Obsolescent Treaties: Global Value Chains and the Termination of Bilateral Investment Treaties

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Abstract

Global value chain (GVC) integration makes contractual forms of asset protection redundant, leading to the decline of bilateral investment treaties (BITs). As a technological change in trade, GVCs create positive spillovers—such as employment and economic growth—to the host country, which changes the political calculus of expropriation. The host government trades off the benefits of rents from taxation or even expropriation of foreign investment, with the political benefits associated with the increased employment and growth that follow GVCs. As the disaggregated production deepens, the government's commitment problem to not over-tax these firms weakens. This reduces foreign investors' need for BITs as insurance for entry. Deeper GVCs are associated with BIT termination, especially where leaders may care more about worker wages, such as in democracies. Using value-added in trade indicators at the dyad level to measure GVC integration, I find that dyads with deeper GVC integration are more likely to experience BIT termination. Meanwhile, when GVC integration is high, democracies are more likely to unilaterally terminate BITs. This paper reveals how globalization transforms itself through technological change.

Keywords: Global Value Chains; BIT Termination

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1 Introduction

I provide a technology-based explanation for the decline of international institutions. As a technological change in international trade, global value chain (GVC) integration makes contractual forms of asset protection like bilateral investment treaties (BITs) redundant, leading to their termination.

Despite the increasing backlash from states and their domestic audience (Berge, 2020; Brutger and Strezhnev, 2022; Moehlecke and Wellhausen, 2022), the investor-state dispute settlement (ISDS) mechanism incorporated in BITs is one of the most important institutional innovations in the international investment regime. As the ISDS mechanism allows foreign investors to sue the host government directly upon a violation of their rights, it provides investors with insurance against expropriation by host governments. Hence, host governments sign BITs to attract foreign investment. However, the development of GVCs alters such dynamics in the political calculus of expropriation. The host government trades off the benefits of rents from taxation or even expropriation of foreign investment, with the political benefits associated with the increased employment and growth that follow GVCs. When the fragmented production chains generate increasingly greater political benefits, the government becomes unwilling to jeopardize domestic firms' access to production chains and workers' employment opportunities by unfair treatment of foreign investors. As a result, the need for BITs as a contractual form of asset protection declines, leading to the termination of BITs.

Figure 1 shows the over time trend in BIT signatures and terminations. The green solid line captures the number of new BIT signatures, from which we can see that new BIT signatures surged in the 1990s and have been decreasing sharply since then. The blue dashed line indicates the increasing trend in BITs termination. To compare how the trend of BIT status coevolves with GVC integration, the red dotted line shows the total dyadic GVC integration measured by value-added in trade. We can see a sharp increase in the level of GVC integration over time. Figure 1 presents some interesting questions. Why are there treaty signatures and terminations at the same time? Will the decline of the international investment institution continue? And how does GVC contribute to this trend?

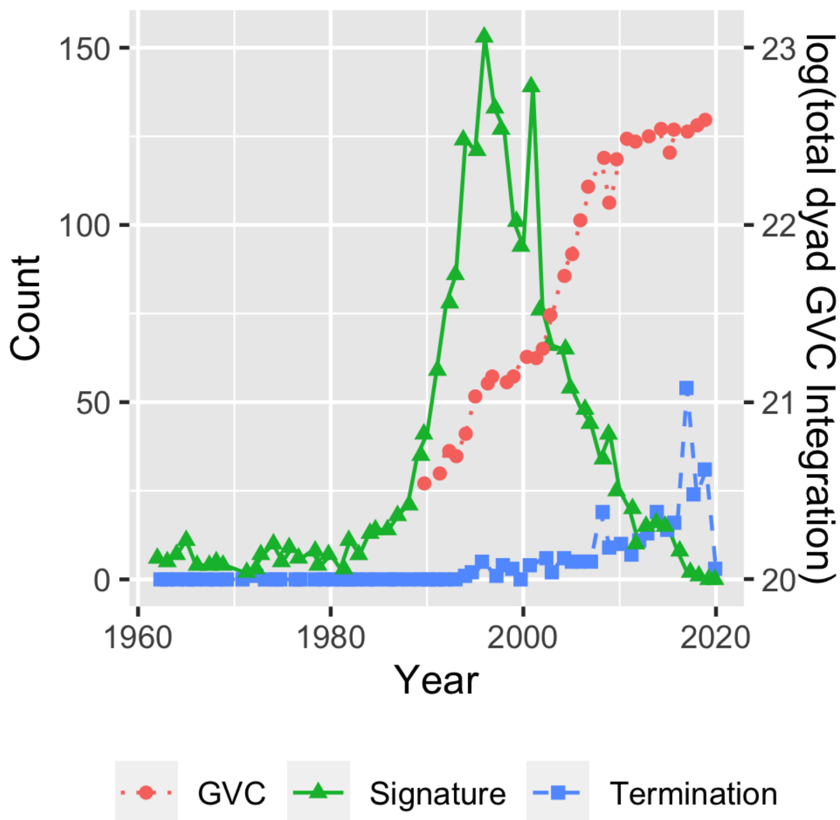

Figure 1: Trend of BIT Status and GVC Integration

To systematically understand how GVC integration affects states' incentives to terminate BITs, I propose a model between a host government and a foreign investor. The model conceptualizes GVCs as positive spillovers that foreign investment generates in the host country's economy. The ISDS mechanism requires the host government to pay a compensation to foreign investors if the host government loses the claim. To incorporate the intuition of the ex post cost mechanism, I assume that BITs take the form of a probability that reverses the host government's regulation, which limits the benefits that the host government can gain from regulations.

When GVC integration is shallow, the host government benefits from expropriating foreign investors without suffering from the loss of political support that the production chains generate. The host government cannot commit to not expropriating. Foreseeing potential expropriation, foreign investors need the insurance from the BIT to enter the market in the host country. Therefore, the host government has incentives to maintain their BITs to attract foreign investment.

When GVC integration grows deeper, the political support generated by GVCs gradually overrides the rents of regulations. As a result, the host government becomes unwilling to jeopardize foreign investment. Anticipating a much smaller probability of high regulations, foreign investors become assured to enter the host country even without the protection from BITs. Hence, the host government terminates the BIT to regain its autonomy without losing foreign investment. GVC integration substitutes for BITs.

BIT terminations are more likely for democracies. As democratic government values the increased employment and economic growth created by GVCs more than autocracies, the commitment of property rights protection is more credible in democracies with deep GVC integration. Hence, the need for BITs to attract foreign investment is lower in democracies than in autocracies. We expect more BIT terminations in democracies than in autocracies when GVC integration is deep.

With a sample of all the dyads that have signed a BIT, I use the value-added in trade indicator to measure GVC integration between the dyad. I find that GVC integration increases the probability of BITs termination. Moreover, when GVC integration is deep, democracies are more likely to unilaterally terminate their BITs than autocracies are. The results are robust to different regression specifications.

I provide a new explanation for the phenomenon of BITs termination (Peinhardt and Wellhausen, 2016; Haftel and Thompson, 2018; Johns et al., 2019; Thompson et al., 2019; Huikuri, 2022). Scholars tend to interpret the phenomenon of BIT terminations as a sign of a backlash against globalization (Walter, 2021). I show how GVC integration as a technological change in international trade makes contractual forms of property rights protection like BITs redundant, which demonstrates not so much a backlash of international cooperation as a transformation of the international investment regime.

I also demonstrate the role of GVCs in transforming international institutions. GVCs have significantly changed the landscape of the international political economy (Kim and

Rosendorff, 2021). Osgood (2018) shows that integration in GVCs increases firms' support for free trade. GVCs can mitigate states' incentives to file anti-dumping cases (Jensen et al., 2015) and to depreciate their currency (Weldzius, 2021). GVCs also improve labor standards in developing countries (Malesky and Mosley, 2018, 2021). Faced with the ISDS, the host government may undo its regulations even after it wins the dispute when GVC integration is deep (Moehlecke, 2020). Lastly, Johns and Wellhausen (2016) present the property rights protection function of GVCs. I provide new empirical evidence in support of the property rights protection function of GVCs. Furthermore, I explore the interaction of GVC integration with international institutions and show that GVCs make international treaties redundant.

2 BITs and the Termination

2.1 BITs

BITs are international agreements between two states to facilitate foreign investment. The creation of BITs is to provide investors from developed countries with protection from expropriation by host governments. The key property rights protection mechanism in BITs is the investor-state dispute settlement (ISDS) mechanism, which allows the foreign investors to file a claim against the host government directly at the International Center for Settlement of Investment Disputes (ICSID). This is different from the case of trade disputes at the World Trade Organization (WTO), where foreign investors do not have the legal standing to challenge possible violations and have to sue the host government through their own government. As the ISDS imposes *ex-post* costs on the host government given a violation (Allee and Peinhardt, 2011), states sign BITs to make up for the insufficiency of domestic institutions in protecting the rights of foreign investors. BITs facilitate the credibility in property rights protection (Arias et al., 2018) and the competition for foreign investment (Elkins et al., 2008).

However, it can be costly for states to maintain a BIT. As the majority of the claims deal with regulatory expropriations, states lose the autonomy of domestic regulations (Pelc, 2017; Moehlecke, 2020), especially in issue areas like environment, health, and safety, leading to a more extensive backlash among the domestic audience. Consistent with such backlash, we observe a decreasing trend of new BIT signatures and an increasing trend of BIT termination since 2000, as is shown in Figure 1.

2.2 The Termination Process

If a state wishes to terminate a BIT, it is required to follow the Vienna Convention on the Law of Treaties (VCLT) and the provisions of the BIT. Under Article 54 of the VCLT, there are two ways to terminate a treaty. First, a treaty may be terminated at any time by the consent of all parties. Second, a unilateral termination may take place in conformity with the treaty provisions. There are two main models of termination clauses in BITs (Bernasconi-osterwalder et al., 2020). One is the "tacit renewal" termination clause. The party needs to notify the other party a period before the treaty expires, which is usually 6 months. Otherwise, the treaty is automatically renewed for an additional term. The other model is the "fixed-term" termination clause. The BIT takes into effect for an agreed period, after which either party can terminate the treaty at any time with a certain period notice beforehand, which is usually one year.

Most BITs include the sunset clause. It allows the treaty to continue its legal effects after its termination for a certain period, which ranges from 10 to 20 years. One thing to notice is that such legal effects only apply to investments established in the host country when the BIT is in force and cannot apply to investors who enter the host country after the BIT is terminated. This suggests that despite the sunset clause, the action of termination is still a meaningful signal of what to expect from the market.

In practice, some states terminate their BITs by consent with the renegotiation of a new BIT, while some terminate their BITs by consent without concluding a new one. Some states unilaterally terminate multiple BITs in batches, such as Ecuador, Indonesia, and India.

2.3 Current Explanations for the Termination

The most prevalent explanation for this phenomenon is based on a bounded rationality framework (Poulsen and Aisbett, 2013). When states sign the treaties, they are not fully aware of what they have signed up for. Rather than dealing with expropriation by host governments, recent trends show that 70% of disputes deal with indirect expropriation where the host government's regulation degrades the value of investment (Pelc, 2017). To avoid costly ISDS disputes, host governments sometimes have to refrain from imposing regulations that are popular among the domestic audience, which is known as the regulatory chilling effect of BITs (Moehlecke, 2020; Pelc, 2017). Hence, the occurrence of potential ISDS disputes helps host governments learn about the boundary in their domestic regulatory space. Therefore, states faced with more ISDS disputes are more likely to renegotiate their BITs (Haftel and Thompson, 2018; Thompson et al., 2019).

Despite the limited information states had when signing the BITs, the bounded rationality framework is insufficient to explain the failure in the design of international institutions. Uncertainty is ubiquitous in international agreements. Due to the nature of these incomplete contracts, many international agreements intentionally incorporate elements of flexibility to increase the stability of the regime (Rosendorff and Milner, 2001; Rosendorff, 2005; Johns, 2014; Pelc and Urpelainen, 2015). The dispute settlement mechanism in BITs is a way for host governments to compensate the investors and reestablish their compliance with the treaty when the need for violation is high. Hence, it is puzzling why the ISDS mechanism fails to incorporate uncertainties. This paper rationalizes states' treaty termination as a deliberate decision due to the development of GVCs, which provides an alternative option for property rights protection.

Another explanation for the termination of BITs focuses on states' bargaining power (Huikuri, 2022). If a state was in a weaker position when signing the treaty, it has incentives and the ability to demand renegotiation or even treaty exit as its bargaining power increases. This paper complements this explanation by demonstrating that GVC integration can be one potential source for the change in bargaining power.

3 Model

The model features two actors: a home firm F and the host government G.

F decides whether to invest in G's territory to maximize its profits. G aims to attract foreign investment to boost its domestic support. G may have incentives to impose regulations after F enters, which hurts F's interests. To solve this time-inconsistency problem, G can maintain a BIT with F's country, which creates some probability of reversing G's regulation and serves as an insurance for F's investment. However, maintaining a BIT constrains G's domestic regulatory autonomy. Hence, G decides whether to maintain the BIT at the cost of its regulatory autonomy.

In this model, GVCs take the form of positive spillover effects of F's investment on G's economy, which creates preference alignment between G and F and potentially mitigates the time-inconsistency problem.

3.1 Sequence

The sequence of the game is as follows:

1. G decides whether to maintain a BIT ($b = 1$) or not ($b = 0$).

2. F determines whether to invest $k \in \{0, K\}$.

3. G observes its political benefits B from imposing regulations r. B is a random draw from the cumulative distribution function $H(\cdot)$.

4. G determines its regulation level $r \in [0, 1]$.

5. If $r \geq 0$, a dispute occurs. Nature determines the outcome based on the probability that F wins given a violation $Pr(win|violation) = \lambda b$. If F wins, r is reversed to 0; otherwise, r remains.

3.2 Payoffs

3.2.1 Firm's Payoff

F aims to maximize its profits by investing in G. Its payoff is as follows:

$$U_F(k) = \underbrace{W(k)}_{\text{Production}} - \underbrace{k}_{\text{Production cost}} - \underbrace{rk}_{\text{Regulation cost}}$$

F decides whether to invest a fixed amount of capital K in G or not: $k \in \{0, K\}$. $W(X)$ is a production function with $W(0) = 0, W'(\cdot) > 0$, and $W''(\cdot) < 0$. F pays a cost k for investing in G. The unit cost of investment is standardized as 1. Due to G's regulation r, F pays an additional cost rk.

3.2.2 Government's Payoff

G determines whether to maintain the BIT, which leads to a loss of autonomy. Its payoff is as follows:

$$U_G(b, r) = \delta \underbrace{\beta(1-r)k}_{\text{Spillover from GVCs}} + \underbrace{Br}_{\text{Political rents}} - \underbrace{\lambda b}_{\text{Autonomy loss}}$$

where G has two choice parameters: the choice of treaty maintenance b and the level of regulation r.

G's utility function has three components. First, $\beta(1-r)k$ captures G's utility from the spillovers from GVCs. G can benefit from GVC integration only when F decides to invest $k = K$. $\beta \in [0, \bar{\beta}]$ indicates G's integration into GVCs with F's country. G's regulation r deteriorates the spillover effects of GVCs integration and leaves G with a smaller share of GVCs' spillovers $\beta(1-r)$. To capture the institutional heterogeneity, δ indicates G's level of democracy, which captures how much G cares about social welfare, and hence GVCs' spillovers.

Second, Br captures G's political rents. B capture the political benefits that G obtains from imposing regulations r. B is a random variable and can only be observed by both G and F after it is realized after F's investment decision. B follows a cumulative distribution function (CDF) $H(\cdot)$, the probability density function (PDF) of which is $h(\cdot)$. To simplify the calculation, let $H(\cdot)$ be the CDF of the uniform distribution $U(0, \bar{B})$.

Lastly, G pays for the autonomy loss if it maintains the BIT ($b = 1$), the level of which is determined by the BIT strength λ. Recall that if G sets regulations r greater than 0, a dispute occurs. λ captures the probability that F wins given a violation. If F wins, r is reversed to 0. Otherwise, r remains. As G's regulatory space is constrained by the size of λ, λ captures the autonomy loss G faces with the presence of a BIT.

3.3 Information Set

The following exogenous parameters are public information to both G and F: GVC integration β, regime type δ, BIT strength λ, and F's production function $W(\cdot)$. The political benefits of regulations B is a random variable, the distribution of which is public information. However, the value of B is only observable after F's investment decision.

3.4 Assumptions

The model has several important assumptions.

First, the model abstracts away from the investors' strategic decision about whether to file an ISDS claim. For example, Pelc (2017) shows that investors may file claims that have a low probability of winning under the consideration that such claims can generate additional payoffs from deterring regulations. The model strips away other factors that may determine the result of disputes (Strezhnev, 2017; Donaubauer et al., 2018; Rao, 2021) to focus our attention on G's treaty choice b.

Second, the model assumes that if investors win the claim, the regulation is reversed.[1] This is inconsistent with the empirical observation by Moehlecke et al. (2019) who show that the host government undoes the regulation only when sued by MNCs from states with

[1] In reality, when investors win the claim, the host government does not need to reverse the regulation. Instead, the host government pays a compensation to the investors. Mathematically, the specification of regulation reversion generates the same results as the specification of compensation. However, the model uses the former so that we do not need an extra parameter for the amount of compensation that the host government has to pay.

deep GVC integration in the host state. Their observation is consistent with this paper's argument that GVC integration protects the property rights of foreign investors and lead to their investment even in the absence of BITs. The model treats regulation reversion as a mechanistic process to demonstrate that even in the absence of GVC privileges in the outcome of a dispute, investors still have incentives to invest once the host government has deep GVC integration.

3.5 Equilibria

The equilibrium concept is Subgame Perfect Nash Equilibrium (SPNE). The following proposition demonstrates the equilibria of the model.[2]

Proposition 1 *Let* $C_1 = \frac{1}{K}H^{-1}(\frac{(2-\lambda)K - W(K)}{(1-\lambda)K})$ *and* $C_2 = \frac{1}{K}H^{-1}(\frac{2K - W(K)}{K})$.

When GVC integration is low: $\beta \in [0, \frac{C_1}{\delta})$, *G never has incentives to maintain a BIT:* $b^* = 0$. *F never invests in G:* $k^* = 0$. *G always sets high regulations:* $r^* = 1$.

When GVC integration is moderate: $\beta \in [\frac{C_1}{\delta}, \frac{C_2}{\delta})$, *G's BIT maintenance choice is* $b^* = \begin{cases} 1 & \text{if } \delta\beta \geq \frac{\sqrt{2\bar{B}\lambda}}{K} = C_3 \\ 0 & \text{otherwise} \end{cases}$. *F invests in G only when a BIT is present:* $k^* = \begin{cases} K & \text{if } b = 1 \\ 0 & \text{if } b = 0 \end{cases}$.

G's regulation decision is $r^* = \begin{cases} 1 & \text{if } B \geq \delta\beta K \text{ or } k = 0 \\ 0 & \text{if } B < \delta\beta K \text{ and } k = K \end{cases}$.

When GVC integration is high: $\beta \in [\frac{C_2}{\delta}, \bar{B}]$, *G terminates its BITs:* $b^* = 0$. *F always invests in G:* $k^* = K$. *G's regulation choice is* $r^* = \begin{cases} 1 & \text{if } B \geq \delta\beta K \\ 0 & \text{if } B < \delta\beta K \end{cases}$.

[2]The solution to the model is shown in Appendix A.

3.6 Hypotheses

I present the equilibria with respect to GVC integration β in Figure 2.[3]

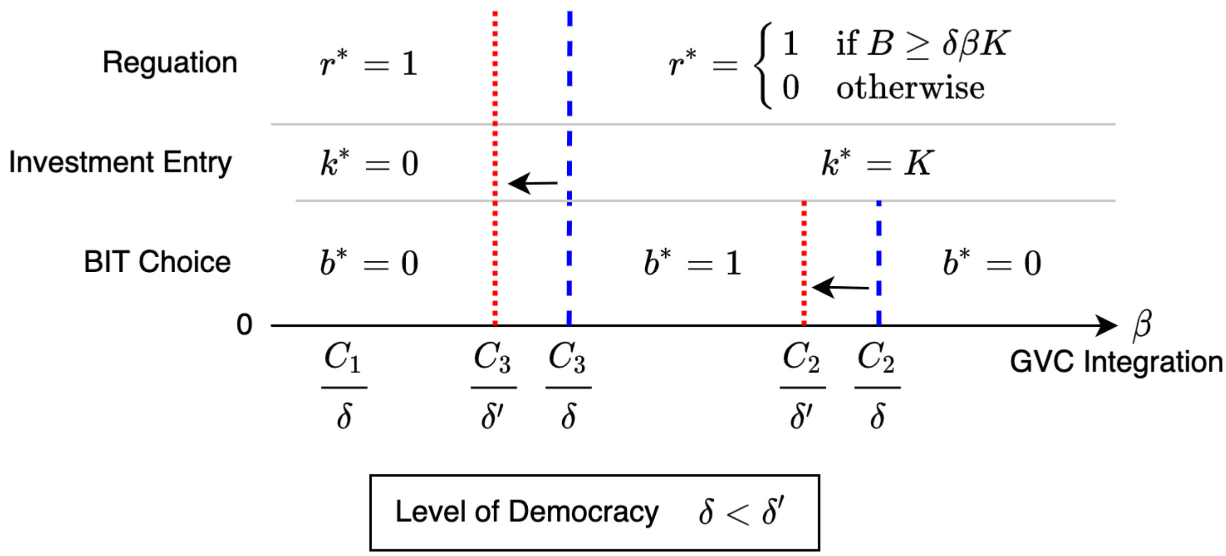

Figure 2: Equilibria with Different Levels of GVC Integration

Holding the regime type δ constant, when GVC integration β is below $\frac{C_3}{\delta}$, G never maintains a BIT and always sets regulation to the highest level, while F never invests. When GVC integration β grows above $\frac{C_3}{\delta}$, G maintains BITs to attract foreign investment and sets high regulations only when the political benefits B from doing so are large enough ($B \geq \delta\beta K$). F always invests due to the insurance provided by the treaty. When GVC integration is deep enough $\beta \geq \frac{C_2}{\delta}$, G terminates the BIT, and F does not exit G's market because F does not expect to see high regulations given GVCs' large spillovers. G imposes high regulations only when the political benefits from regulations are large enough ($B > \delta\beta K$). However, given a relatively large level of GVC integration, the political benefits have to be very large for the violation to happen.

Figure 2 suggests that the sample of dyads that have a BIT in place is the set of dyads

[3]I assume that the maximum political benefits from regulation $\bar{B}$ and the BIT strength λ are neither too small or too big: $\frac{1}{2}H^{-1}(\frac{(2-\lambda)K - W(K)}{(1-\lambda)K})]^2 \leq \bar{B}\lambda \leq \frac{1}{2}[H^{-1}(\frac{2K - W(K)}{K})]^2$. This assumption ensures that $C_1 \leq C_3 \leq C_2$, which focuses our attention on the more interesting dynamics in the argument. The detailed discussion about this assumption is in Appendix A.

whose GVC integration is large enough ($\beta \geq \frac{C3}{\delta}$). To explain the variation of BIT terminations, we examine the sample of dyads whose GVC integration is above the left blue dashed line in Figure 2. Comparing the level of GVC integration to the left and the right of the right blue dashed line, we can see that as GVC integration grows, G is more likely to terminate the BIT, which generates the following hypothesis.

Hypothesis 1 *GVC integration substitutes for BITs.*

To examine the heterogeneous effect of regime type, the red dotted lines in Figure 2 show the changes in thresholds for different equilibria when G becomes more democratic ($\delta < \delta'$). The comparison between the left red dotted line and the left blue dashed line shows that when GVC integration is relatively low, democracies are more likely to maintain their BITs due to the greater utility democratic governments can obtain from GVCs' spillovers. This suggests that democracies have a greater demand for BITs than autocracies when GVC integration is low. This generates the following hypothesis:

Hypothesis 2 *When GVC integration is low, democracies are less likely to terminate BITs than autocracies.*

The comparison between the right red dotted line and the right blue dashed line of Figure 2 shows that when GVC integration is high, democracies are more likely to terminate their BITs than autocracies. This is because investors believe that democracies are less likely to impose high regulations when democratic governments can benefit more from GVC integration due to their investment. The following hypothesis summarizes this dynamic.

Hypothesis 3 *When GVC integration is high, democracies are more likely to terminate BITs than autocracies.*

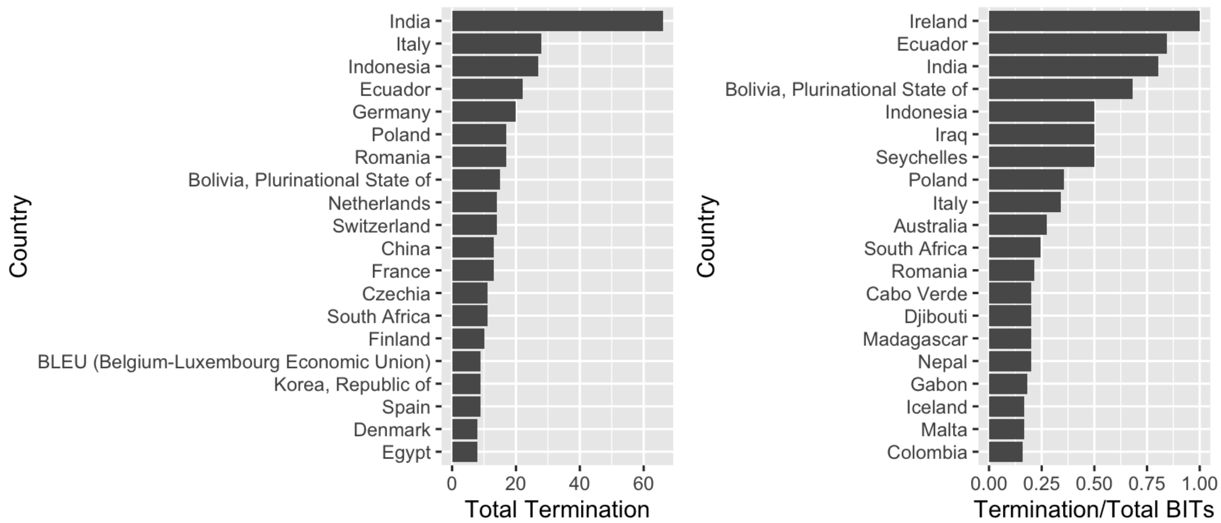

Figure 3: Top 20 Countries with the Largest Number/Share of Termination

4 Data

4.1 BIT Terminations

The BITs data is obtained from the Mapping of IIA Content database from the United Nations Conference on Trade and Development (UNCTAD) website.[4] The dataset provides detailed information on 2539 BITs, among which 280 have experienced a termination. The type of termination includes expiration (2.9%), replacement by new treaties (33.6%), termination by consent (6.9%), and unilateral termination (56.8%).

Figure 3 shows the top 20 countries with the largest number and share of termination. We can see that Bolivia, Ecuador, India, Indonesia, Italy, Poland, and South Africa all ranked high in both the number and share of BIT termination.

To test which countries are more likely to unilaterally denounce BITs, I collected information about the party in a dyad that unilaterally terminates the BIT based on news reports, policy reports, and academic papers.[5] The countries that unilaterally terminate the most

[4]UNCTAD, Mapping of IIA Content, available at https://investmentpolicy.unctad.org/international-investment-agreements/iia-mapping

[5]There are four treaties that I did not find information about the terminating party: El Salvador-Nicaragua BIT (1999), France-Israel BIT (1983), Hungary-Israel BIT (1991, Malaysia-Norway BIT (1984). These treaties were terminated between 1995 to 2008, earlier than the majority of observed terminations. They were not included in the analysis given the missing data issue.

frequently are India, Indonesia, Ecuador, Bolivia, South Africa, Italy, Poland, Netherland, and Malta. These are all democratic countries, which is consistent with Hypothesis 3.

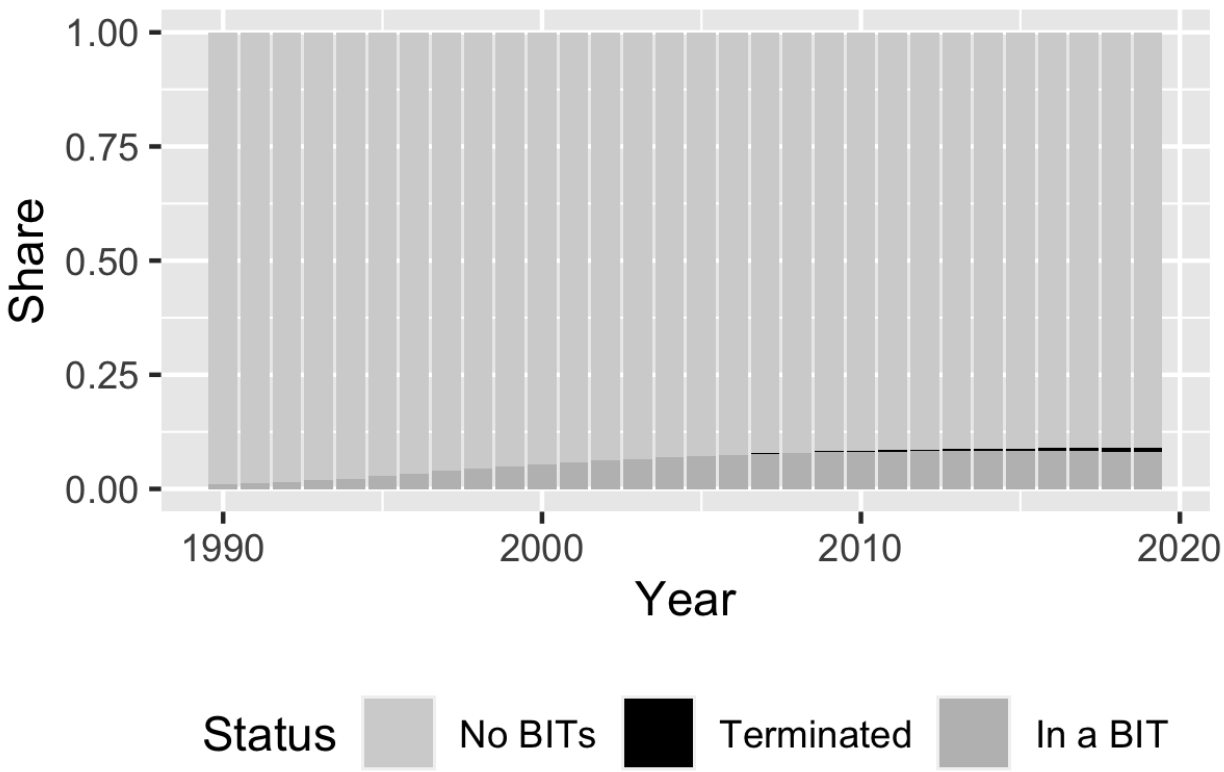

Figure 4: Distribution of the BIT Status Among All Dyads

To demonstrate the sample under analysis, Figure 4 shows the distribution of the BIT status among all dyads. More than 90% of dyads do not have a BIT. Only about 1% to 7% of the dyads have a BIT. BIT termination grows from almost zero to 0.8% of all dyads. The following analysis focuses on the dyads that have a BIT or have terminated a BIT.

4.2 Global Value Chains (GVCs)

Broadly speaking, "a global value chain consists of a series of stages involved in producing a product or service that is sold to consumers, with each stage adding value, and with at least two stages being produced in different countries; a firm participates in a GVC if it produces at least one stage in a GVC" (Antràs, 2020, p. 3).[6] From a narrower perspective, GVCs

[6]One of the most common examples of a GVC is how an iPhone is produced.

feature the incomplete contract nature of global production and emphasize the production with customized inputs and destined exports, which is termed relational contracting (Antràs, 2016, 2020).

As this paper conceptualizes GVC integration as a positive spillover effect of foreign investment on the host country's economy, an ideal measure of GVC integration should capture such spillovers. Among different measures of GVCs,[7] this paper uses the value-added in trade indicators, which are the most widely used measure of GVCs. These measures break down the global production process of a product and calculate the value-added in each stage of the production. Hence, these measures capture how much value a country brings to a product and can be good indicators of the spillover effect of GVC integration on the domestic economy.

The data is obtained from the UNCTAD-Eora Global Value Chain Database (Casella et al., 2019). This database constructs a multi-region input-output table (MRIO) based on national input-output tables or supply/use tables and international trade statistics.[8] The MRIO table allows us to obtain information about the dyad-level value-added trade indicators, including Domestic Value Added (DVA), Foreign Value Added (FVA), and Indirect Value Added exports (DVX). Specifically, DVA in exports is the value-added in exports whose outputs are produced by domestic industries. FVA in exports is the value-added in exports whose outputs are produced by foreign industries, which is also called the backward participation in GVCs. DVX in exports is the value-added that is embodied in the exports of other countries and upstream contributions of DVA of other industries. It is also known as the forward participation in GVCs. This paper uses the sum of FVA and DVX to measure a country's GVC integration with another country.[9] The unit of analysis is at the dyad-year level.[10]

[7]Table B.1 shows a survey of different measures of GVCs and their data sources.

[8]Due to data quality issue, the following countries are excluded from the analysis: Belarus, Benin, Burkina Faso, Congo, Eritrea, Ethiopia, Guinea, Guyana, Libya, Moldova, Serbia, Sudan, Yemen, and Zimbabwe.

[9]The results are robust using either FVA or DVX as a measure of GVC integration.

[10]The GVCs measure is also available at the industry level. However, this paper does not use the more refined information for two reasons. First, the model's prediction about the treaty is at the country level, so the industry-level GVCs measure does not match the theory well. Even though we can construct the disputes at the industry level, there is a huge harmonization problem due to different countries' reporting standards, which is the second reason why a more aggregate measure is a better one.

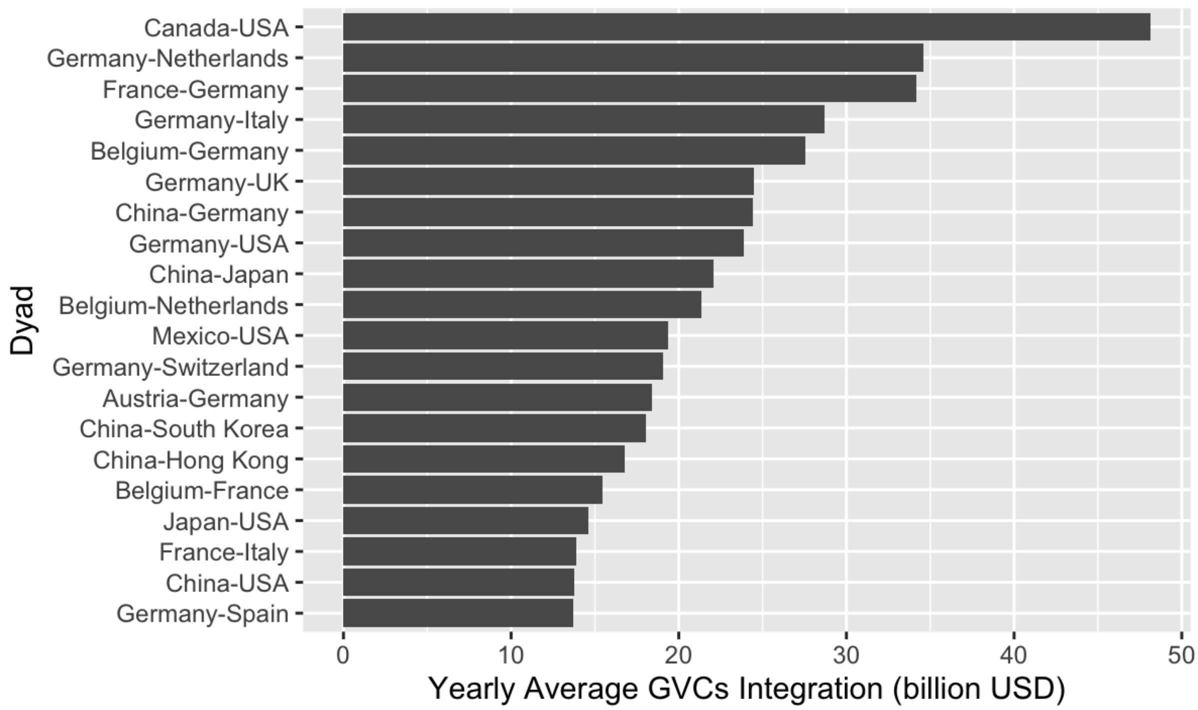

Figure 5: Top 20 Dyads with the Greatest Yearly Average GVC integration

In terms of the variation of GVCs, Antràs and de Gortari (2020) show that the optimal location for production at a stage of the GVC is a function of the marginal costs of production in the host country and the proximity to the precedent and the subsequent locations of production, suggesting the importance of geographic location for the degree of GVC integration. Figure 5 shows the top 20 dyads with the greatest yearly average GVC integration, from which we can infer that the level of GVC integration can be driven by the magnitudes of GDP of the countries in the dyad and the geographic distance between the two countries.

To further explore the relationship between GVC integration and BIT status, Figure 6 plots the yearly average GVC integration for dyads that never signed a BIT, dyads with a never-terminated BIT, and dyads with a terminated BIT. First, the comparison between dyads with no BIT (red dotted line) and dyads with a terminated BITs (blue dashed line) shows that BIT terminations occur for dyads that have experienced a much greater increase in GVC integration, leading to an even greater degree of GVC integration than the rest two groups. Second, comparing dyads with no BITs termination (green solid line) with dyads with a termination (blue dashed line), we can see that the blue dashed line is always higher

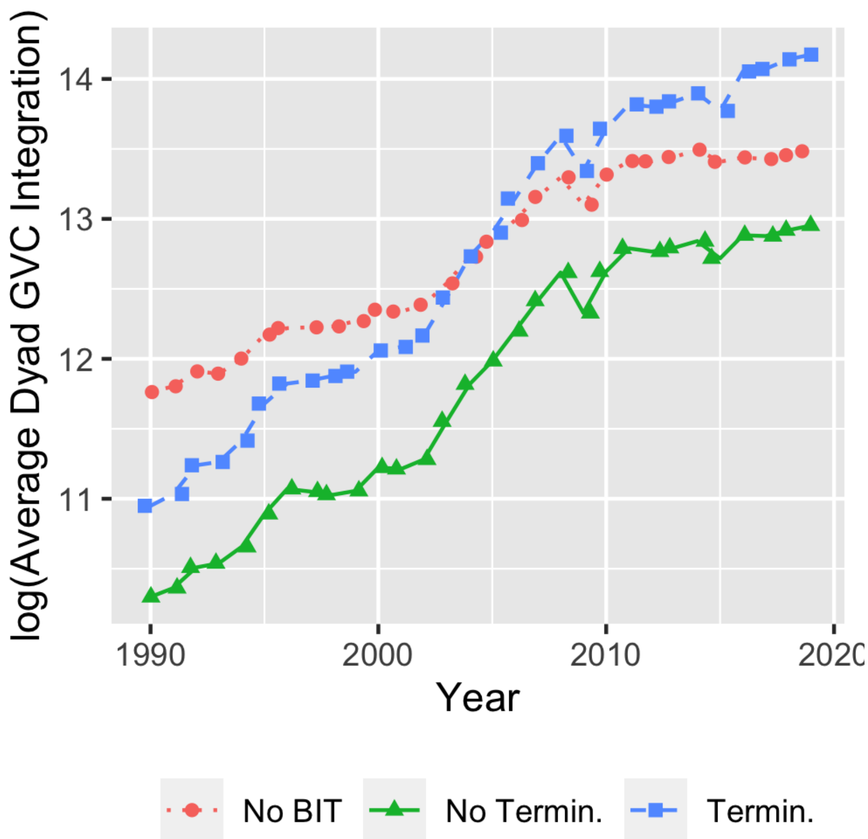

Figure 6: Trend of GVC Integration by BIT Status

than the green solid line, implying that some degree of GVC integration can be a necessary condition for BITs termination. Lastly, the comparison between dyads with no BIT (red dotted line) and dyads with no BIT termination (green solid line) shows that dyads with no BIT always have a greater level of GVC integration, suggesting that once GVC integration is deep enough, BITs are not necessary.

5 Results

5.1 Does GVC integration Substitute for BITs?

Given the right-censored nature of the BITs data, this paper uses the Cox proportional hazard model with time-dependent covariates to test how GVC integration affects BITs termination. To test the substitution relationship between GVC integration and BITs in Hypothesis 1, this paper employs a sample of undirected dyads covering years since a BIT has been in force. The regression equation is as follows:

$$h(t|Z_{ij,t-1}) = h_0(t)e^{\beta_1 GVC_{ij,t-1} + Z_{ij,t-1}\Gamma + \theta_i + \lambda_j + \gamma_y}$$

$h(t|Z_{ij,t-1})$ represents the conditional probability of having a BIT termination at time t, conditional on having survived to time t. e^{β_1} captures the hazard ratio and represents how much more likely a BIT termination will occur given one unit increase in GVC integration. It should be greater than 1 to lend support for Hypothesis 1. The key assumption of the Cox proportional hazard model is that hazard rates are proportional across units, which is tested using the Schoenfeld test.[11]

$GVC_{ij,t-1}$ is the dyad-year level measure of GVC integration between country i and j in time $t-1$ in logarithms. $Z_{ij,t-1}$ is a set of control variables. Following Haftel and Thompson (2018), the control variables include the gap in GDP per capita between the dyad, the gap in the population between the dyad, the gap in Polity IV, cumulative disputes of both countries, whether there is a PTA between the dyad, whether any party is a common law country, whether both parties are EU members, and the sum of FDI inflows standardized by GDP.[12] θ_i, λ_j, and γ_y capture country i, country j, and year-specific frailty parameters drawn from a Gaussian distribution with mean zero. All the independent variables are lagged for one year to avoid simultaneity bias.

Table 1 shows the results.[13] Column (1) shows the results with a set of basic control variables. Column (2) and (3) add more control variables to the regression. Due to the missing data issue in the FDI inflow variable, Column (4) replicates the regression in Column (2) using Column (3)'s sample to make sure that the results are not driven by the change in the sample. As we can see, a 100% increase in GVC integration is correlated with a 19 to

[11] The results of the test are shown in Figure C.1. The frailty terms are not checked in the test.

[12] The data of GDP per capita and the population is collected from the World Development Indicators (WDI) of the World Bank (https://datacatalog.worldbank.org/dataset/world-development-indicators). The regime data is collected from the Center for Systemic Peace (https://www.systemicpeace.org/polityproject.html). The PTA data is collected from Dür et al. (2014). The common law data is collected from LaPorta et al. (2008). The FDI inflow data is from UNCTADstat (https://unctadstat.unctad.org/EN/BulkDownload.html).

[13] There are 840 observations related to BIT renegotiations. The results are robust removing these observations.

Table 1: GVCs Integration and BITs Termination

	Termination of BIT			
	Full sample			Sample in (3)
	(1)	(2)	(3)	(4)
log(1+GVC)	1.242***	1.197***	1.190**	1.196**
	(4.80)	(3.34)	(2.93)	(3.03)
Gap of GDP per capita	1.019	1.033	0.989	0.990
	(0.50)	(0.84)	(-0.24)	(-0.23)
Gap of Population	1.187***	1.268***	1.237**	1.239**
	(2.61)	(3.33)	(2.82)	(2.83)
Gap of Polity IV	0.994	1.004	1.013	1.013
	(-0.45)	(0.27)	(0.80)	(0.79)
Cumulative disputes		0.974	0.984	0.983
		(-0.41)	(-0.25)	(-0.27)
PTA		1.363*	1.510**	1.506**
		(1.80)	(2.14)	(2.12)
Dyad total exports		1.003	0.987	0.986
		(0.12)	(-0.45)	(-0.49)
Common law		0.932	1.085	1.068
		(-0.28)	(0.30)	(0.24)
Between EU members		2.108**	2.239**	2.209**
		(2.29)	(2.35)	(2.32)
Sum(ΔFDI inflow/GDP)			0.520	
			(-0.62)	
Observations	33,241	33,241	29,780	29,780
Party 1 RE	Y	Y	Y	Y
Party 2 RE	Y	Y	Y	Y
Year RE	Y	Y	Y	Y
AIC	289.39	291.89	261.56	263.08
BIT	265.38	250.74	219.42	224.18

Note: *p<0.1; **p<0.05; ***p<0.01
Coefficients greater than 1 indicate a positive relationship, and vice versa.
Z scores in parentheses.

24% increase in the probability of a BIT termination. This is consistent with Hypothesis 1.

In terms of the control variables,[14] the gap in population size in the dyad significantly increases the probability of BIT termination. However, the difference in regime types does not affect the probability of termination. Interestingly, the results show that cumulative ISDS disputes within the dyad do not increase the probability of termination, which is inconsistent with the finding by Haftel and Thompson (2018). In terms of the PTAs, we can see that the trade agreement also increases the probability of BITs termination. As both Kim (2021) and Zeng et al. (2021) show that PTAs increase GVC integration, the positive

[14] Given that some control variables are post-treatment to other control variables, the interpretation of the coefficients should be taken with a grain of salt.

relationship between the existence of a PTA and BITs termination is consistent with the substitution argument of the paper. The variable EU members captures a special set of BITs terminations. As is shown in the dispute between the Dutch company *Achmea* and the Slovak Republic, the European Commission realized the incompatibility between the arbitration clause in BITs and the autonomy of EU law and has been urging its member states to terminate their intra-EU BITs voluntarily. The positive coefficient of EU members is consistent with this situation. Lastly, when unilaterally terminating their BITs, some states claim that BITs do not increase FDI inflows (Olivet, 2017), suggesting that FDI inflow may reduce the probability of BITs termination. Column (3) in Table 1 controls for the increase in FDI inflows standardized by GDP and shows that increase in FDI inflows are not correlated with BITs termination. This is consistent with the model prediction that when GVC integration grows above $\frac{C2}{\delta}$, BIT terminations do not affect the investment decisions.

Table 2 examines the robustness of the above results with different regression specifications. Using the same sample as in the survival analysis,[15] Column (1) to (4) employ the Ordinary Least Squares (OLS) model and control for different sets of control variables and fixed effects. We can see that the coefficient estimates for GVC integration are significantly and consistently positive. Using the Logistic regression model, Column (5) shows that GVC integration consistently increases the probability of BITs termination.

5.2 The Heterogeneous effect of Regime Type

To examine Hypothesis 2 and 3 about the heterogeneous effect of regime type on countries' termination decisions, this section employs a directed dyad-year sample. The regression equation is similar to the one in Section 5.1. There are two key differences. First, the event to be examined in this test is whether a country decides to terminate its BIT with

[15]The results are robust using a full sample where all dyads remain in the sample. More specifically, for dyads that terminated their BITs, the dependent variable remains to be 1 until the end of the period. The results are shown in Table C.1. In addition, there are 858 observations related to BIT renegotiations. The results are robust removing these observations.

Table 2: GVC Integration and BITs Termination: Survival Analysis Sample

	Dependent variable:				
	Terminated				
	OLS	OLS	OLS	OLS	Logit
	(1)	(2)	(3)	(4)	(5)
log(1+GVC)	0.002***	0.002***	0.008***	0.011***	0.256***
	(0.0005)	(0.0005)	(0.002)	(0.004)	(0.086)
Gap in GDP per capita	0.0005	0.0005	0.002***	0.003***	0.0002
	(0.0004)	(0.0003)	(0.001)	(0.001)	(0.031)
Gap in total population	0.001**	0.001**	0.0003	0.00005	0.280***
	(0.0003)	(0.0003)	(0.001)	(0.002)	(0.053)
Gap in Polity IV	0.00002	0.0001	0.0001	0.0003	−0.030**
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.015)
Accumulative ISDS disputes		0.001	0.002	0.003*	0.061
		(0.001)	(0.001)	(0.002)	(0.045)
PTA		0.0001	−0.002	−0.003	0.426**
		(0.001)	(0.002)	(0.003)	(0.176)
Common law		0.00000			0.396**
		(0.002)			(0.177)
Both EU members		0.007***			0.622**
		(0.002)			(0.268)
Total dyadic exports				−0.0005	−0.061
				(0.001)	(0.093)
Sum(FDI inflow/GDP)				−0.004	−2.200
				(0.005)	(1.518)
Year FE	Y	Y	Y	Y	N
Party 1 FE	Y	Y	N	N	N
Party 2 FE	Y	Y	N	N	N
Dyad FE	N	N	Y	Y	N
Observations	34,693	34,693	34,693	25,265	25,265
R^2	0.030	0.031	0.062	0.077	
Adjusted R^2	0.022	0.023	0.012	0.014	
Akaike Inf. Crit.					1,952.008

Note: *p<0.1; **p<0.05; ***p<0.01
Standard error clustered at the dyad level in parentheses.

the other country in the dyad rather than whether termination occurs between the dyad. To code this variable, I explore the information about the type of BIT termination in the UNCTAD dataset with a supplementary self-collected dataset about the party who unilaterally denounces the treaty. I only examine unilateral termination cases because it is hard to infer which party initiated the process in cases of expirations, terminations by consent, and renegotiations.

Second, instead of focusing on the impact of GVC integration on BITs termination, I examine the heterogeneous effect of regime type when GVC integration is high. To provide support for Hypothesis 3, we expect a positive coefficient on the interaction between regime type and GVC integration.

In terms of control variables, since we are interested in the identity of the terminating party, the regression includes a set of country characteristics, including GDP per capita, total population, cumulative disputes between the dyads, whether a PTA exists between the dyad, whether the state has common law origin, whether the state is an EU member, and FDI inflow standardized by GDP.

Table 3 displays the results. Column (1) shows the results without the interaction term. Column (2) includes the interaction term. We can see that the effect of GVC integration is mostly driven by democracies. Specifically, given the level of GVC integration, 1 point increase in Polity IV score is correlated with a 2 to 4% increase in the probability of BIT termination, which supports Hypothesis 3.

Table 3: GVCs Integration and Unilateral BITs Termination

	Unilateral Termination of BIT					
	Full sample		Sample in (3)			No EU members
	(1)	(2)	(3)	(4)	(5)	(6)
log(1+GVC)	1.044	0.791	0.846	0.834	0.827	0.740
	t = 1.019	t = −2.522**	z = −1.11	z = −1.09	z = −1.16	z = −1.38
Polity IV	1.336	0.890	0.817	0.943	0.796	0.846
	t = 7.619***	t = −0.987	z = −1.06	z= −1.22	z = −0.69	z = 0.233
GVC * Polity		1.034	1.020	1.032	1.035	1.044
		t = 3.244***	z = 2.04**	z = 1.64*	z = 1.82*	z = 1.66*
GDP per capita	0.932	0.928	0.997	0.703	0.746	0.576
	t = −1.378	t = −1.470	z = −0.03	z = −2.62***	z = −2.36**	z = −3.92***
Population	2.980	3.030				
	t = 11.921***	t = 12.044***				
Cumulative disputes	0.999	0.993	1.025	1.042	1.034	1.004
	t = −0.015	t = −0.136	z= 0.44	z = 0.77	z=0.61	z = 0.06
PTA	1.171	1.165	0.988	1.064	1.033	0.839
	t = 0.865	t = 0.837	z = −0.06	z = 0.30	z = 0.16	z = −0.75
Common law	0.370	0.348				
	t = −3.012***	t = −3.205***				
EU members	0.233	0.227				
	t = −4.318***	t = −4.407***				
Sum(FDI inflow/GDP)				0.018		0.024
				z = −0.89		z = −0.73
Country RE	N	N	Y	Y	Y	Y
Year RE	N	N	Y	Y	Y	Y
Observations	66,561	66,561	66,561	62,902	62,902	40,081
R^2	0.006	0.006				
Wald Test	304.590*** (df = 8)	316.370*** (df = 9)				
AIC			619.40	593.58	586.95	532.69
BIC			596.40	569.28	565.34	510.09

Note: *p<0.1; **p<0.05; ***p<0.01
Coefficients greater than 1 indicate a positive relationship, and vice versa.

The rest columns of Table 3 examine the robustness of the results.[16] Column (3) controls for country and year random effects. Column (4) controls for FDI inflow. Due to the missing data issue in the FDI inflow variable, Column (5) runs the same regression as in Column (3) but with the same sample as in Column (4). Lastly, as many BIT terminations are related to the terminations of intra-EU BITs, the results could be driven by the democratic countries in the EU. Column (6) replicates the regression in Column (5) excluding countries that are EU members. In all these settings, we see that the coefficient estimates of the interaction term between GVC integration and regime type are significantly greater than 1. One thing to notice is that the statistical significance level decreases sharply as more controls are included in the regression. This could be due to the low variation in countries' democratic levels over time.

To check the robustness of the findings in the survival analysis, Table 4 employs the OLS and Logistic regression specifications.[17] Column (1) to (6) presents the OLS regression results. Column (1) controls for the basic set of country characteristics. Column (2) controls for dyadic factors, including previous ISDS disputes, the existence of PTA, and whether both countries are EU members. Column (3) to (5) examines the influence of economic indicators, such as exports to the BIT partner country and total FDI inflows. Column (6) controls for dyad fixed effect, which is the most comprehensive specification among all the OLS specifications. Lastly, Column (7) and (8) employs the Logistic specifications.

In general, the interaction term between GVC integration and regime type has positive coefficients, suggesting that given a certain level of GVC integration, democracies are more likely to terminate their BITs than autocracies. This is consistent with Hypothesis 3. In addition, the regime type variable has consistent negative coefficients across different specifications, suggesting that when GVC integration is low, democracies have stronger incentives to maintain BITs due to their high social welfare concerns.

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[16]When including the frailty terms, some control variables makes the estimation fail. Hence, Table 3 removes these variables. Table 4 conducts robustness check using other specifications to ensure that the results are not driven by the omission of these control variables.

[17]The results are robust and even stronger using the full sample, where all dyads remain in the sample until the end of the period. Table C.2 shows the results.

Table 4: GVC Integration and Unilateral BITs Termination: Robustness Check

	Dependent variable:							
	Incentive to Terminate							
	OLS	OLS	OLS	OLS	OLS	OLS	Logit	Logit
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(1+GVC)	−0.0001	−0.0002	−0.00001	−0.0001	−0.00003	0.006	−0.078	0.119
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.006)	(0.089)	(0.118)
Polity IV	−0.001	−0.0005	−0.001	−0.001*	−0.001*	−0.002*	−0.094	−0.122
	(0.0004)	(0.0003)	(0.0004)	(0.0003)	(0.0004)	(0.001)	(0.114)	(0.121)
GVC * Polity IV	0.0001**	0.0001**	0.0001**	0.00004*	0.0001*	0.0001	0.023**	0.024**
	(0.00003)	(0.00003)	(0.00003)	(0.00002)	(0.00003)	(0.0001)	(0.010)	(0.010)
GDP per capita	0.001	0.001	0.004	0.001	0.003	0.002	0.133***	−0.158**
	(0.001)	(0.001)	(0.004)	(0.001)	(0.003)	(0.003)	(0.037)	(0.074)
Total population	0.006	0.006	0.009	0.004	0.007	0.010	0.911***	0.869***
	(0.005)	(0.005)	(0.008)	(0.005)	(0.007)	(0.009)	(0.059)	(0.066)
Accumulative ISDS disputes		0.001	0.001	0.001	0.001	0.002	0.082**	0.090**
		(0.0005)	(0.0004)	(0.0005)	(0.0004)	(0.001)	(0.039)	(0.042)
PTA		−0.001	−0.001	−0.001	−0.0005	−0.003	0.008	0.098
		(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.186)	(0.210)
Both EU members		0.002	0.002	0.002	0.002		0.729**	0.721**
		(0.001)	(0.002)	(0.001)	(0.002)	(0.000)	(0.358)	(0.365)
Exports to BIT partner			−0.0002		−0.0002	−0.0002		−0.232***
			(0.0002)		(0.0002)	(0.0002)		(0.080)
Sum(FDI inflow/GDP)				0.002	0.002	0.004		−6.067
				(0.003)	(0.003)	(0.004)		(5.098)
Year FE	Y	Y	Y	Y	Y	Y	N	N
Country FE	Y	Y	Y	Y	Y	Y	N	N
Dyad FE	N	N	N	N	N	Y	N	N
Observations	70,697	70,697	59,819	66,910	56,987	56,987	70,697	56,987
R^2	0.041	0.041	0.043	0.044	0.046	0.061		
Adjusted R^2	0.038	0.039	0.041	0.041	0.043	0.027		
Akaike Inf. Crit.							1,657.621	1,375.405

Note: *p<0.1; **p<0.05; ***p<0.01

Standard error clustered at the dyad level in parentheses.

Figure 7 shows the marginal effect of regime type on BITs termination based on the specification in Column (6) in Table 4. The dark shaded area is the confidence interval at 90%, while the light shaded area corresponds to the 95% significance level. Although the results about the heterogeneous effects of regime type in Figure 7 are not as strong as the results in Section 5.1, which could be due to the low variation in states' democratic levels, the patterns are generally consistent with Hypothesis 2 and 3.

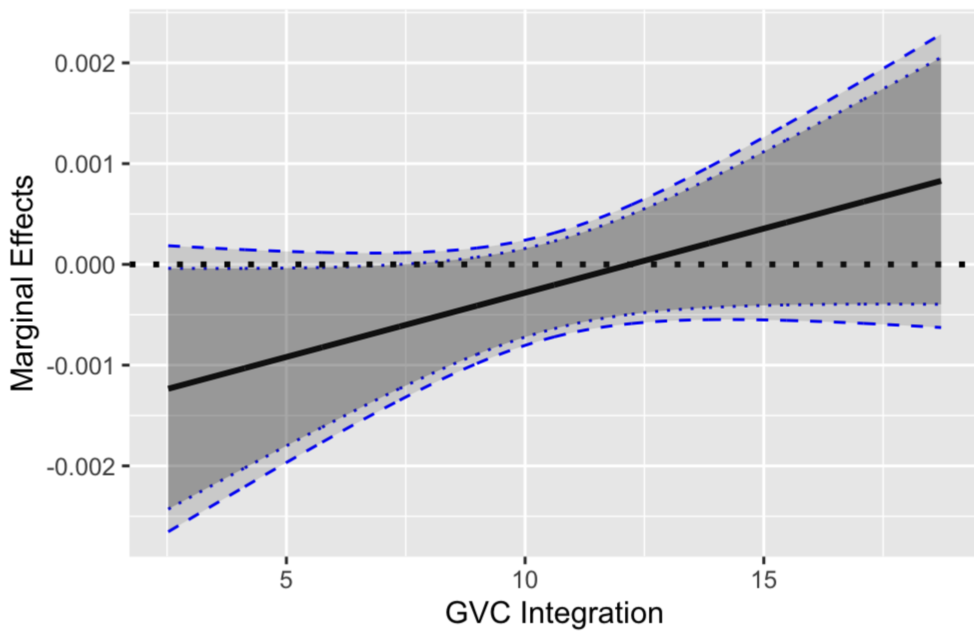

Figure 7: The Marginal Effect of Regime Type on BITs Termination

6 Conclusion

States' integration into GVCs can lead to BITs termination. As GVCs create positive spillovers to the host country's economy, the host government with high social welfare concerns values the positive spillovers that foreign investors can bring to domestic firms and workers. Hence, as the economy grows increasingly integrated into the GVC, the host government becomes more unwilling to expropriate foreign investors. As a result, the need for BITs as a contractual form of property rights protection declines, leading to the treaty termination.

I show the heterogeneous effect of regime type on BITs termination. As democratic governments have greater social welfare concerns, they value the positive spillovers from GVCs more. When GVCs provide enough positive spillovers, democratic governments are less willing to set high regulations to harm foreign investors than autocracies are, suggesting that democracies can more credibly commit to property rights protection. As GVCs grow, the need for BITs decreases for democracies. Therefore, democracies are more likely to terminate their BITs when their GVC integration is deep.

I find that GVC integration leads to a greater probability of BITs termination. In addition, when GVC integration is shallow, democracies are less likely to unilaterally denounce BITs than autocracies. However, when GVC integration grows deeper, democracies are more likely to unilaterally denounce BITs than autocracies.

I demonstrate how GVC integration as a technological change in international trade can make the contractual form of property rights protection redundant. This offers a more nuanced picture of the backlash against globalization. Instead of interpreting BITs termination as states' withdrawals from international cooperation in the issue area of international investment, I suggest that states terminate their investment treaties once they find a less costly option to address the commitment problem in international investment. As GVC integration can reshape how international trade and investment take place, the phenomenon of BIT terminations reveals how globalization transforms itself through technological change.

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A Solution to the Model

A.1 For G's decision about the level of regulation:

FOC wrt r: $-\delta\beta k + B \rightarrow r^* = \begin{cases} 1 & \text{if } B \geq \delta\beta k \\ 0 & \text{if } B < \delta\beta k \end{cases}$

With Prob. $1 - H(\delta\beta k)$, $r^* = 1$. With Prob. $H(\delta\beta k)$, $r^* = 0$.

A.2 For F's decision about investment:

With a BIT:

$EU_F(k = K|q = 0) = [1-H(\delta\beta K)][\lambda(W(K)-K)+(1-\lambda)(W(K)-2K)]+H(\delta\beta K)(W(K)-K)$

$EU_F(k = 0|q = 0) = 0$

F invests iff $EU_F(k = K|q = 0) \geq EU_F(k = 0|q = 0) \rightarrow$

$$H(\delta\beta K) \geq \frac{(2-\lambda)K - W(K)}{(1-\lambda)K}$$

$$\delta\beta \geq \frac{1}{K}H^{-1}(\frac{(2-\lambda)K - W(K)}{(1-\lambda)K}) = C_1$$

Without a BIT:

$EU_F(k = K|q = 1) = [1 - H(\delta\beta K)][W(K) - 2K] + H(\delta\beta K)(W(K) - K)$

$EU_F(k = 0|q = 1) = 0$

F invests iff $EU_F(k = K|q = 1) \geq EU_F(k = 0|q = 1) \rightarrow$

$$H(\delta\beta K) \geq \frac{2K - W(K)}{K}$$

$$\delta\beta \geq \frac{1}{K}H^{-1}(\frac{2K - W(K)}{K}) = C_2$$

In summary,

$$k^* = \begin{cases} K & \text{if } \delta\beta \geq \frac{1}{K} H^{-1}(\frac{(2-\lambda)K - W(K)}{(1-\lambda)K}) = C_1, \ and \ q = 0 \\ K & \text{if } \delta\beta \geq \frac{1}{K} H^{-1}(\frac{2K - W(K)}{K}) = C_2, \ and \ q = 1 \\ 0 & \text{Otherwise} \end{cases}$$

We assume that $W(K) - K > 0$, which means $C_1 < C_2$.

A.3 For G's decision about treaty maintenance:

Case 1 $\delta\beta \in [0, C_1) \rightarrow k^* = 0, r^* = 1, b^* = 0$

Case 2 $\delta\beta \in [C_1, C_2)$

$\rightarrow k^* = \begin{cases} K & \text{if } b = 1 \\ 0 & \text{if } b = 0 \end{cases}$

$EU_G(b = 0|\delta, \beta) = E(B) + \lambda = \int_0^{+\infty} xh(x)\,dx$

$EU_G(b = 1|\delta, \beta) = E(B|B \geq \delta\beta K) + E(\delta\beta K|B < \delta\beta K) = \int_{\delta\beta K}^{+\infty} xh(x)\,dx + \int_0^{\delta\beta K} \delta\beta K h(x)\,dx - \lambda$

$b = 0$ iff $EU_G(b = 0|\delta, \beta) \geq EU_G(b = 1|\delta, \beta) \rightarrow$

$$\lambda \geq \int_0^{\delta\beta K} h(x)(\delta\beta K - x)\,dx$$

To simplify the calculation, let H be a the CDF of a uniform distribution. Hence, $h(x) = \begin{cases} \frac{1}{\bar{B}} & 0 \leq x \leq \bar{B} \\ 0 & x \geq \bar{B} \end{cases}$, which gives us $\lambda \geq \frac{(\delta\beta K)^2}{2\bar{B}} \rightarrow \delta\beta \leq \frac{\sqrt{2\bar{B}\lambda}}{K} = C_3$. Therefore,

$$b^* = \begin{cases} 0 & \text{if } \delta\beta \leq \frac{\sqrt{2\bar{B}\lambda}}{K} \\ 1 & \text{otherwise} \end{cases}$$

Case 3 $\delta\beta \in [C_2, +\infty)$

$\rightarrow k^* = K$

$$\rightarrow r^* = \begin{cases} 1 & \text{if } B \geq \delta\beta K \\ 0 & \text{if } B < \delta\beta K \end{cases}$$

$EU_G(b = 0|\delta, \beta) = \int_{\delta\beta K}^{+\infty} xh(x)\, dx + \int_0^{\delta\beta K} \delta\beta K h(x)\, dx$

$EU_G(b = 1|\delta, \beta) = \int_{\delta\beta K}^{+\infty} xh(x)\, dx + \int_0^{\delta\beta K} \delta\beta K h(x)\, dx - \lambda$

$\rightarrow b^* = 0$

We need to understand the position of C_3 with respect to C_1 and C_2.

- If $C_3 < C_1$, $b^* = 1$ when $\delta\beta \in [C_1, C_2)$.
- If $C_3 > C_1$, $b^* = 0$ when $\delta\beta \in [C_1, C_2)$. G never maintains a BIT because the potential political benefits from regulations is big and the autonomy loss is large: $\frac{\sqrt{2\bar{B}\lambda}}{K} > \frac{1}{K} H^{-1}(\frac{2K - W(K)}{K}) \rightarrow \bar{B}\lambda > \frac{H^{-1}(\frac{2K - W(K)}{K})^2}{2}$. However, such cases are not interesting to explore and do not appear in the empirical analysis.

Therefore, we assume that $\frac{1}{2} H^{-1}(\frac{(2-\lambda)K - W(K)}{(1-\lambda)K})]^2 \leq \bar{B}\lambda \leq \frac{1}{2}[H^{-1}(\frac{2K - W(K)}{K})]^2$ to focus the analysis on the interesting dynamics in the argument.

B Measuring Global Value Chains

Table B.1: A Summary of GVC Measure and Data Source

Measure	Unit of Analysis	Data Source	Paper
Value Added in Trade: backward, forward	Country dyad	UNCTAD-Eora TiVA	Zeng et al. (2021), Weldzius (2021)
Trade in intermediate goods	Dyad-industry	UN Comtrade	Moehlecke et al. (2019)
Related-party trade	Firm	Activities of US Multinational Enterprises (BEA)	Jensen et al. (2015)
	Industry	Benchmark Input-Output Table (BEA) US Census Bureau: related-party trade	Osgood (2018)

Table 1. Efforts to map GVCs (status as of August 2019)

Project	Institution	Data sources	Countries	Industries	Years	Comments
UNCTAD-Eora GVC Database	UNCTAD/Eora	National Supply-Use and I-O tables, and I-O tables from Eurostat, IDE-JETRO and OECD	189	26-500 depending on the country	1990–2015 (nowcast for 2016, 2017 and 2018)	Meta database drawing together many sources and interpolating missing points to provide broad, consistent coverage
Trade in Value Added (TiVA) dataset	OECD	National I-O tables	64	34	2005–2015 (projections 2016)	Information on all OECD countries, and 27 non-member economies (including all G20 countries)
World Input-Output Database (WIOD): 2016 Release	Consortium of 11 institutions, EU funded	National Supply-Use tables	43	56	2000–2014	Based on official national account statistics; uses end-use classification to allocate flows across partners and countries
Other multi-region input-output databases						
EXIOBASE	EU-based consortium, exiobase.eu	National supply-use tables	44+5	200	1995–2013	Covers 44 countries plus five rest-of-world regions
ADB Multi-Region Input-Output Database (ADB MRIO)	Asian Development Bank	An extension of WIOD which includes 5 additional Asian economies (Bangladesh, Malaysia, Philippines, Thailand and Viet Nam)	45	35	2000, 2005–2008, 2011	The information for the 5 additional Asian countries are estimates methodically produced to assist research and analysis, not official statistics
Global Trade Analysis Project (GTAP)	Purdue University	Contributions from individual researchers and organizations	121 countries plus 20 regions	65	2004, 2007, 2011, 2014	Includes data on areas such as energy volumes, land use, carbon dioxide emissions and international migration.
South American Input-Output table	ECLAC and Institute of Applied Economic Research (IPEA) from Brazil	National I-O tables	10	40	2005	Based on official information from National Accounts

Source: UNCTAD.

Figure 1. Structure of an MRIO Table

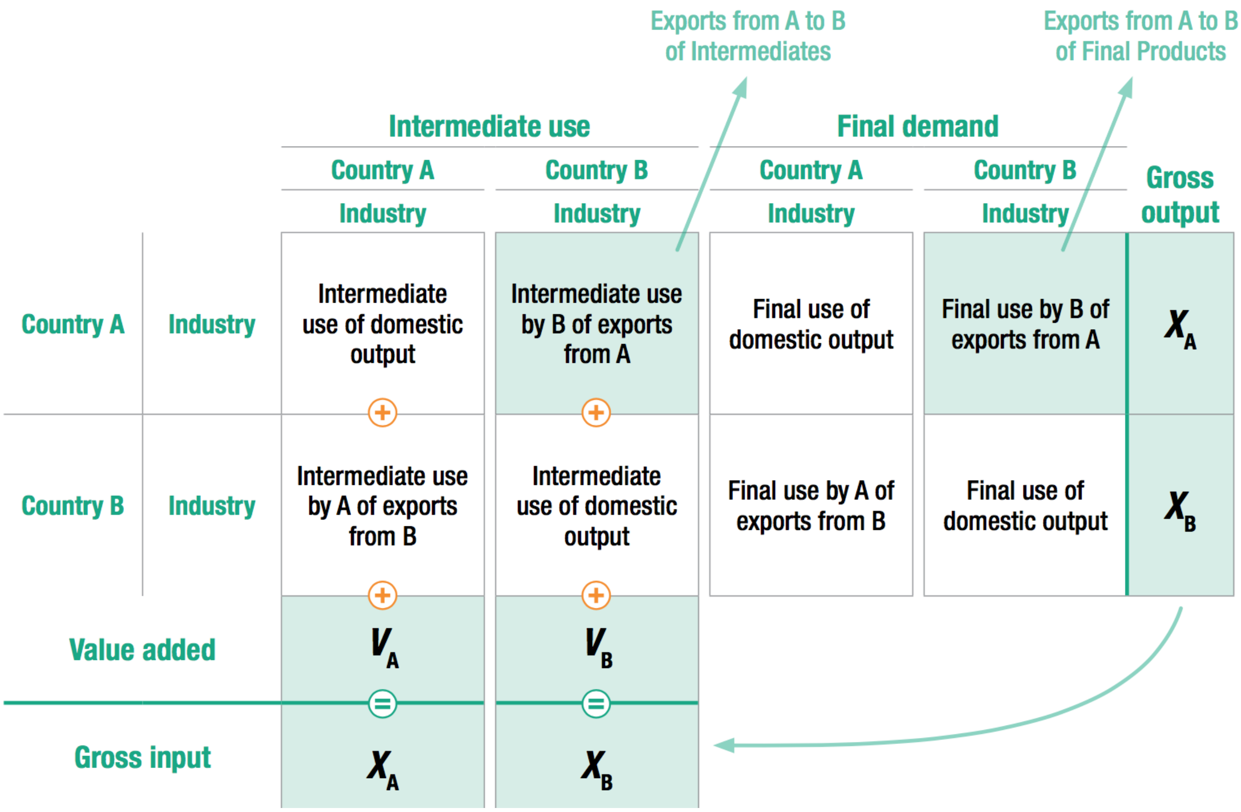

Figure 2. The matrix of the value-added content of trade

DVA

DVX

FVA

	Country 1	Country 2	Country 3	...	Country K	...	Country N
Country 1	F^{11}	F^{12}	F^{13}	...	F^{1K}	...	F^{1N}
Country 2	F^{21}	F^{22}	F^{23}	...	F^{2K}	...	F^{2N}
Country 3	F^{31}	F^{32}	F^{33}	...	F^{3K}	...	F^{3N}
...	...	...	...	...	...	...	...
Country K	F^{K1}	F^{K2}	F^{K3}	...	F^{KK}	...	F^{KN}
...	...	...	...	...	...	...	...
Country N	F^{N1}	F^{N2}	F^{N3}	...	F^{NK}	...	F^{NN}

C Figures and Tables

Figure C.1: Results for Schonfeld Test

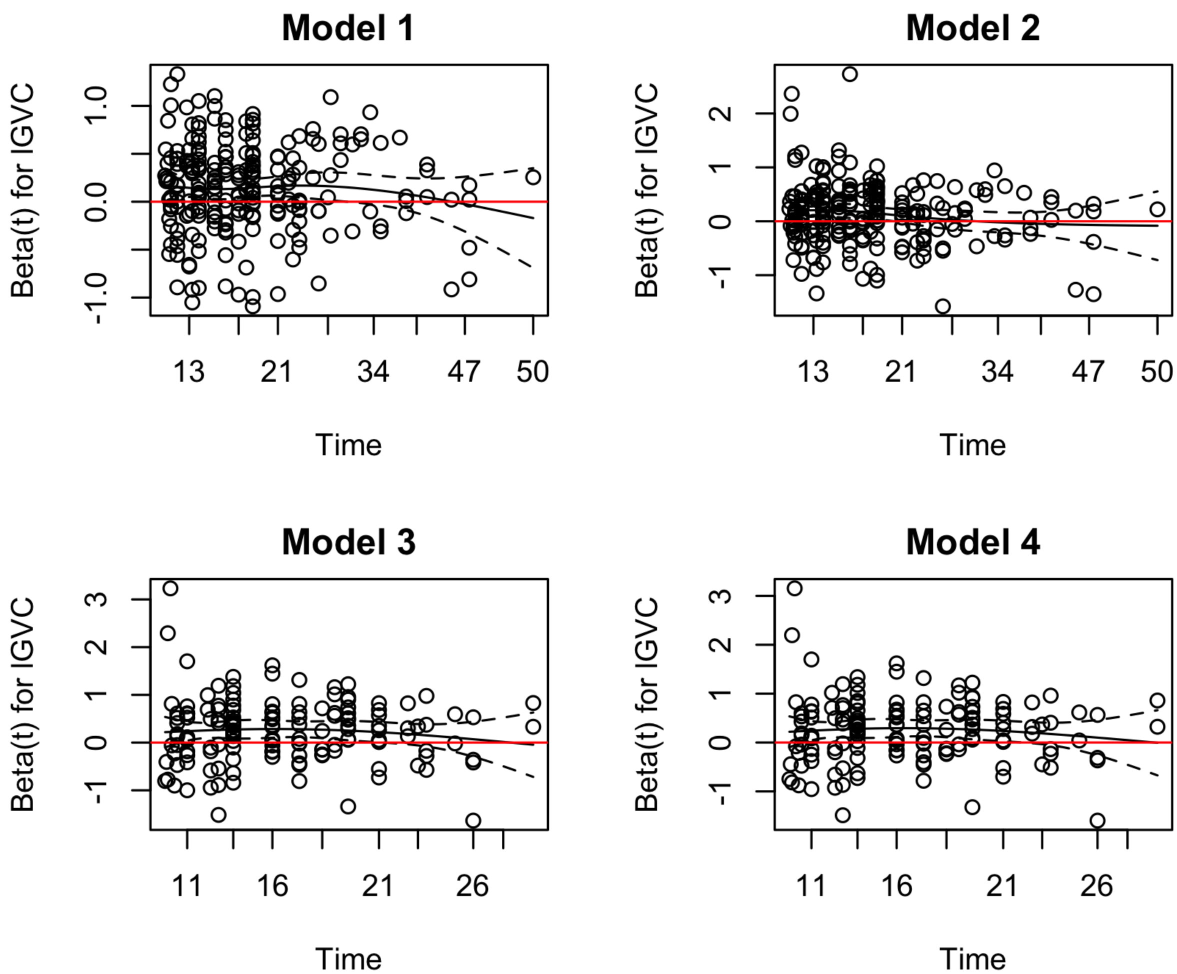

Table C.1: GVC Integration and BITs Termination: Full Sample

	Dependent variable:				
	Terminated				
	OLS	OLS	OLS	OLS	Logit
	(1)	(2)	(3)	(4)	(5)
log(1+GVC)	0.018***	0.017***	0.027***	0.035***	0.297***
	(0.004)	(0.004)	(0.008)	(0.011)	(0.034)
Gap in GDP per capita	−0.004*	−0.004*	−0.001	0.001	−0.079***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.011)
Gap in total population	0.006*	0.006**	−0.005	−0.005	0.054***
	(0.003)	(0.003)	(0.006)	(0.008)	(0.020)
Gap in Polity IV	0.001*	0.001**	−0.0001	0.002**	−0.005
	(0.001)	(0.001)	(0.001)	(0.001)	(0.006)
Accumulative ISDS disputes		−0.002	0.006	0.009	0.020
		(0.004)	(0.006)	(0.006)	(0.024)
PTA		0.003	−0.013	−0.022**	0.483***
		(0.007)	(0.009)	(0.010)	(0.069)
Common law		0.011			−0.224***
		(0.016)			(0.069)
Both EU members		0.023			0.023
		(0.019)			(0.096)
Total dyadic exports				−0.00002	0.020
				(0.003)	(0.036)
Sum(FDI inflow/GDP)				−0.016	−3.601***
				(0.010)	(0.642)
Year FE	Y	Y	Y	Y	N
Party 1 FE	Y	Y	N	N	N
Party 2 FE	Y	Y	N	N	N
Dyad FE	N	N	Y	Y	N
Observations	36,093	36,093	36,093	26,354	26,354
R^2	0.141	0.142	0.388	0.439	
Adjusted R^2	0.135	0.135	0.357	0.403	
Akaike Inf. Crit.					9,278.062

Note: *p<0.1; **p<0.05; ***p<0.01

Standard error clustered at the dyad level in parentheses.

Table C.2: GVC Integration and Unilateral BITs Termination: Full Sample

	Dependent variable:							
	Incentive to Terminate							
	OLS	OLS	OLS	OLS	OLS	OLS	Logit	Logit
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(1+GVC)	−0.001	−0.001	−0.0002	−0.001	−0.0003	0.013	−0.086**	0.101**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.016)	(0.036)	(0.050)
Polity IV	−0.002	−0.002	−0.003	−0.003*	−0.003*	−0.006*	−0.117**	−0.148***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)	(0.046)	(0.049)
GVC * Polity IV	0.0002**	0.0002**	0.0003**	0.0001*	0.0002*	0.0004*	0.022***	0.022***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.004)	(0.004)
GDP per capita	0.004	0.004	0.014	0.002	0.008	0.007	0.103***	−0.315***
	(0.004)	(0.004)	(0.011)	(0.004)	(0.009)	(0.009)	(0.018)	(0.037)
Total population	0.032	0.031	0.046	0.026	0.038	0.047	0.671***	0.594***
	(0.022)	(0.022)	(0.030)	(0.021)	(0.028)	(0.032)	(0.028)	(0.033)
Accumulative ISDS disputes		0.002	0.002	0.003	0.002	0.005	0.104***	0.114***
		(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.020)	(0.021)
PTA		−0.003	−0.002	−0.002	−0.001	−0.010	0.050	0.147
		(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.090)	(0.102)
Both EU members		0.005	0.005	0.005	0.006		−0.279	−0.304
		(0.004)	(0.004)	(0.004)	(0.004)		(0.214)	(0.217)
Exports to BIT partner			−0.001**		−0.001*	−0.001		−0.203***
			(0.001)		(0.0005)	(0.001)		(0.036)
Sum(FDI inflow/GDP)				−0.001	0.001	0.005		−14.268***
				(0.006)	(0.007)	(0.009)		(1.371)
Year FE	Y	Y	Y	Y	Y	Y	N	N
Country FE	Y	Y	Y	Y	Y	Y	N	N
Dyad FE	N	N	N	N	N	Y	N	N
Observations	71,685	71,685	60,777	67,791	57,838	57,838	71,685	57,838
R^2	0.149	0.150	0.158	0.153	0.159	0.248		
Adjusted R^2	0.147	0.148	0.156	0.151	0.157	0.221		
Akaike Inf. Crit.							5,761.006	4,592.803

Note: *p<0.1; **p<0.05; ***p<0.01
Standard error clustered at the dyad level in parentheses.