.003)	(0.000)	(0.000)	(0.000)
Democratic dyad	-0.055***	-0.055***	-0.055***	0.000	0.000	0.000
	(0.012)	(0.012)	(0.012)	(0.001)	(0.001)	(0.001)
Joint WTO	-0.087***	-0.087***	-0.086***	0.002*	0.002*	0.002*
	(0.014)	(0.014)	(0.014)	(0.001)	(0.001)	(0.001)
Joint OECD	0.256***	0.254***	0.252***	0.001	0.002	0.002
	(0.088)	(0.088)	(0.088)	(0.005)	(0.005)	(0.005)
Joint EU	0.695***	0.703***	0.704***	-0.033***	-0.031***	-0.033***
	(0.076)	(0.076)	(0.076)	(0.003)	(0.003)	(0.003)
FTA	0.115***	0.116***	0.115***	0.002	0.001	0.002
	(0.021)	(0.021)	(0.021)	(0.002)	(0.002)	(0.002)
Invest Chapter	-0.173***	-0.173***	-0.173***	-0.003	-0.003	-0.003
	(0.061)	(0.061)	(0.061)	(0.004)	(0.004)	(0.004)
Leader degree	0.109	0.158	0.188*	0.044***	0.030***	0.040***
	(0.110)	(0.106)	(0.108)	(0.007)	(0.007)	(0.007)
Leader centrality	0.037	0.032	0.020	0.050***	0.040***	0.045***
	(0.050)	(0.053)	(0.053)	(0.005)	(0.005)	(0.005)
Leader clustering	-0.104***	-0.105***	-0.110***	-0.003	-0.006**	-0.005**
	(0.025)	(0.025)	(0.025)	(0.002)	(0.002)	(0.002)
Follower degree	0.262	0.379**	0.452**	-0.005	-0.029***	-0.009
	(0.197)	(0.180)	(0.183)	(0.012)	(0.011)	(0.011)
Follower centrality	0.245***	0.236***	0.221***	0.072***	0.053***	0.063***
	(0.080)	(0.086)	(0.083)	(0.007)	(0.007)	(0.007)
Follower clustering	-0.074***	-0.077***	-0.082***	0.008***	0.005***	0.006***
	(0.018)	(0.017)	(0.018)	(0.002)	(0.002)	(0.002)
Leader GDP per capita	0.029*	0.031*	0.033*	0.008***	0.008***	0.009***
	(0.018)	(0.018)	(0.018)	(0.002)	(0.002)	(0.002)
Leader GDP	0.000***	0.000***	0.000***	0.000***	0.000**	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Follower GDP per capita	0.105***	0.106***	0.105***	0.005***	0.004***	0.005***
	(0.018)	(0.018)	(0.018)	(0.001)	(0.001)	(0.001)
Follower GDP	0.000***	0.000***	0.000***	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Fixed-effects						
ids	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics						
Observations	113,150	113,150	113,150	181,470	181,470	181,470
R^2	0.88804	0.88803	0.88804	0.94182	0.94185	0.94183
Within R^2	0.62564	0.62563	0.62565	0.79737	0.79747	0.79741

Clustered (ids) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

E.3 Removing OECD Country Dyads

Table SM.7: The effect of BIT bridging: removing OECD pairs

Dependent Variables:	BIT formation		log FDI in stock	
Model:	(1)	(2)	(1)	(2)
Variables				
Lagged BIT	0.883***	0.863***		
	(0.002)	(0.002)		
Lagged log FDI in stock			0.773***	0.756***
			(0.008)	(0.008)
BIT bridge (binary)	0.016***	0.006***	0.047***	0.033**
	(0.001)	(0.002)	(0.013)	(0.015)
Democratic gap		-0.008**		-0.104***
		(0.003)		(0.034)
Log distance		0.094		-9.303***
		(0.169)		(2.956)
Legal gap		-0.004		-0.111***
		(0.004)		(0.038)
Log trade volume		0.001***		0.009***
		(0.000)		(0.003)
Democratic dyad		-0.002		-0.028**
		(0.001)		(0.012)
Joint WTO		0.000		-0.033**
		(0.001)		(0.014)
Joint EU		-0.028***		0.691***
		(0.004)		(0.136)
FTA		0.002		0.112***
		(0.002)		(0.022)
Leader degree		0.051***		-0.052
		(0.008)		(0.122)
Leader centrality		0.047***		0.031
		(0.005)		(0.055)
Leader clustering		-0.006**		-0.103***
		(0.003)		(0.024)
Follower degree		-0.011		0.896***
		(0.013)		(0.226)
Follower centrality		0.074***		-0.146
		(0.007)		(0.091)
Follower clustering		0.005***		-0.025
		(0.002)		(0.016)
Leader GDP per capita		0.009***		0.017
		(0.002)		(0.018)
Leader GDP		0.000***		0.000***
		(0.000)		(0.000)
Follower GDP per capita		0.006***		0.054***
		(0.001)		(0.018)
Follower GDP		0.000		0.000**
		(0.000)		(0.000)
Fixed-effects				
ids	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes
Fit statistics				
Observations	176,060	172,390	107,198	105,773
R^2	0.93959	0.94010	0.80394	0.80570
Within R^2	0.79197	0.79397	0.55400	0.55626

Clustered (ids) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

E.4 Removing Country Dyads with Tax Havens

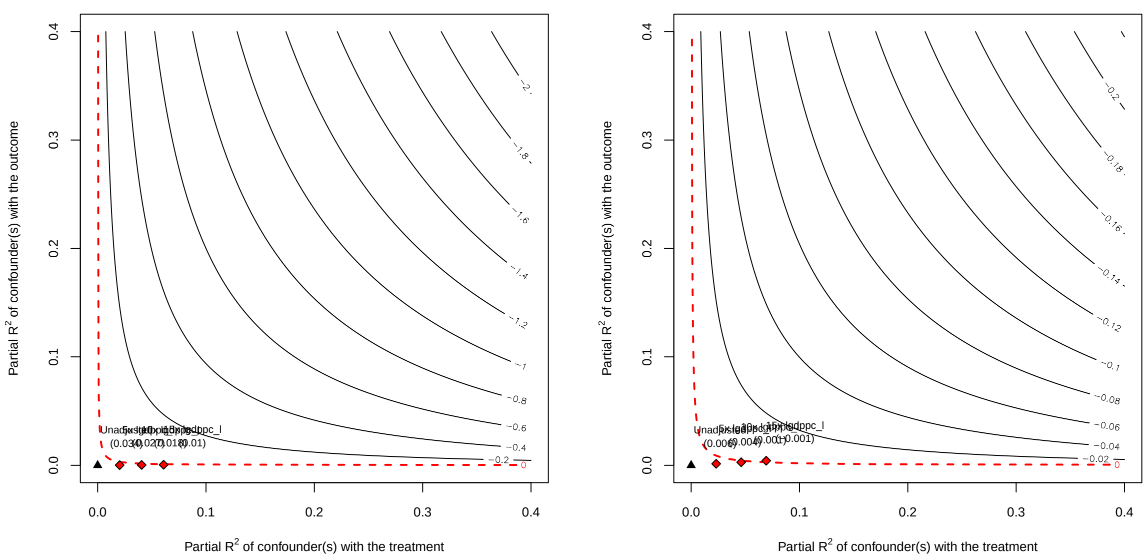
Table SM.8: The effect of BIT bridging: removing tax havens

Dependent Variable:	log FDI in stock				BIT Formation			
Tax Haven:	Narrow		Broad		Narrow		Broad	
Model:	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Variables								
Lagged log FDI in stock	0.803***	0.778***	0.783***	0.755***				
	(0.006)	(0.007)	(0.008)	(0.009)				
Lagged BIT					0.885***	0.868***	0.880***	0.862***
					(0.001)	(0.002)	(0.002)	(0.002)
BIT bridge (binary)	0.060***	0.040**	0.078***	0.051***	0.016***	0.007***	0.015***	0.007***
	(0.014)	(0.017)	(0.014)	(0.017)	(0.001)	(0.002)	(0.002)	(0.002)
Democratic gap		-0.104***		-0.103***		-0.006		-0.007*
		(0.035)		(0.035)		(0.004)		(0.004)
Log distance		-5.459**		-5.382**		0.053		0.051
		(2.404)		(2.701)		(0.136)		(0.166)
Legal gap		-0.122***		-0.107***		-0.005		-0.004
		(0.037)		(0.040)		(0.004)		(0.004)
Log trade volume		0.010***		0.009***		0.001***		0.001***
		(0.003)		(0.003)		(0.000)		(0.000)
Democratic dyad		-0.057***		-0.042***		0.001		0.001
		(0.012)		(0.012)		(0.001)		(0.001)
Joint WTO		-0.095***		-0.056***		0.002**		0.001
		(0.014)		(0.015)		(0.001)		(0.001)
Joint OECD		0.250***		0.241**		0.001		0.004
		(0.087)		(0.113)		(0.005)		(0.005)
Joint EU		0.694***		0.916***		-0.032***		-0.037***
		(0.076)		(0.110)		(0.003)		(0.003)
FTA		0.115***		0.101***		0.002		0.001
		(0.022)		(0.024)		(0.002)		(0.002)
Leader degree		0.212*		0.007		0.039***		0.044***
		(0.111)		(0.124)		(0.007)		(0.009)
Leader centrality		0.025		0.078		0.045***		0.047***
		(0.055)		(0.055)		(0.005)		(0.006)
Leader clustering		-0.124***		-0.060**		-0.005**		-0.008**
		(0.025)		(0.026)		(0.003)		(0.003)
Follower degree		0.363*		0.696***		-0.008		-0.026**
		(0.188)		(0.213)		(0.011)		(0.013)
Follower centrality		0.273***		0.159*		0.063***		0.071***
		(0.085)		(0.089)		(0.007)		(0.008)
Follower clustering		-0.089***		-0.031*		0.005***		0.002
		(0.018)		(0.016)		(0.002)		(0.002)
Leader GDP per capita		0.021		0.019		0.008***		0.009***
		(0.018)		(0.019)		(0.002)		(0.002)
Leader GDP		0.000***		0.000***		0.000***		0.000***
		(0.000)		(0.000)		(0.000)		(0.000)
Follower GDP per capita		0.103***		0.062***		0.004***		0.008***
		(0.019)		(0.020)		(0.001)		(0.002)
Follower GDP		0.000***		0.000***		0.000		0.000
		(0.000)		(0.000)		(0.000)		(0.000)
Fixed-effects								
ids	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Observations	108,813	107,010	89,669	88,077	177,817	173,183	147,834	143,578
R^2	0.89080	0.89132	0.88514	0.88539	0.94137	0.94176	0.94014	0.94050
Within R^2	0.62616	0.62990	0.59624	0.60026	0.79728	0.79855	0.79044	0.79178

Clustered (ids) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

E.5 Sensitivity Analysis

In this section, we present the results of sensitivity analysis using the omitted variable bias framework proposed by Cinelli and Hazlett (2020). The following figure shows the contour plots produced via `sensemakr`. The x-axis represents the hypothetical residual share of variation in the treatment (binary BIT bridge) explained by unobserved confounders, while the y-axis represents the hypothetical partial R^2 of unobserved confounders with the outcome (BIT formation and FDI flow). The numbers in parentheses below the variable names and contour lines indicate the effect size. The figure demonstrates that the treatment effect remains positive after accounting for the unobserved confounder 10 times as strong as the observed benchmark covariate (GDP of the leading state). The treatment effect, however, becomes zero when the unobserved confounder is 15 times stronger than the observed benchmark covariate (GDP of the leading state).



(a) Outcome: FDI flow

(b) Outcome: BIT formation

Figure SM.4: Sensitivity Analysis for Main Results (Table 1, Column (2) and (4)). The black triangles indicate the baseline coefficient. The red rhombi indicate the adjusted coefficients after accounting for unobserved confounders that are 5x, 10x, and 15x as strong as the benchmark covariate (GDP of the leading state), from left to right consecutively.

F H1 and H2: Full Panel Data Analysis

In this section, we conduct additional tests for H_1 and H_2 using the the full panel data of country dyads and years using an alternative estimation strategy. Given this data structure, we adopt a fixed-effect counterfactual estimator incorporating heterogeneous treatment effects (Liu, Wang and Xu, 2024). This estimation strategy allows us to identify the average treatment effect of BIT bridges on FDI flows and the likelihood of subsequent BIT formation among the countries that become indirectly connected by BIT bridges. Moreover, this estimator has the desirable property that allow us to address the negative probability problem due to staggered treatment adoption (Sun and Abraham, 2021):

$$Y_{ij,t} = \beta_{ij,t} D_{ij,t} + \gamma_{ij,t} Y_{ij,t-i} + \alpha_{ij} + \xi_t + \varepsilon_{ij,t}, \tag{12}$$

In line with our main analyses, we foucs on the case where the treatment variable $D_{ij,t-1}$ is a dummy variable that equals 1 if at time $t-1$, country i and j are indirectly connected by *at least* one intermediate country within the BIT network. $\beta_{ij,t}$ is the heterogeneous effect of BIT bridge at time t. We are interested in the average treatment effect on the treated (ATT) at time t: $\beta_t = \frac{\sum_{ij} D_{ij,t-1} \beta_{ij,t}}{\sum_{ij} D_{ij,t-1}}$. Crucially, for our first hypothesis, we further account for the existence of direct BIT between a country pair by recording whether a country pair has an active BIT in place as a dummy variable as part of the covariates.

We apply the fixed effect counterfactual estimator to evaluate two quantities of interest: the effect of indirect connection in the BIT network on bilateral FDI flows, and the likelihood of direct BIT conclusion. Focusing on the variation over time for each country pair that has recorded investment flows, we look for whether there is a difference in the trends of bilateral FDI flows and direct BIT formation before and after they become indirectly connected.

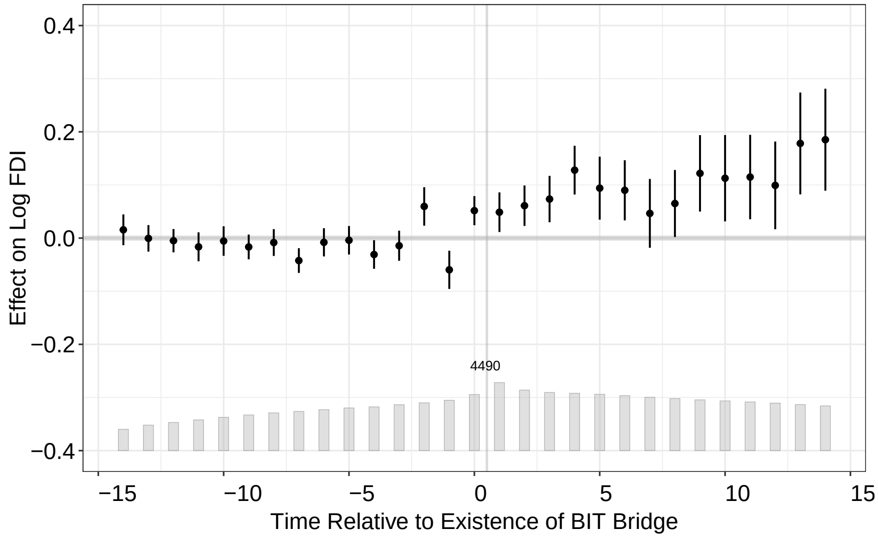


Figure SM.5: Effect of indirect connection in the BIT network on bilateral FDI flow: The plot shows the ATT (average treated effects on the treated units) of indirect BIT connection on the FDI flow between country pairs. The gray bars denote the number of observations used in computing the effect across each period. The model estimates 95% confidence intervals with 500 block bootstraps.

Figure SM.5 shows the estimated treatment effects among treated units (ATT) on bilateral FDI flows[30] with 95% confidence intervals (H_1). $t = 1$ indicates the first year when two countries are connected via a BIT bridge. We measure the effects from the onset of the treatment assignment, leveraging the plausible exogeneity given the third-party state's ratification decision. We plot the contemporaneous effects at $t = 0$ and the persistent effects after the indirect connection is established for up to 15 years (from $t = 0$ to $t = 14$). The shaded regions for periods prior to the indirect connection aim to detect anticipation effects and pre-trends. We use $t = 0$ as the reference group and plot the estimated effects for up to fifteen years before the year of treatment ($t = -15$ to $t = -1$). We observe a strong and positive effect when comparing the trend of bilateral FDI flows between the indirectly connected and controlled dyads. We find that indirect connection in the BIT network leads to an increase between 4% to 19% in bilateral investment flows in indirectly connected country

[30] Note that, since our data on FDI documents the bilateral stocks, which is defined as "the value of the share of capital and reserves (including retained profits) attributable to the parent enterprise", the difference-in-differences estimators should thus be interpreted as effects on FDI flows. See https://unctadstat.unctad.org/datacentre/dataviewer/metadata/dimension-element/US.FdiFlowsStock/1418/Flow/09 for a full definition of FDI stock.

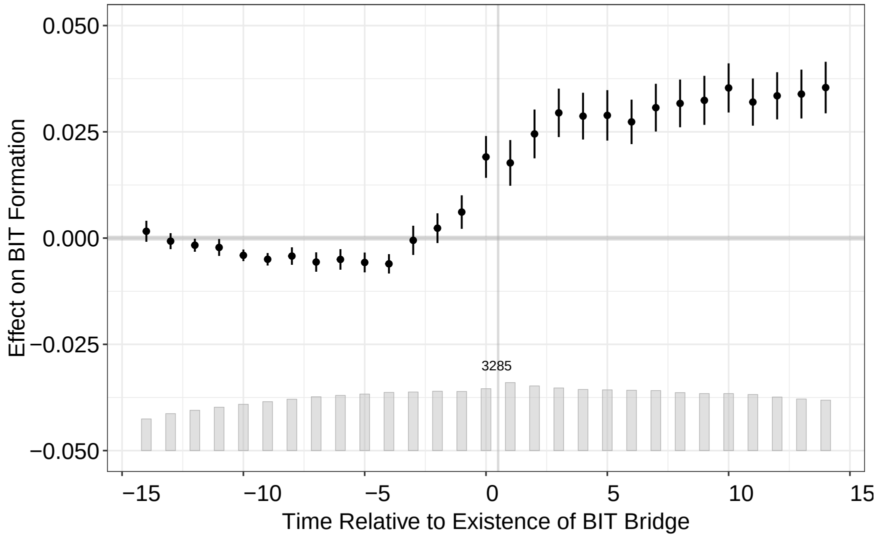
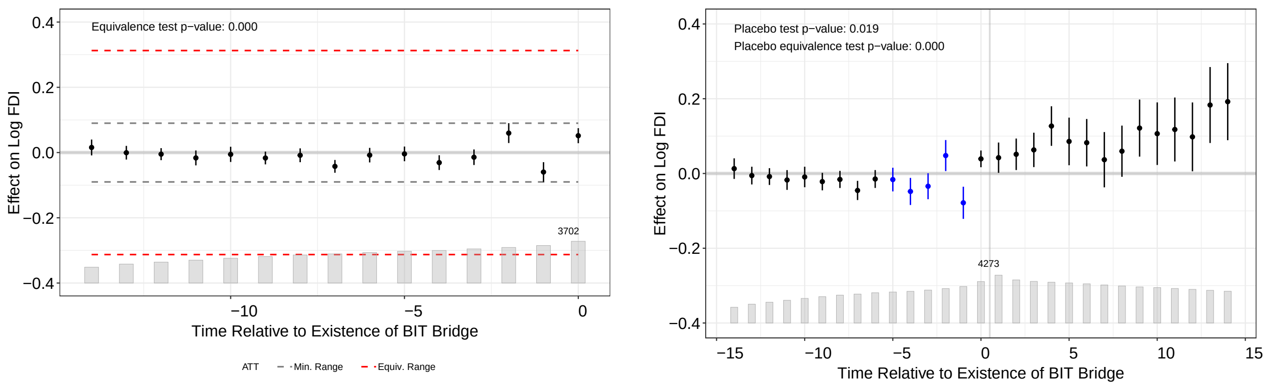


Figure SM.6: Effect of indirect connection in the BIT network on direct BIT formation: The plot shows the ATT (average treated effects on the treated units) of indirect BIT connection on the likelihood of direct BIT formation between country pairs. The model estimates 95% confidence intervals with 500 bootstraps.

dyads relative to the controlled dyads, which are comparable in magnitude to our findings in the main analyses.

Similarly, Figure SM.6 shows the estimated treatment effects among treated units (ATT) on the likelihood of direct BIT formation with 95% confidence intervals (H_2). Again, we observe a strong and positive effect when comparing the trend of direct BIT formation between the indirectly connected and controlled dyads. We find that indirect connection in the BIT network makes indirectly connected country dyads 1.9% - 3.7% percent more likely to form a direct BIT between themselves in the 10 years after treatment relative to the controlled dyads, which are again comparable in magnitude to our findings in the main analyses. All effects are significant at the 95% level for the 10 years after the initial treatment assignment. It is noteworthy, however, that the estimated dynamic effects, which are significant due to the large number of observations, in pre-treatment periods indicate a possible violation of the parallel-trends assumption.



Equivalence Test

Placebo Test

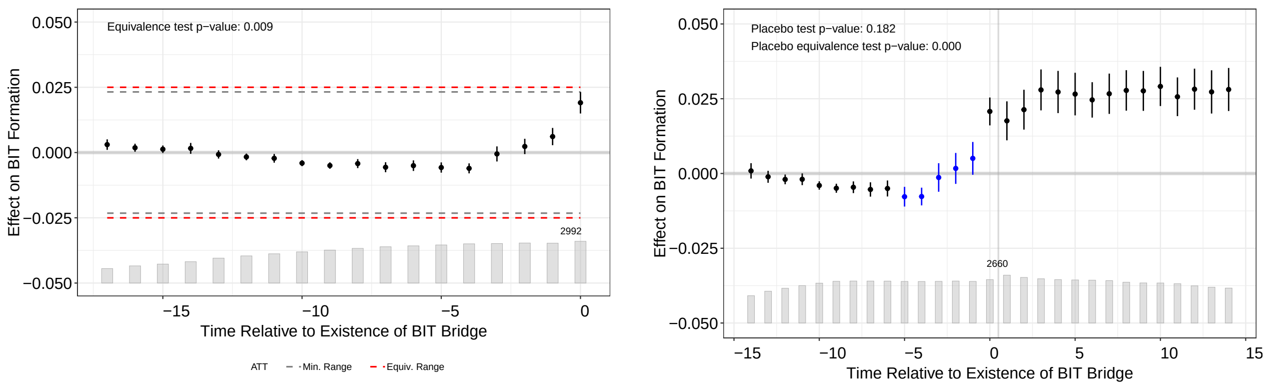
Figure SM.7: Model diagnostics for the event study for H1. On the left panel, we report the results for equivalence test, where the null hypothesis is existence of pre-trend. In this figure, the grey dash lines bound the 90% CI (at the 5% level) for ATT estimates in pre-treatment periods. The red dashed lines are boundaries determined by ATT estimates in post-treatment periods. If the grey lines do not exceed the red boundaries, meaning that the magnitude of ATT estimates in pre-treatment is relatively small enough, and the null hypothesis of pre-trend is rejected. For the right panel, the estimates highlighted in blue indicate the time periods selected for placebo tests. Gray bars at the bottom indicate the number of observations used to calculate the estimates in each period. While we reject the null hypothesis of placebo tests due to the large number of observations, we are also able to reject the null hypotheses of placebo equivalence tests. Overall, these results suggest that there exist no significant violations of parallel trends.

F.1 Robustness and Sensitivity

We noted that in Figure SM.5 and SM.6, several estimates in the pre-treatment period return statistically significant results that may raise concerns of "pre-trends". To assess the severity of potential parallel trend violations and whether we can still recover any causally identified effects, we conduct equivalence tests and placebo equivalence tests as robustness checks.

In the equivalence test, the null hypothesis is the existence of pre-trends (Hartman and Hidalgo, 2018; Liu, Wang and Xu, 2024). For the placebo equivalence test, we regard several periods before treatment, highlighted in blue, as placebo periods. Left panel of Figure SM.7 and SM.11 displays equivalence test results for H1 and H2. In the equivalence test, for both outcomes, the p-values are smaller than 0.05, suggesting that we can reject the null hypothesis of the existence of pre-trends.

Results for the placebo equivalence test are shown in right panel of Figure SM.7 and SM.11. As



Equivalence Test

Placebo Test

Figure SM.8: Model diagnostics for the event study for H2. On the left panel, we report the results for equivalence test, where the null hypothesis is existence of pre-trend. In this figure, the grey dash lines bound the 90% CI (at the 5% level) for ATT estimates in pre-treatment periods. The red dashed lines are boundaries determined by ATT estimates in post-treatment periods. If the grey lines do not exceed the red boundaries, meaning that the magnitude of ATT estimates in pre-treatment is relatively small enough, and the null hypothesis of pre-trend is rejected. For the right panel, the estimates highlighted in blue indicate the time periods selected for placebo tests. Gray bars at the bottom indicate the number of observations used to calculate the estimates in each period. For both analyses, we are able to reject the null hypotheses of placebo equivalence tests, and we fail to reject the null hypothesis of the placebo test, which suggests there exist no significant violations of parallel trends, compared to the magnitude of estimated treatment effects.

previously noted, the 95 % confidence intervals in both dynamic effects do not cover 0 in several placebo periods. Nevertheless, for log FDI as outcome, the joint placebo tests have p-values greater than 0.05, suggesting that we cannot reject the null hypotheses that the parallel trends assumptions hold. However, for BIT formation as the outcome, which itself is a rare event, may affect the goodness of fit of a linear TWFE model, and the the joint placebo tests have p-values smaller than 0.05. However, the p-value of the placebo equivalence tests are both smaller than 0.05, suggesting that we may reject the null hypothesis of non-zero placebo effects. Combining the equivalence test and placebo equivalence test, we conclude that the violation of parallel trend assumption is not severe in our main analyses and the estimated effects in the post-treatment periods are still valid.

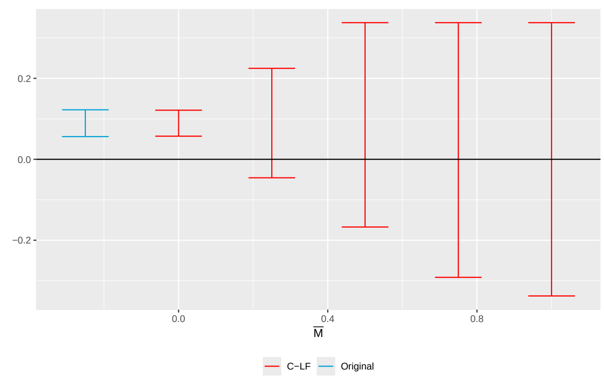
Lastly, we further implement an additional sensitivity analysis proposed by Rambachan and Roth (2023). In essence, this analysis allows us to assess how severe the parallel trend violations can get before our main effects become explained away by pre-existing trends in direct BIT formation prior to the treatment assignments. We perform the `HonestDiD` check to measure the sensitivity of our difference-in-differences analyses to violations in parallel trends (Rambachan and Roth, 2023). This analysis assumes that the estimated dynamic effects $\beta = (\ldots, \beta_{-1}, \beta_0, \beta_1, \ldots)$ can be decomposed into two parts: the bias from differences in trends δ and the true treatment effects τ, i.e.,

$$\beta = \underbrace{\begin{pmatrix} 0 \\ \tau_{\text{post}} \end{pmatrix}}_{=:\tau} + \underbrace{\begin{pmatrix} \delta_{\text{pre}} \\ \delta_{\text{post}} \end{pmatrix}}_{=:\delta},$$

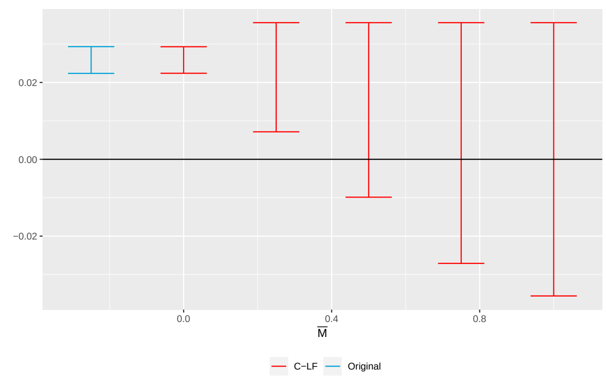
where $\tau_{\text{pre}} = 0$ as the dynamic effects are zero in pre-treatment periods. This decomposition allows partial identification of τ_{post} given $\hat{\beta}$ and the relationship between the trends δ_{pre} and δ_{post}. We adopt the "relative magnitude" approach to bound δ_{post} given some positive real number M:

$$\Delta^{RM}(M) = \left\{\delta : \forall t \geq 0, |\delta_{t+1} - \delta_t| \leq M \cdot \max_{s<0} |\delta_{s+1} - \delta_s|\right\},$$

which means that the violation of the parallel trend assumption in the post-treatment period is at most as large as $\bar{M}$ times the worst case in the pre-treatment periods. After adjusting the parallel trends using the period with the most several violations ($t = -1$ for H_1, and $t = -4$ for H_2), our main results remain significant in the post-treatment periods for $M \leq 0.3$ for log FDI in stock values and $M < 0.3$ for BIT formation (see Figure SM.9). However, if the value of $\bar{M} \geq 0.3$, the estimated effects become insignificant. Therefore, the estimates remain valid if we can tolerate a slight violation (on average 30% of the most severe violation observed) of the parallel trend assumption.



Log FDI



BIT Formation

Figure SM.9: Placebo Test

G H1: Alternative Explanations

To compute the number of newly traded goods for each country during our window of observation, we collected 4-digit level trade data from the Altas of Economic Complexity from 1988-2020. For each country, we classify a product as a newly traded product if the country has no documented export or a documented trade volume of 0 in year $t-2$ and $t-1$ but has a documented trade volume greater than 0 in year t. We then tabulate the sum of all new export products to obtain their count measures at the country-year level, which is then used as the outcome variable in the analyses. We use the same model specification as in Section F and report the following results and robustness checks:

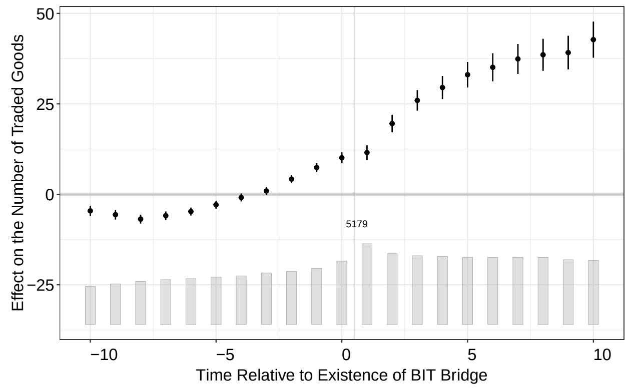
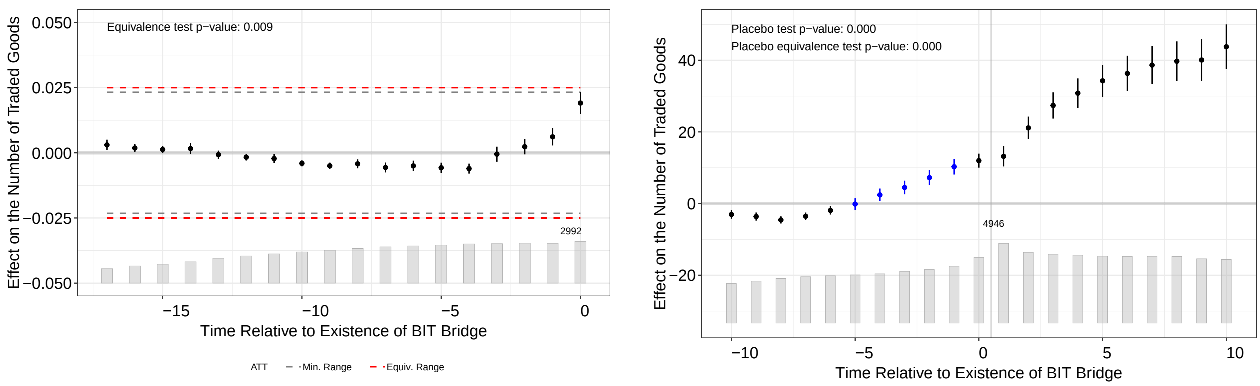


Figure SM.10: Effect of indirect connection in the BIT network on the number of traded goods: The plot shows the ATT (average treated effects on the treated units) of indirect BIT connection on number of sectors with non-zero trade flows between country pairs. 95% confidence intervals estimated with 500 bootstraps.



Equivalence Test

Placebo Test

Figure SM.11: Model diagnostics for the event study for Figure SM.10. On the left panel, we report the results for equivalence test, where the null hypothesis is existence of pre-trend. In this figure, the grey dash lines bound the 90% CI (at the 5% level) for ATT estimates in pre-treatment periods. The red dashed lines are boundaries determined by ATT estimates in post-treatment periods. If the grey lines do not exceed the red boundaries, meaning that the magnitude of ATT estimates in pre-treatment is relatively small enough, and the null hypothesis of pre-trend is rejected. For the right panel, the estimates highlighted in blue indicate the time periods selected for placebo tests. Gray bars at the bottom indicate the number of observations used to calculate the estimates in each period. While we reject the null hypothesis of placebo tests due to the large number of observations, we are also able to reject the null hypotheses of placebo equivalence tests. Overall, these results suggest that there exist no significant violations of parallel trends.

H H3: Full Results for Table 2

Table SM.9: The heterogeneous effect of BIT bridging across varying levels of legal gap

Dependent Variable:	log FDI in stock						BIT Formation					
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Variables												
Lagged log FDI in stock	0.785***	0.787***	0.795***	0.768***	0.767***	0.773***						
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.006)						
Lagged BIT							0.878***	0.875***	0.884***	0.867***	0.866***	0.866***
							(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
BIT bridge (number)	0.145***			0.151***			-0.001**			-0.001**		
	(0.013)			(0.014)			(0.001)			(0.001)		
BIT bridge (number) × Log distance	-0.015***			-0.017***			0.000***			0.000		
	(0.001)			(0.002)			(0.000)			(0.000)		
BIT bridge (number) × Legal gap	-0.023***			-0.017***			0.001***			0.001***		
	(0.004)			(0.005)			(0.000)			(0.000)		
BIT bridge (log number)		1.047***			1.035***			0.018***			0.016***	
		(0.082)			(0.083)			(0.005)			(0.005)	
BIT bridge (log number) × Log distance		-0.106***			-0.114***			0.000			-0.001*	
		(0.009)			(0.009)			(0.001)			(0.001)	
BIT bridge (log number) × Legal gap		-0.165***			-0.133***			0.007***			0.010***	
		(0.020)			(0.025)			(0.001)			(0.002)	
BIT bridge (binary)			1.507***			1.548***			0.054***			0.047***
			(0.168)			(0.168)			(0.011)			(0.011)
BIT bridge (binary) × Log distance			-0.153***			-0.163***			-0.005***			-0.005***
			(0.019)			(0.019)			(0.001)			(0.001)
BIT bridge (binary) × Legal gap			-0.292***			-0.218***			0.005			0.016***
			(0.035)			(0.044)			(0.003)			(0.003)
Democratic gap				-0.101***	-0.129***	-0.137***				-0.006	-0.005	-0.005
				(0.034)	(0.034)	(0.033)				(0.003)	(0.003)	(0.003)
Log distance				-4.092*	-3.071	-4.139**				0.027	0.096	0.089
				(2.183)	(2.036)	(2.020)				(0.130)	(0.133)	(0.139)
Legal gap				-0.044	0.030	0.024				-0.011***	-0.018***	-0.015***
				(0.041)	(0.045)	(0.045)				(0.004)	(0.004)	(0.004)
Log trade volume				0.012***	0.011***	0.009***				0.001***	0.001***	0.001***
				(0.003)	(0.003)	(0.003)				(0.000)	(0.000)	(0.000)
Democratic dyad				-0.041***	-0.044***	-0.053***				0.000	0.001	0.001
				(0.012)	(0.012)	(0.012)				(0.001)	(0.001)	(0.001)
Joint WTO				-0.079***	-0.084***	-0.087***				0.002**	0.002	0.002
				(0.014)	(0.014)	(0.014)				(0.001)	(0.001)	(0.001)
Joint OECD				0.296***	0.297***	0.264***				0.004	0.004	0.002
				(0.091)	(0.091)	(0.090)				(0.005)	(0.005)	(0.005)
Joint EU				0.468***	0.515***	0.636***				-0.028***	-0.030***	-0.033***
				(0.080)	(0.076)	(0.075)				(0.003)	(0.003)	(0.003)
FTA				0.093***	0.088***	0.101***				0.003	0.001	0.001
				(0.020)	(0.020)	(0.021)				(0.002)	(0.002)	(0.002)
Leader degree				0.072	0.110	0.177				0.040***	0.025***	0.037***
				(0.113)	(0.106)	(0.108)				(0.007)	(0.007)	(0.007)
Leader centrality				0.097*	0.061	0.011				0.052***	0.042***	0.046***
				(0.052)	(0.054)	(0.053)				(0.005)	(0.005)	(0.005)
Leader clustering				-0.100***	-0.103***	-0.108***				-0.003	-0.006**	-0.005**
				(0.025)	(0.025)	(0.025)				(0.002)	(0.002)	(0.002)
Follower degree				0.351*	0.363*	0.495***				-0.009	-0.029***	-0.009
				(0.205)	(0.186)	(0.185)				(0.012)	(0.011)	(0.011)
Follower centrality				0.282***	0.245***	0.193**				0.072***	0.053***	0.064***
				(0.081)	(0.087)	(0.083)				(0.007)	(0.007)	(0.007)
Follower clustering				-0.064***	-0.058***	-0.070***				0.008***	0.005***	0.005***
				(0.018)	(0.017)	(0.018)				(0.002)	(0.002)	(0.002)
Leader GDP per capita				0.038**	0.044**	0.045**				0.008***	0.009***	0.009***
				(0.018)	(0.018)	(0.018)				(0.002)	(0.002)	(0.002)
Leader GDP				0.000***	0.000***	0.000***				0.000***	0.000	0.000**
				(0.000)	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)
Follower GDP per capita				0.111***	0.109***	0.103***				0.005***	0.004***	0.005***
				(0.018)	(0.018)	(0.018)				(0.001)	(0.001)	(0.001)
Follower GDP				0.000***	0.000***	0.000***				0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)
Fixed-effects												
ids	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics												
Observations	113,475	113,475	113,475	113,150	113,150	113,150	182,440	182,440	182,440	181,470	181,470	181,470
R^2	0.88828	0.88831	0.88791	0.88851	0.88861	0.88832	0.94179	0.94198	0.94175	0.94184	0.94188	0.941861
Within R^2	0.62370	0.62379	0.62246	0.62723	0.62754	0.62660	0.79691	0.79757	0.79678	0.79743	0.79758	0.79750

Clustered (ids) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table SM.10: The heterogeneous effect of BIT bridging on FDI based on the occurrence of ISDS events along BIT bridges

Dependent Variable:	log FDI in stock											
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Variables												
Lagged log FDI in stock	0.796***	0.799***	0.801***	0.777***	0.777***	0.777***	0.796***	0.799***	0.801***	0.777***	0.777***	0.777***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
BIT bridge (number)	0.016***			0.004			0.016***			0.004		
	(0.002)			(0.002)			(0.002)			(0.002)		
BIT bridge (number) × ISDS case	0.003			0.008			0.001			0.064		
	(0.003)			(0.013)			(0.004)			(0.056)		
BIT bridge (log number)		0.076***			0.013			0.076***			0.013	
		(0.011)			(0.013)			(0.011)			(0.013)	
BIT bridge (log number) × ISDS case		0.041*			0.160			0.021			0.769	
		(0.024)			(0.167)			(0.030)			(0.680)	
BIT bridge (binary)			0.055***			0.035**			0.055***			0.035**
			(0.014)			(0.016)			(0.014)			(0.016)
BIT bridge (binary) × ISDS case			0.101			0.446			0.035			3.187
			(0.082)			(0.726)			(0.094)			(3.082)
Democratic gap				-0.111***	-0.107***	-0.102***				-0.111***	-0.107***	-0.102***
				(0.033)	(0.033)	(0.033)				(0.033)	(0.033)	(0.033)
Log distance				-5.420**	-5.449**	-5.525**				-5.425**	-5.456**	-5.525**
				(2.338)	(2.333)	(2.325)				(2.336)	(2.331)	(2.325)
Legal gap				-0.105***	-0.107***	-0.109***				-0.105***	-0.107***	-0.109***
				(0.036)	(0.036)	(0.036)				(0.036)	(0.036)	(0.036)
Log trade volume				0.010***	0.010***	0.010***				0.010***	0.010***	0.010***
				(0.003)	(0.003)	(0.003)				(0.003)	(0.003)	(0.003)
Democratic dyad				-0.055***	-0.055***	-0.055***				-0.055***	-0.055***	-0.055***
				(0.012)	(0.012)	(0.012)				(0.012)	(0.012)	(0.012)
Joint WTO				-0.087***	-0.087***	-0.086***				-0.087***	-0.087***	-0.086***
				(0.014)	(0.014)	(0.014)				(0.014)	(0.014)	(0.014)
Joint OECD				0.258***	0.257***	0.252***				0.260***	0.258***	0.252***
				(0.088)	(0.087)	(0.088)				(0.087)	(0.087)	(0.088)
Joint EU				0.695***	0.703***	0.704***				0.695***	0.703***	0.704***
				(0.076)	(0.076)	(0.076)				(0.076)	(0.076)	(0.076)
FTA				0.115***	0.116***	0.116***				0.115***	0.116***	0.116***
				(0.021)	(0.021)	(0.021)				(0.021)	(0.021)	(0.021)
Leader degree				0.109	0.156	0.190*				0.110	0.158	0.191*
				(0.110)	(0.106)	(0.108)				(0.110)	(0.106)	(0.108)
Leader centrality				0.038	0.032	0.019				0.037	0.031	0.018
				(0.050)	(0.053)	(0.053)				(0.050)	(0.053)	(0.053)
Leader clustering				-0.104***	-0.106***	-0.109***				-0.104***	-0.106***	-0.109***
				(0.025)	(0.025)	(0.025)				(0.025)	(0.025)	(0.025)
Follower degree				0.253	0.364**	0.451**				0.254	0.370**	0.451**
				(0.198)	(0.181)	(0.183)				(0.197)	(0.180)	(0.183)
Follower centrality				0.248***	0.241***	0.222***				0.249***	0.240***	0.222***
				(0.080)	(0.086)	(0.083)				(0.080)	(0.086)	(0.083)
Follower clustering				-0.074***	-0.077***	-0.082***				-0.074***	-0.077***	-0.083***
				(0.018)	(0.017)	(0.018)				(0.018)	(0.017)	(0.018)
Leader GDP per capita				0.030*	0.031*	0.033*				0.029*	0.030*	0.032*
				(0.018)	(0.018)	(0.018)				(0.018)	(0.018)	(0.018)
Leader GDP				0.000***	0.000***	0.000***				0.000***	0.000***	0.000***
				(0.000)	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)
Follower GDP per capita				0.106***	0.106***	0.105***				0.105***	0.105***	0.105***
				(0.018)	(0.018)	(0.018)				(0.018)	(0.018)	(0.018)
Follower GDP				0.000***	0.000***	0.000***				0.000***	0.000***	0.000***
				(0.000)	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)
ISDS case				-0.177	-0.450	-0.465				-1.533	-2.393	-3.306
				(0.275)	(0.486)	(0.721)				(1.289)	(2.045)	(3.081)
ISDS Sample	Full						Favoring Investors					
Fixed-effects												
ids	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics												
Observations	115,025	115,025	115,025	113,150	113,150	113,150	115,025	115,025	115,025	113,150	113,150	113,150
R^2	0.88776	0.88763	0.88753	0.88803	0.88803	0.88804	0.88776	0.88763	0.88752	0.88806	0.88806	0.88808
Within R^2	0.62306	0.62262	0.62227	0.62563	0.62563	0.62564	0.62306	0.62261	0.62227	0.62570	0.62573	0.62578

Clustered (ids) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

I H3: Heterogeneous Effects by Types of Country Dyads

Table SM.11: The heterogeneous effect of BIT bridging on FDI across varying levels of legal gap: by country dyads

Dependent Variable:	log FDI in stock					
Dyads:	North-South		South-South		North-North	
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
Lagged log FDI in stock	0.755***	0.734***	0.811***	0.785***	0.722***	0.714***
	(0.006)	(0.006)	(0.008)	(0.009)	(0.014)	(0.015)
BIT bridge (binary)	1.801***	1.385***	1.090***	1.373***	2.205***	1.419**
	(0.245)	(0.254)	(0.131)	(0.131)	(0.524)	(0.567)
BIT bridge (binary) × Log distance	-0.167***	-0.131***	-0.124***	-0.161***	-0.285***	-0.193***
	(0.027)	(0.028)	(0.015)	(0.015)	(0.064)	(0.069)
BIT bridge (binary) × Legal gap	-0.454***	-0.362***	-0.033	-0.017	0.149	-0.219
	(0.056)	(0.064)	(0.032)	(0.040)	(0.574)	(0.733)
Democratic gap		0.154*		-0.060*		0.469
		(0.083)		(0.032)		(1.019)
Log distance		-2.153		-5.321**		0.852
		(6.477)		(2.531)		(1.058)
Legal gap		-0.149*		-0.003		3.686**
		(0.086)		(0.044)		(1.630)
Log trade volume		0.042***		0.011***		0.090
		(0.007)		(0.003)		(0.092)
Democratic dyad		0.014		0.011		0.119
		(0.024)		(0.013)		(0.298)
Joint WTO		0.025		-0.051***		0.068
		(0.025)		(0.014)		(0.208)
Joint EU		0.357***		0.444***		-0.020
		(0.072)		(0.107)		(0.096)
FTA		0.021		0.160***		-0.026
		(0.026)		(0.028)		(0.143)
Leader degree		0.765***		-0.053		-0.393
		(0.140)		(0.139)		(0.335)
Leader centrality		-0.171**		0.111**		0.599*
		(0.085)		(0.054)		(0.339)
Leader clustering		-0.103**		-0.025		-0.123
		(0.043)		(0.022)		(0.282)
Follower degree		1.310***		0.899***		-1.269***
		(0.271)		(0.213)		(0.472)
Follower centrality		0.232*		-0.105		1.404***
		(0.122)		(0.086)		(0.399)
Follower clustering		0.011		0.004		-0.360**
		(0.032)		(0.013)		(0.165)
Leader GDP per capita		0.087**		0.026		-0.028
		(0.044)		(0.017)		(0.319)
Leader GDP		0.000***		0.000***		0.000***
		(0.000)		(0.000)		(0.000)
Follower GDP per capita		0.013		0.034*		0.144
		(0.028)		(0.019)		(0.258)
Follower GDP		0.000**		0.000***		0.000
		(0.000)		(0.000)		(0.000)
Fixed-effects						
ids	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics						
Observations	75,454	75,454	81,681	81,681	9,068	9,068
R^2	0.83099	0.83278	0.80490	0.80810	0.90254	0.90341
Within R^2	0.55079	0.55554	0.60087	0.60742	0.54867	0.55269

Clustered (ids) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

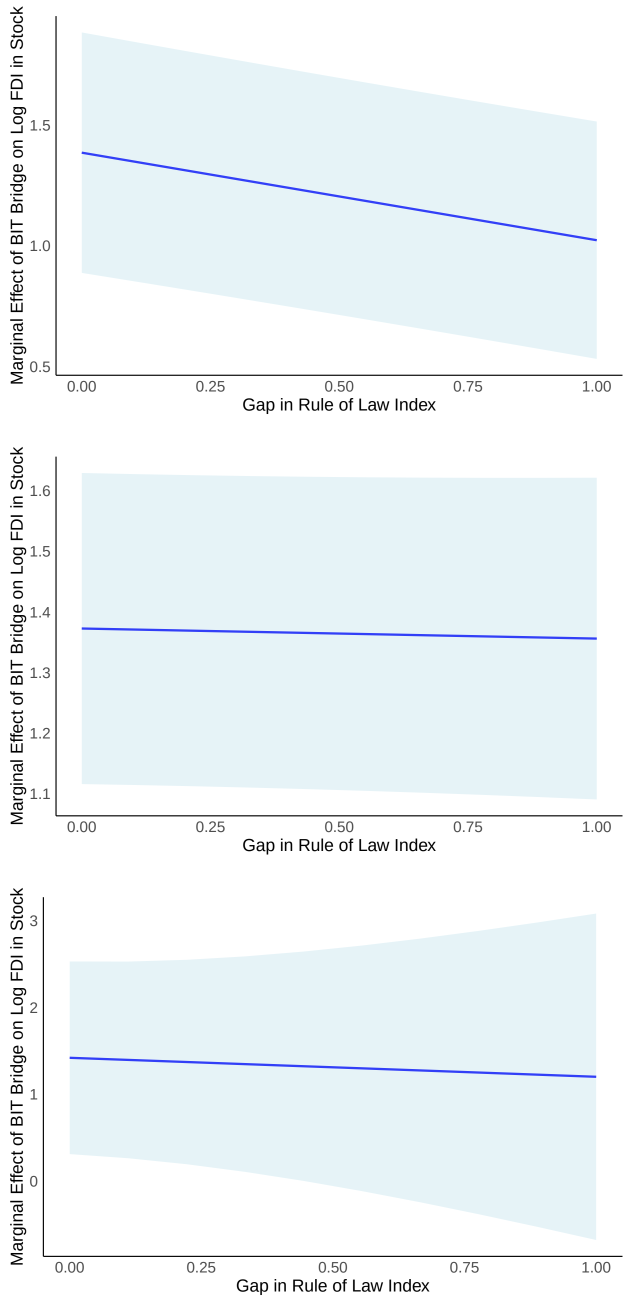


Figure SM.12: Marginal Effect of BIT Bridge on FDI with resepects to Gap in Quality of Legal Institution by Dyad Type. The top figure shows the marginal effect among north-south country dyads. The middle figure shows the marginal effect among south-south country dyads. The bottom figure shows the marginal effect among north-north country dyads