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Dangerous liaisons: An endogenous model of international trade and human rights

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Abstract

This article applies recent advances in network analysis to highlight a central tension faced by policymakers – balancing the benefits of engaging with the international system and the associated domestic policy costs. International trade rewards certain domestic practices, such as respect for human rights. Enforcing such practices, however, is politically costly and sometimes prohibitive to state leaders who rely on political repression to stay in power. In such cases, domestic elites often resort to an alternative strategy of securing the benefits of international trade – setting up indirect trade channels through intermediary states. These competing incentives are modeled within a single framework using a formal network game in which states form trade-links (direct or indirect) with other states, while simultaneously choosing their optimal level of domestic human rights protections. The model suggests that there may be an inverse relationship between a state's embeddedness within a network of indirect trade and respect for human rights: indirect trade channels serve as loopholes that allow domestically troubled states to enjoy the benefits of trade without pressure for domestic improvement. The predictions are supported by the results of the empirical analyses of the international trade and repression data (1987–2000), conducted using a coevolutionary actor-oriented longitudinal-network model – a statistical estimator that closely mimics the theoretical model.

Keywords

human rights, indirect trade, network analysis, network game, repression

Introduction

Recent research has emphasized the advantages of network analysis for theoretically modeling interdependence (Gallop, 2016; Larson, 2016; Ward and Dorussen, 2016). This article applies advances in network game theory to explore the relationship between international trade and domestic respect for human rights. Through its tight link to international finance, international trade creates a powerful incentive for leaders to protect domestic human rights.[1] Repression and arbitrary law enforcement undermine the business marketplace by creating uncertainty. Even if businesses are not the direct target of repressive actions, arbitrary arrests, disappearances, and instances of torture undermine the confidence of international financial institutions, raising insurance premiums and interest rates on obtaining credit and, thus, stifling trade. At the same time, many governments rely on repression in order to maintain power. While a government may want the economic benefits that come from trade, improving domestic conditions that facilitate trade may reduce their ability to extract rents or control dissent. Finding a balance between the benefits accrued

[1] Trading firms have influence over their country's international economic policies, due to their small number, large size, significant lobbying budgets, high productivity, and access to political elites. For example, 4% of the 5.5 million US firms in 2000 engaged in exports, with the top 10% accounting for 96% of US exports (Bernard et al., 2007: 2). General Motors (GM) chairman Charles Wilson, at his 1953 Senate Armed Services Committee confirmation hearing to become US defense secretary, exemplified this viewpoint, stating that keeping his current position at GM poses no conflict of interest, because 'what is good for the country is good for General Motors, and vice versa' (Fogel, Morck & Yeung, 2008: 84).

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from international trade and the level of domestic repression is, therefore, one of the central tasks faced by state leaders. The network perspective adopted here recasts this task as more than a binary trade-off between the amount of trade and repression, highlighting an additional option of relying on indirect trade – trade relationships in which an intermediary state earns a risk premium by channeling goods to or from high-risk states.[2]

One drawback to arrangements utilizing such middlemen, of course, is that indirect trade is less efficient than direct trade, as each intermediary takes a 'cut' from the profits as the cost of assuming risk. Despite its inefficiency, examples of indirect trade are ubiquitous and can be found in many industrial sectors, ranging from weapons to automobiles and soft drinks. Hong Kong, for example, has long served as such a bridge between the human-rights conscious world and China (*Economist*, 2014). On a more intricate level, Iranian entrepreneur Babak Zanjani was able to earn $17.5 billion by channeling millions of barrels of oil through a web of indirect trade routes involving 64 companies in Dubai, Turkey, and Malaysia (Erdbrink, 2013).

The goal of this article is to explore the relationship between states' reliance on indirect trade and protections of human rights. I capture this complex relationship with a multiplayer non-cooperative formal game, in which states simultaneously choose their level of respect for human rights and a set of direct trade relationships with other states. Counter-intuitively, the model predicts that, under some reasonable conditions, there is an inverse relationship between states' reliance on indirect links and their incentive to protect human rights: indirect trade creates a loophole that allows domestically troubled states to enjoy the benefits of trade without pressure for improvement. I find support for the theoretical predictions by testing them on trade and human rights data between 1987 and 2000. The endogeneity of network formation and effect is estimated using a coevolutionary actor-oriented longitudinal-network model (RSiena) with two dependent variables (Ripley et al., 2015).

The article makes three important theoretical/empirical contributions. First, it demonstrates that, under reasonable conditions, some states have an incentive to channel trade through indirect links, despite the inefficiencies associated with relying on intermediaries. Second, the model explains why some states may rationally choose to ignore the economic incentives to improve their domestic conditions, created by the international trade network. Finally, the article advances our knowledge of international organization by problematizing the origin of international networks within a unified theoretical framework that treats network formation and effect as two parts of a single endogenous strategic process – a move away from descriptive network analysis towards theoretical models of network formation and effects.

Trade and repression

Recent human rights research has shifted away from the traditionalist view of treating the interests of international firms as in natural alignment with those of repressive regimes (i.e. both benefit from using repression to keep down the costs of labor and production).[3] While this perspective found some support during earlier time periods (Cardoso & Faletto, 1979; Maxfield, 1998), more recent empirical research suggests that such relationships may no longer hold (Blanton & Blanton, 2007; Hafner-Burton, 2009; Richards, Gelleny & Sacko, 2001). There are three explanations for this change: spotlight effects, a changing labor market, and the financial risk, or operations cost, mechanism developed here.

Recent studies note that the issue of human rights has come up with increased frequency during economic negotiations, especially those involving Western states (Hafner-Burton, 2005, 2009). The 2004 USA–Singapore free trade agreement, for example, stipulates that both parties 'strive to ensure' a number of collective bargaining, labor, and minimum wage rights, and establishes several joint committees and procedures to oversee compliance (Hafner-Burton, 2009: 7). Similar clauses are found in a large number of agreements involving Western states. Increased attention to human rights practices has been drawn by the so-called 'spotlight effect' associated with the human rights advocates' use of media to shame multinational corporations (MNCs) into improving human rights conditions in their international locations (Murdie & Davis, 2012). Such shaming, more recently accompanied by legal and economic sanctions against the violating firms, has been rather effective, forcing a number of MNCs, most notably

[2] Indirect trade is a transfer of goods from state *A* to state *C* through state *B*, e.g. German cars shipped to Ukraine through Poland.

[3] Repressive regimes are not necessarily equivalent to non-democratic regimes. The two are conceptually and empirically distinct, although correlated ($r = 0.46$). Gibler & Randazzo (2011: 703), for example, find that 40% of democracies lack the independent judiciaries necessary to constrain repressive government action.

Nike, Starbucks Coffee, and Gap, to make substantial revisions to their overseas practices or even pull their business out of states with repressive regimes.

The second explanation emphasizes a shift of international business interests from natural resource procurement to consumer products, manufacturing, information, and service sectors (Kozlow, Rutter & Walker, 1978). According to this explanation, changes in labor markets triggered a corresponding shift from demands for cheap labor to a focus on a skilled workforce (Mody, Dasgupta & Sinha, 1999; Moran, 2002). By damaging human capital (decreasing productivity, discouraging the pursuit of certain professions), repression prevents the workforce from being fully competitive on the world market (Blanton & Blanton, 2007: 146). While respect for human rights is not a necessary condition for achieving high skills and productivity, talent and creativity are more likely to thrive in favorable human rights conditions (Nussbaum, 2011; Sen, 2005).

While the spotlight effect and the labor market explanations help account for improvements in labor rights, neither of them speaks directly to the central relationship of interest in this article – that between trade and repression. I draw on the economics literature to develop a third explanation for the relationship between international trade and domestic repression, one that highlights the economic risks of business operation, or operations costs, associated with repressive regimes.

I argue that domestic repression imposes several economic costs on trading firms, as well as their international partners. International trade is impossible without the support of international financial institutions, who insure the transactions between the buyers and sellers, grant credit, and collect payments (Van der Veer, 2010). Even if businesses are not the target of repression per se, arbitrary arrests, disappearances, and instances of torture within a country undermine the confidence of financial institutions, which respond by increasing insurance premiums and credit interest rates (Jensen, 2008). Ukraine's Standard & Poor credit ratings, already lowered as a result of the political unrest that started in November 2013, was dropped further days after new instances of government repression against protesters in January–February of 2014 (World Business Press, 2014). China's 2014 crackdown on protesters in Hong Kong had similar detrimental effects on Hong Kong's economic role as a business intermediary between China and the world (*Economist*, 2014). This suggests that, in addition to responding to the general political unrest, financial markets may also respond more specifically to instances of government repression.

Repression also increases the risk of business operations within a country by disrupting the flow of capital, goods, and information. Similar to international conflict (Haim, 2016; Lupu & Traag, 2013; Maoz, 2009), domestic repression diverts resources, previously used in production of certain exports, towards the needs of the repressive apparatus, thus reducing the volumes/quality of those exports. By creating riskier economic environments, repression may also interrupt supply chains of imports necessary for production, and even push trading partners towards alternative, more stable markets. All of these factors make repressive regimes less attractive venues for international business.

Deflecting the costs of repression

Broadly speaking, any government's survival in power hinges on its successful use of three strategies: distributing economic rents (private goods), offering policy concessions (public goods), and repressing opposition (Acemoglu & Robinson, 2012; Davenport, 2007; Davies, 2016; Ritter, 2014). The use of repression, however, is both more costly and less certain than the other two tools. The costs of repression go beyond the material expenses associated with training internal police and gathering intelligence. Even more notably, repression destroys the loyalty of the population – a necessary condition for the successful use of the other two survival strategies (Gandhi, 2008; Wintrobe, 1998). Moreover, the use of repression carries a higher level of risk, as repression may lead to escalation of political dissent or even leader removal (Ritter & Conrad, forthcoming; Francisco, 1996; Gupta, Singh & Sprague, 1993). Governments, therefore, are most likely to rely on repression as a last resort, when distribution of benefits or policy concessions do not constitute viable alternatives, that is, in countries that lack both the rich resources necessary to distribute rents and the political institutions that allow for making credible policy concessions (Conrad & DeMeritt, 2013).

In other words, once it starts relying on repression, a government risks being caught in a 'vicious cycle' of not being able to give it up. In order to give up repression, it must shift to another tool of maintaining its hold on power. Distribution of rents, however, is dependent on the availability of rich natural resources, which are usually exogenous. The ability to provide public goods in the form of policy concessions, in the meantime, is predicated on the capacity to build viable political institutions and rebuilding the lost trust of the population – both lengthy and gradual processes.

Elites within repressive regimes, therefore, are unlikely to give up repression. Repression's negative effects on trade, in the meantime, can be moderated by setting up international economic transactions through indirect channels. Reliance on intermediaries allows elites from repressive states to benefit from economic deals with less- or non-repressive states, who would be unable or reluctant to deal with them directly. Unable to do direct business with US companies, such as Coca-Cola, for example, North Korea is known to import Coke from intermediary countries like Taiwan or Singapore (*New Zealand Herald*, 2012; Williams, 2013). In each case, the illicit trade is channeled through chains of intermediaries, with the goal of either obfuscating its final destination (e.g. Coke and North Korea) or the original source (e.g. oil and Iran). In summary, unwilling to give up repression as a tool to maintain authority, elites may deflect some of the associated economic costs by paying a risk premium to intermediaries, who help channel their international trade.

Networks game

In this section, I recast the theoretical mechanisms described above in more formal terms.

Players

Let $N = \{1, ..., n\}$ represent the states in the international system. Trade among these states is represented by a network graph (g) whose nodes are identified with the states and whose arcs capture their pairwise (dyadic) trade. Let ij denote the subset of N containing i and j and refer to it as a trade-link between states i and j. The interpretation is that if $ij \in g$ (alternatively, $ij = 1$), then nodes i and j have direct trade, while if $ij \notin g$, then nodes i and j have no direct trade.

Actions

Each state makes two simultaneous decisions: (1) what direct trade-links to form, if any, and (2) whether to violate human rights (*abuser*) or pay a fixed cost σ to set up human rights protecting institutions (*respecter*). The rules for making each of these decisions are described below.

Decision 1: Choosing trade-links. This decision involves each state simultaneously announcing the set of states to which it wishes to form trade-links.[4] The links that are formed are those in which both of the states involved in the link named each other. More formally, for the first decision made in the game, the action space of player i is a vector $S_i = [s_{i1}, \ldots, s_{in}]$, where $s_{ij} = 1$ if i chooses to form a link with j, and $s_{ij} = 0$ otherwise. If $S = S_1 \times \ldots \times S_n$ is the profile of actions played, then link ij forms iff both $\{s_{ij} = 1\} \in S_i$ and $\{s_{ji} = 1\} \in S_j$. The network that forms is

$$g(S) = \{ij | s_{ji} = 1 \text{ and } s_{ij} = 1\}.$$

Decision 2: Choosing domestic type. In this part of the game, each state chooses its type: *respecter* (action 1) or *abuser* (action 0). The action space of player i for the type decision is

$$D_i = \{0, 1\}.$$

An actor's type captures the factors that improve its trade benefits and attractiveness as a trade partner, which represent its operations costs, that is, its domestic economic risk. This article focuses on domestic risks resulting from a government's failure to protect the human rights of its citizens, although the level of economic risk depends on many other factors, such as rule of law, property rights protections, judicial independence (Souva, Smith & Rowan, 2008: 385), or engagement in international conflict (Lupu & Traag, 2013). To reiterate the argument above, trade within repressive regimes is associated with higher insurance premiums that cut into profits of international businesses, thus making human rights abusing states less attractive in terms of business environments (Jensen, 2008). Prominence of human rights protections as an important consideration for investment decisions has also been demonstrated at the micro-level, in surveys of top-level business executives who rank judicial effectiveness and human rights protections as the fourth and sixth most important determinant in allocating new investments (out of 23 factors) (Biglaiser & Staats, 2010: 514).[5]

Payoffs

Trade-links

States derive trade benefits from their direct trade-links, such as the ability to sell goods on their markets and

[4] Recent work in economics has emphasized the importance of modeling the choice to engage in trade, as opposed to looking only at trade volumes (Helpman, Melitz & Rubinstein, 2008).

[5] Judicial effectiveness and human rights rank above such factors as tax rates (11), support for markets (8), US relationship (17), low levels of government regulation (13), low tariffs (14), high growth (16), overall wealth (19), low levels of government-own enterprises (20), and average income (22).

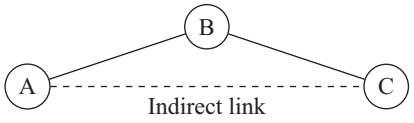


Figure 1. Direct vs. indirect links: An illustration

access to their goods (Dreher, 2006; Ricardo, 2004 [1817]). States also derive benefits from the indirect links connecting them to the trade partners of their trade partners. As previously discussed, indirect links allow for movement of goods that are unavailable through direct trade for political or other reasons. Indirect trade may also allow for the movement of substitute goods.

The trade benefits that state A obtains from trade with state C, however, are diminishing with the number of links through which the goods pass (i.e. efficiency loss). To capture this, I denote the benefits that state A derives from a direct trade-link with state B by δ, such that $0 < \delta < 1$. If the two states are not directly connected, but instead trade through at least one intermediary, then indirect trade benefits are calculated by raising δ to the power that is equal to the number of states on the shortest path between them. For example, for the trade network depicted in Figure 1, A's indirect trade benefit from trade with C would be calculated by raising δ to the second power, as A is trading with C through one intermediary B (the shortest path between A and C consists of two links: AB and BC). Note that restricting δ to $[0, 1]$ ensures that trade benefits decline with the number of intermediaries, as raising δ to higher powers results in lower values.

International trade also involves certain costs. Apart from transportation and communication costs associated with moving goods across borders, international trade requires legal expertise to successfully draft contracts, pay foreign taxes, etc. The literature also shows that trade may hurt domestic producers by lowering the prices for their goods (Mukherjee, Smith & Li, 2009; Rogowski, 1989). The costs of forming direct trade-links with each state are captured in the model by a homogeneous parameter $c > 0$.

In summary, let $u_i(g)$ denote the 'net value' that state i derives from trade with j, and c denote the cost to i of maintaining the link ij. The utility of each player i from graph g is then a function of the number of i's direct trade partners k_i, or i's *degree*, multiplied by the cost of forming a link c, and the sum of i's benefits from each direct and indirect trade-link that it is involved in, $\delta^{t_{ij}}$, where t_{ij} is the number of links in the shortest path between i and j. The shortest path from i to j is defined as the path involving the lowest number of links that connects i and j.[6] More formally:

$$u_i(g) = f\left(\sum_{j \neq i} \delta^{t_{ij}}, ck_i\right). \quad (1)$$

Note that t_{ij} is set to ∞ if there is no path between i and j.

Domestic type

The second decision involves each state's choice of its domestic type: *abuser* or *respecter*. *Respecter* states pay a fixed cost $\sigma > 0$ of setting up human rights protecting institutions, while the cost of playing *abuser* is standardized to 0.[7] The cost of playing *respecter*, σ, however, may be compensated by the increases in trade benefits associated with being able to attract more direct trade partners.

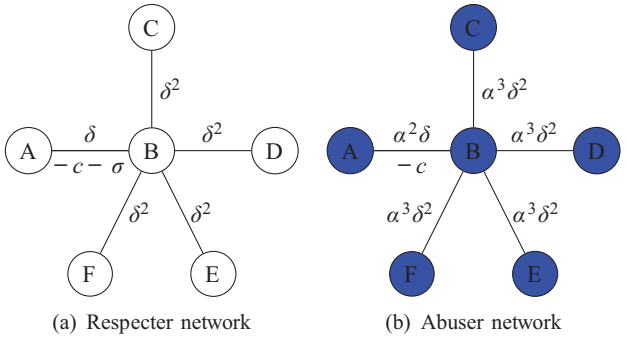
To model the effect of playing *abuser/respecter* on the benefits from trade, suppose α represents the benefit that state i gains from trade, or i's *operations costs*, where $0 \leq \alpha \leq 1$.[8] States with higher values of α (e.g. strong protections of human rights) both make more attractive trade partners and derive greater benefit from international trade. Indirect trade through states with stronger human rights protections (high α) provides more benefits than indirect trade through states with weaker human rights protections (low α).

Thus, α enters i's utility function in three ways: (1) as α_i or i's own operations costs given i's human rights protections, (2) as α_j or a weighting parameter on i's benefit from trading with j, given j's operations cost (j's human rights protections), and (3) as α_l or a weight on i's benefit from indirect trade, which captures the level of human rights protections in the intermediary states on the shortest path from i to j. Assume that α takes on the value of 1 if state i is a *respecter* ($d_i = 1$). For

[6] If there are two or more shortest paths of equal lengths, i selects the one with the greatest number of links of *respecter* type. In cases of ties, i randomly decides to use one of the paths with the same length.

[7] To distinguish the costs associated with poor human rights practices from the transaction costs associated with moving goods across borders, I refer to the former as *operations costs*, α, and to the latter as *transaction costs*, c.

[8] Parameter α may vary depending on a set of exogenous factors, such as domestic market size or resource endowment, or endogenous factors, such as tax rates. More broadly, both exogenous and endogenous factors that make i a more attractive trade partner can be thought of as operations costs. The current focus is on human rights, while controlling for other factors.



(a) Respecter network (b) Abuser network

Figure 2. Calculating players' utilities: An illustration

all states i, $0 \leq \alpha \leq 1$, and $\alpha_i \in \{\alpha, 1\} \forall i$. With this in mind, u_i's utility function takes the following form:

$$u_i(g|d_i, d_1, ..., d_n) = \alpha_i \sum_{j=1}^{n} \prod_{l \in P} \alpha_{ijl} \delta - \sigma d_i - k_i c, \quad (2)$$

where $P = \{l_1, \ldots, l_j\}$ is the shortest path between i and j, or the set of links that make up the path with the lowest number of links between i and j. So α_{ijl} is the type of each state l, which is a link on the shortest path from i to j.

Figure 2 provides an illustration. Let the white and blue nodes represent *respecters* and *abusers*. Figure 2a presents a network made up of *respecters*. The utility to state A from this network consists of $\delta - c$, its net benefit from a direct trade-link with state B, plus four times δ^2 for four indirect links through B to C, D, E, and F. Finally, we must subtract σ, the fixed cost of playing *respecter*. More formally, state A's utility can be written as:

$$\begin{aligned} u_A(g|d_A = 1, d_B = 1, d_C = 1, d_D = 1, \\ d_E = 1, d_F = 1) = \delta + 4\delta^2 - c - \sigma \end{aligned} \quad (3)$$

The corresponding utility to state A in the network of *abusers* (Figure 2b) consists of $\alpha^2\delta - c$, its net benefit from a direct trade-link with state B, plus four times $\alpha^3\delta^2$ for four indirect links through B to C, D, E, and F or:

$$\begin{aligned} u_A(g|d_A = 1, d_B = 1, d_C = 1, d_D = 1, \\ d_E = 1, d_F = 1) = \alpha^2\delta + 4\alpha^3\delta^2 - c \end{aligned} \quad (4)$$

Note that the two networks depicted in Figure 2 differ only in the types of states that make them up. Comparing Equations 3 and 4, we see that this difference results in two trade-offs in the payoff function: (1) *respecters* must pay σ, while *abusers* have no cost, and (2) *abusers*' utilities are discounted by α. Importantly, the value lost due to this discounting increases with the number of both direct and indirect links in the network.

Predictions

I solve the game using the Pairwise Nash Stability equilibria concept (Chyzh, 2013; Gallop, 2016). The solution to the game provides several important insights regarding the relationship between trade and human rights.[9] First, despite the efficiency loss associated with trading through intermediaries, the model identifies the conditions under which some or even most international states will rationally choose to channel their trade indirectly. Second, while international trade favors human rights *respecters* over *abusers*, the model helps identify some reasonable conditions, under which some or even the majority of international states will not protect domestic human rights. In particular, these two relationships hold within a class of equilibria – which I call *heterogeneous equilibria* – that exist when the net cost–benefit from a direct trade-link, while positive, is less than that from an indirect (second degree) trade-link. Such link costs, in other words, favor indirect trade and lead to equilibria in which states 'separate' into two groups: some act as intermediaries (center-nodes), while others act as 'indirect traders' and use these center-nodes to channel trade.[10]

By combining distance-based discounting (i.e. mutual trade benefits are inversely related to the length of the shortest path between actors) and type-specific discounting parameters (i.e. benefits from trading with *abusers* have a steeper distance-based decline), the utility function creates a preference for intermediaries of *respecter* type. As a shift from trading directly to trading indirectly would result in a greater net loss for *respecters* than for *abusers*, states will maximize their benefits by minimizing their total shortest paths to human rights *respecters*. As a result, *respecters* will be more likely to serve in the roles of

[9] The empirical predictions are derived for star-shaped symmetrical equilibria, as during the time period under investigation the trade network is neither complete nor sparsely connected, with approximately 35% of dyads having no direct trade. For details on equilibria choice and the full solution, see the Online appendix.

[10] This article highlights that *intermediaries* tend to be *center-nodes* (every state relies on the same few intermediaries), rather than 'weak links' connecting isolated subnetworks. This is empirically consistent with the observation that there are relatively few hub-cities like Amsterdam or Singapore, or states that serve as sanction-busters. This is consistent with other studies (Galeotti, Goyal & Kamphorst, 2006; Jackson, 2008; Jackson & Wolinsky, 1996).

trade-hubs (intermediaries) and form more direct trade relationships than *abusers*.[11] In the simplest case of a network that consists of only one *respecter* and multiple *abusers*, the *respecter* will serve as the center of a star-shaped network, and each *abuser* will enjoy exactly one direct link (to the *respecter*), which will also connect it indirectly to all other *abusers*.

Replacing the dichotomous *respecter*/*abuser* language of the game with a more continuous conceptualization of the level of human rights protections, this prediction can be restated as Hypothesis 1 (derived from Proposition 3 in the online appendix).

> *Hypothesis 1:* The level of human rights protections is positively (negatively) related to the probability of forming direct (indirect) trade-links.

Since the relationship between trade and human rights is endogenous, the model also produces a prediction related to the effect of direct/indirect trade on the incentive to protect human rights. This incentive varies, depending on a state's trade roles (center-node/spokes): in particular, there is an inverse relationship between a state's incentive to protect domestic human rights and its reliance on indirect vs. direct trade. This relationship is a result of a distance-based discounting function associated with the net benefit of protecting human rights, that is, each additional direct link creates a larger benefit that can be gained by protecting human rights than each additional indirect link (removed by a shortest path of one or more intermediaries). States protect human rights when the additional trade benefits to be gained from this improvement in operations costs outweigh the fixed cost of implementing it (e.g. forgoing repression and investing in the necessary administrative capacity). If we think of the total trade benefit necessary to compensate for the cost of implementing human rights protections in terms of a threshold value, each additional direct link brings a state closer to this threshold at a faster pace than each indirect link.

This indicates that center-nodes (states with more direct than indirect trade-links) have a greater incentive to protect domestic human rights, and those with fewer direct/more indirect links have a lower incentive to protect human rights.[12] Rather than dichotomizing states into center-nodes (hubs) and spokes, we can rank them in terms of their relative dependence on indirect links (in relation to their total number of direct and indirect links). Then, states with a greater reliance on indirect links have a weaker incentive to protect human rights (derived from Proposition 4).

> *Hypothesis 2:* A state's reliance on indirect trade-links is inversely related to its respect for human rights.

This prediction highlights that, all else equal, repressive states who channel a large portion of their trade indirectly find themselves in such a position for a reason: they strategically *choose* to rely on indirect trade, in order to avoid the costs of domestic improvement. Given the high level of connectedness within the contemporary trade network, each indirect link is a manifestation of the absence of a (more profitable) direct link, rather than an additional trade channel. States resort to indirect links out of necessity rather than economic preference, opting for indirect trade in exchange for more leeway in their domestic politics.

Importantly, in practice poor human rights are only one of the reasons for a state to rely on indirect rather than direct trade. States may also engage in indirect trade as a result of other factors (captured by the α parameter), such as political disagreements (e.g. China and Taiwan, North and South Korea), poor administrative capacity (e.g. Somalia), or geographical isolation (e.g. island states), or to take advantage of the economies of scale (e.g. many European states channel large amounts of goods through the Netherlands or Belgium). Regardless of the reason, greater reliance on indirect trade results in fewer international constraints/incentives for domestic policymaking. As domestic risks decrease benefits from direct trade, reliance on such trade creates (domestic) pressure for improvement. In contrast, reliance on indirect trade relieves the government of such pressure,

[11] The two roles obtain unequal payoffs: since there is a greater net benefit from each indirect link, center-nodes, which by definition have a larger number of direct than indirect links, obtain lower total payoffs than indirect traders. Note that unequal payoffs are common in public goods games and do not prevent players from playing equilibrium strategies (see, for example Jackson, 2008: 270).

[12] In all non-empty equilibrium networks, all states are connected to all other states, either directly or indirectly (see Proposition 1 in the Online appendix). This means that an increase in indirect links can only come at the expense of a decrease in direct links, and vice versa: a state's numbers of direct and indirect trade partners are not independent, as long as there is a fixed total number of players. Although the empirical trade relationships are more complex, the same general pattern holds: the total numbers of a state's direct and indirect trade partners are inversely related. Reliance on indirect trade, therefore, is best captured with a ratio of the number of indirect links to the total number of links.

'freeing up' the government to engage in repression if it so chooses.

Research design

The theoretical model is best statistically mimicked by a coevolutionary actor-oriented longitudinal-network model, also known as RSiena, with two jointly estimated dependent variables: the network links formed by the actors, and actor-specific outcomes. RSiena isolates the over-time effects of coevolution, homophily, and mutual influence in networks (Snijders, Steglich & Schweinberger, 2007; Steglich, Snijders & Pearson, 2010; Ripley et al., 2015). The estimator has two jointly determined outcome variables that are observed in each time period: the network ties and actor-level outcomes. The central premise is that actors are part of the $n \times n$ network $\mathbf{g}$ and have control over their direct outgoing ties, that is, actors (states) can observe, evaluate, and change both their monadic behavior (human rights) and their network-links (trade-links) from one time period to the next. For tractability purposes, the estimator assumes that $\mathbf{g}$ is dichotomous, that is, that $\mathbf{g}_{ij} = 1$ represents a presence of a tie, and $\mathbf{g}_{ij} = 0$ represents a tie's absence.

Actors adhere to a Markov process by making decisions in the current period after observing the network in the previous period, without any memory of any prior periods. By eliminating actors' ability to coordinate their future actions, this memory restriction helps link the static theoretical model with the temporal dynamic in the data.[13]

In addition to network parameters, RSiena estimates the effects of actor- and dyadic-level exogenous covariates, such as state-level *GDP* per capita or *Population*, or dyadic-level *Geographical distance* between two states.

Dependent variables

The theoretical model highlights non-independence between network formation and effect: recognizing repression's adverse effects on international trade, leaders consciously balance between optimizing their economic profits and political power. The empirical model captures this relationship by jointly estimating the two dependent variables. The first dependent variable is *Trade network*, measured at the system-level. The second dependent variable is the monadic (or state-level) respect for *Human rights*.

Trade network is measured as a directed $n \times n$ matrix $\mathbf{g}$ whose $\mathbf{g}_{ij}(\mathbf{t})$ cells are coded as 1 if state i exported any goods to j in time period t (export $_{ij} > 0$), 0 otherwise.[14] Export data are obtained from the Correlates of War Trade Data (Barbieri, Keshk & Pollins, 2009). *Human rights* is measured using the *Physical integrity* variable from the CIRI Human Rights Data Project (Cingranelli & Richards, 2010). *Physical integrity* is an index that consists of four 3-point variables (Torture, Extrajudicial killing, Political imprisonment, and Disappearance) (Cingranelli & Richards, 2010). The resulting *Human rights* variable is measured on a 9-point ordinal scale ranging from 0 (no respect for human rights) to 8 (full respect for human rights). Although the CIRI dataset includes information for 195 countries between 1981 and 2009, the estimation sample is limited to 126 countries between 1987 and 2000, due to the data availability on other variables, primarily the *Rule of law* measure and *Trade*.[15]

Independent variables

The dependent variable from the *Human rights* equation also serves as the two primary independent variables (*Human rights A* and *B*) in the *Trade network* equation. The *Trade network* equation also includes standard control variables, summarized in Table I. Finally, this equation contains a network-specific endogenous variable, *Degree*, which is the average number of outgoing ties across actors. The *Degree* parameter models actors' overall tendency to form ties. If all other parameters are zero, an insignificant *Degree* parameter indicates that each tie in the network is formed with probability $p = 0.5$. In the long run, such a network would have a density of 0.5, with actors forming 50% of all possible ties. Social networks, however, are typically characterized by much lower densities (Steglich, Snijders & Pearson, 2010: 360). *Degree* accounts for this effect (Ripley et al., 2015).

[13] States (and firm) leaders tend to operate with relatively short time horizons (either for political survival or cognitive reasons) and lack credible commitment mechanisms (the anarchic international system), both of which are necessary to overcome time-inconsistency problems (Miller & Salmon, 1985).

[14] A binary export-link measure is consistent with the theory concerning trade-link formation and other work on trade ties (Helpman, Melitz & Rubinstein, 2008; Kinne, 2012) and network theory more generally (Galeotti, Goyal & Kamphorst, 2006; Jackson, 2008). The results are robust to measuring trade as imports, or as export$_{ij} > 1\%$ or 5% of i's total trade. While the primary estimator used here requires a binary network measure, the results are robust to using a naïve OLS with a continuous measure.

[15] I use CIRI, due to RSiena's requirement for an ordinal actor-level dependent variable (Ripley et al., 2015: 12). Robustness checks using Fariss's (2014) measure produce similar results.

Table I. Control variables

Name	*Effect*	*Measure*	*Source*
Trade equation			
Rule of law	+	Law $(0-3)$ + order $(0-3)$	ICRG Data
Ongoing MID	–	Dichotomous	Ghosn & Bennett (2003)
Peace years	+	Years since last dispute	Ghosn & Bennett (2003)
GDP/capita	+	$\ln\left(\frac{\text{GDP}}{\text{Population}}\right)$	Gleditsch (2002)
Population	+	ln(Population)	Gleditsch (2002)
Distance	–	Logged	Hegre, Oneal & Russett (2010)
Preferential trade agreement (PTA)	+	Dichotomous	Goldstein, Rivers & Tomz (2007)
Alliance similarity	+	S-score, $[-1, 1]$	Signorino & Ritter (1999)
Economic sanctions	–	Dichotomous	(Morgan, Bapat & Kobayashi (2013)
Human rights equation			
Civil war	–	Dichotomous	COW (Sarkees & Wayman, 2010)
International war	–	Dichotomous	COW (Sarkees & Wayman, 2010)
GDP/capita	+	$\ln\left(\frac{\text{GDP}}{\text{Population}}\right)$	Gleditsch (2002)
Population	–	Logged	Gleditsch (2002)
Polity	+	21-point scale	Marshall & Jaggers (2008)
Stability	+	Years since Polity change of $\geq \lvert 3 \rvert$	Marshall & Jaggers (2008)
British colony	+	Dichotomous	Wimmer & Min (2006)
Oil	+	$\ln\left(\frac{\text{Oilexports}}{\text{Population}}\right)$	Ross (2001)

The *Human rights* equation includes the primary independent variable – *Indirect degree ratio*, as well as controls for *Indirect degree* and *Total degree*. As described above, *Indirect degree ratio* conceptualizes a state's relative reliance on indirect vs. direct trade. *Indirect degree* is calculated as the total number of unique 'second degree' trade partners (partners that can be indirectly reached through one intermediary), excluding *i*'s indirect links to states with whom it already has a direct trade-link.[16] Cases in which a pair of states engage in a mix of direct and indirect trade relationships, such as North and South Korea, are excluded by the measure of indirect degree adopted here. As in the theoretical model, the measure of *Indirect degree* captures the opportunity available to the states to channel goods indirectly, rather than the presence of actual trade flows. In accordance with the theoretical model, it is the opportunity to channel goods through indirect trade and, thus, avoid domestic and international pressures to protect human rights, that enables governments to rely on repression if they so choose.[17] *Total degree* is a sum of *Indirect degree* and *Direct degree*.

The *Human rights* equation also includes standard controls, summarized in Table I. The model accounts for temporal dependence – the basic drive towards higher values on the dependent variable over time (Fariss, 2014) – by including linear and quadratic shape effects. All independent variables are mean-centered.

Empirical results

Figure 3 provides a visualization of the relationship between indirect trade and human rights protections. As expected, the geographical regions with the highest number of indirect trade relationships are Africa and the Americas, followed by the Middle East – regions that are known for their low respect for human rights. In contrast, Europe, which tends to have better human rights practices, is characterized by a sparser network of indirect

[16] Cranmer, Desmarais & Kirkland (2012) use an analogous measure, *Intransitive triads*.

[17] Data on actual indirect trade flows are difficult, and often impossible, to gather: for example, sanction-busters are unlikely to reveal the information about their illegal sales. Though the measure of indirect links adopted here suffers from some imprecision, any resulting bias would be conservative.

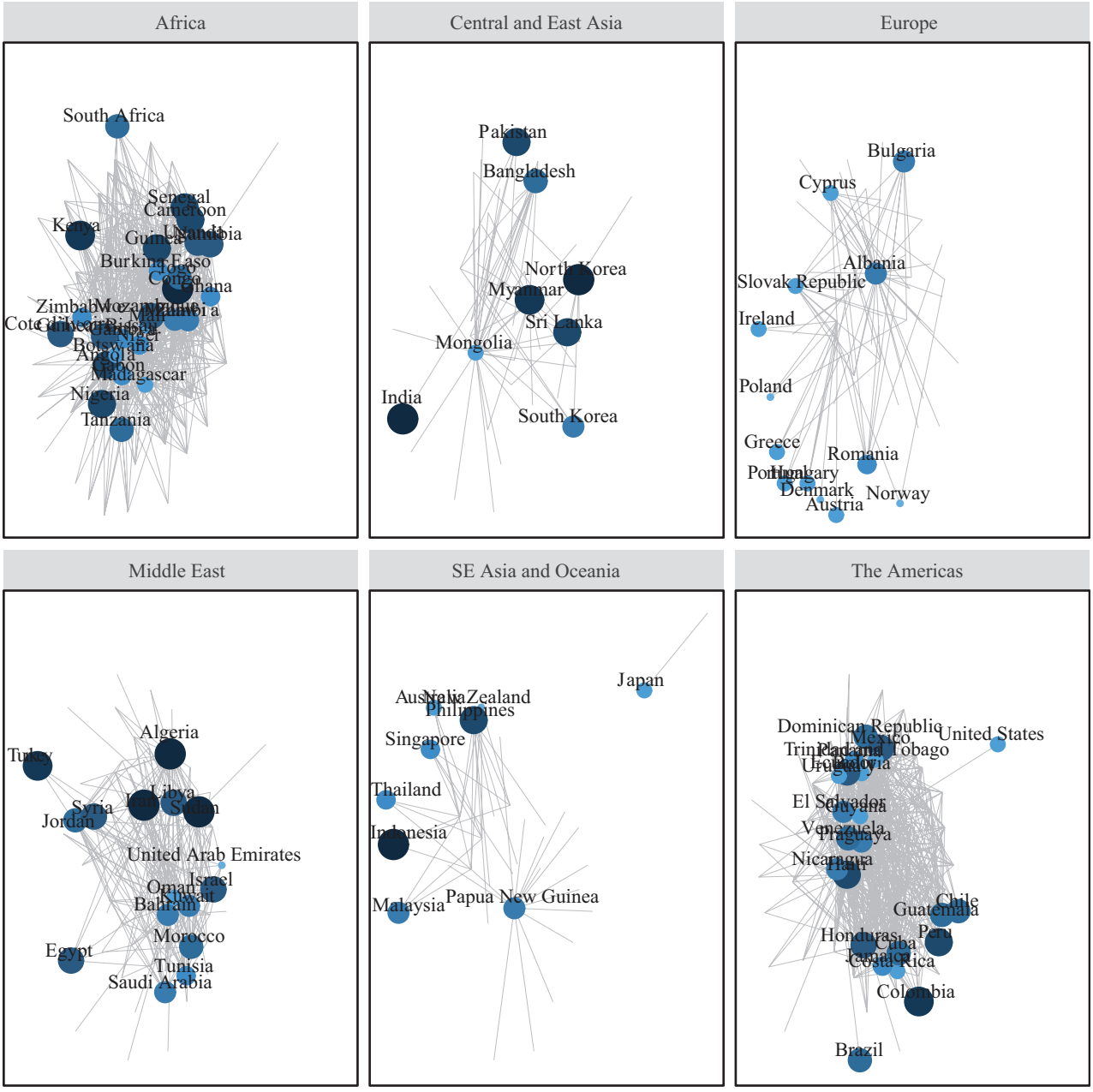


Figure 3. Indirect trade and human rights (2000)

Edges represent indirect trade links; node size and intensity represent the level of human rights abuses. Countries with no indirect links are not displayed. The figure was produced using the geom_net package in R (Tyner & Hofmann, 2015).

trade. In fact, a number of European states have no indirect trade links, and do not show up on the graph. This visual inspection provides both face validity for the measure of indirect trade and initial support for the predictions.

Table II presents the results of the empirical analysis. In the *Trade* equation, the primary parameters of interest are *Human rights A* and *B*. Consistent with Hypothesis 1, both variables are positive and statistically significant. This indicates that states with better human rights practices form more trade-links. This result is important, as it yields credence to the expectation that repression creates an unfavorable business environment.

The effect of trade on human rights is modeled in the second equation of Table II. The variable of interest is the *Indirect degree ratio*, which conceptualizes a state's relative reliance on indirect trade. The

Table II. Trade network and human rights

Trade equation		
Human rights A	0.11	(0.01)**
Human rights B	0.11	(0.01)**
Rule of law A	0.06	(0.01)**
Rule of law B	0.02	(0.01)**
Economic sanctions AB	−0.57	(0.08)**
Ongoing MID AB	−0.95	(0.15)**
Distance AB	−0.09	(0.01)**
PTA AB	0.64	(0.03)**
Alliance similarity AB	0.53	(0.04)**
Peace years AB	0.01	(0.01)
GDP/capita A	0.44	(0.01)**
GDP/capita B	0.34	(0.01)**
Population A	−0.03	(0.01)**
Population B	−0.03	(0.01)**
Degree	0.98	(0.01)**
Human rights equation		
Indirect degree ratio	−1.25	(0.23)**
Indirect degree	2.86	(9.26)
Total degree	−0.01	(0.01)
Civil war	−0.33	(0.06)**
International war	−5.66	(2.73)*
GDP/capita	−0.01	(0.03)
Population	−0.16	(0.03)**
Polity	0.02	(0.01)*
Stability	0.01	(0.01)
British colony	0.01	(0.05)
Oil	−0.01	(0.01)
Linear shape	0.07	(0.02)*
Quadratic shape	−0.06	(0.01)*
N(t)	126 countries (13 years)	

Two-tailed: **p < 0.01, *p < 0.05. Time parameters are suppressed.

coefficient on *Indirect degree ratio* is negative and statistically significant, suggesting an inverse relationship between reliance on indirect links and human rights protections, which is consistent with Hypothesis 2. This result suggests that repressive states find themselves in 'vicious cycles': by starting on the path of repression, they are also forced to rely on indirect trade, which in turn lowers their future incentives for improving human rights. All control variables act as expected.

The model's accuracy at in-sample prediction is visually assessed in Figure 4, which displays the observed and predicted values for the *Human rights* dependent variable. Violin plots (boxplots with overlapping kernel density estimates) summarize the model's in-sample predictions conducted during the estimation process. The

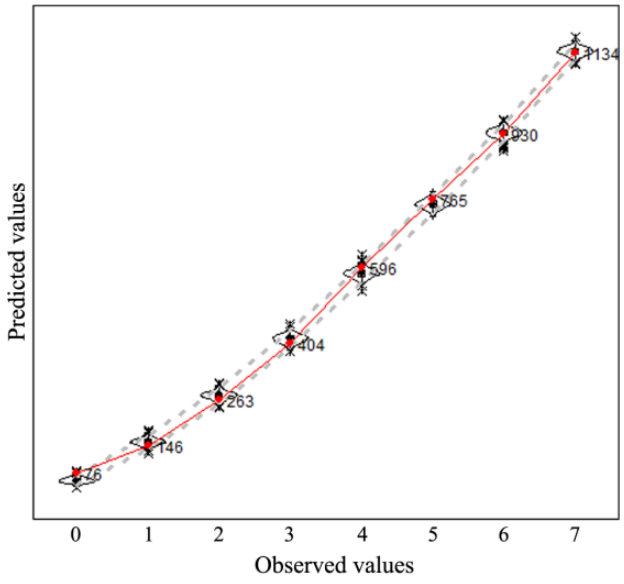


Figure 4. Model fit

Dashed lines represent 95% confidence intervals; violin plots are kernel densities of the predicted values.

dashed lines represent a 95% confidence interval.[18] The red line represents the observed values. Since the 95% confidence interval always contains the observed value, we can conclude that the model has a reasonable fit to the data (Hintze & Nelson, 1998).

Together with the theoretical model, the empirical results suggest some policy insights, such as the possible reasons for failure of such policies as humanitarian military intervention or economic sanctions at improving human rights practices (Li & Drury, 2004; Peksen, 2012). Both of these policies impose or demand a change in domestic type (e.g. from weak to high level of human rights protections), without providing any compensation for the cost of such a change, or even creating additional costs by destroying infrastructure and destabilizing the economy. The model implies, however, that the success of a humanitarian intervention may be enhanced (but not guaranteed) when it is accompanied by administrative and reconstruction aid, as such aid may sufficiently decrease the cost of building human rights institutions.

Bilateral sanctions fail as they further isolate the target by forcing it to redirect its trade flows through indirect links (Lektzian & Biglaiser, 2012), perpetuating its vicious cycle. Multilateral sanctions are also problematic: in the game, states engage in human rights protections when the potential

[18] As *Human rights* is measured on a 9-point ordinal scale ($k = 9$), the predicted values are separated into eight groups ($k - 1$), and the violin plots show the distributions of the predicted values that fall within the range $[k; k + 1]$ for each k.

trade benefits from the network outweigh the costs. In other words, states fail to protect human rights, when the cost of building functioning human rights institutions is greater than the potential gains from becoming a more efficient and attractive trader. By isolating human rights abusers from the rest of the trade network, multilateral economic sanctions decrease rather than enhance their incentive to engage in human rights protections. If the benefits of the pre-sanctions network were insufficient to outweigh the cost of domestic improvements, then the even lower benefits from a sparser post-sanctions network will not do so either. A state with no direct trade partners, in other words, has no incentive to start protecting human rights, as it has no positive benefits from the network to outweigh the cost of doing so. A state with an infinite number of direct trade relationships, on the other hand, will have the greatest incentive to refrain from repressive behavior, but whether this incentive is sufficient is ultimately determined by the cost of enforcing human rights protections.

Instead, the game suggests two solutions. First, the equilibria are, in part, determined by the cost of forming trade relationships. As these costs decrease and all else holds constant, the network slowly moves towards a complete network equilibrium, in which each state has a direct connection to each other state, providing additional incentives for improving domestic practices. Such improvement, however, implies a long-term process, associated with over-time improvements in transportation, information technology, legal training, and treaty negotiation. Second, equilibria are separated based on the cost of building human rights institutions and forgoing repression as a tool for extracting economic benefits. Lowering this cost may be made possible through a more active involvement of the international community, such as raising the costs of repression by empowering domestic opposition, applying political pressure, devising/strengthening legal mechanisms for prosecuting human rights violations (Dancy & Sikkink, 2012; Sikkink, 2011; Keith, 2011), negotiating 'golden parachutes' with current elites (Mansfield & Snyder, 2007), or pressuring states to sign human rights treaties (Fariss, 2014).

Finally, a third way to change the equilibrium involves changing the game or playing an out-of-equilibrium strategy to induce an out-of-equilibrium response: for example, a new player, such as a state, IO, or NGO, whose utility function incorporates changing the behavior of human rights abusers. If the EU, for example, was interested in causing change in Ukraine's human rights practices, it could choose to pay the cost of admitting Ukraine into the EU without requiring domestic change, for the sake of providing Ukraine with additional economic incentives to improve its domestic practices on its own.

Conclusion

Starting with the observation that human rights abuses increase business risks of operations within repressive states, I argue that elites within such states can minimize these costs by engaging in indirect trade. Since repression and reliance on indirect trade are endogenous, states with greater reliance on indirect trade are more likely to engage in human rights violations. In sync with the broader human rights and IR literature, this article emphasizes the necessity to recognize and model the complex non-random processes behind actor interactions, such as non-linear effects of trade (Hill & Jones, 2014: 26), endogeneity and selection in repressive behavior (Ritter & Conrad, forthcoming), and network coevolution (Minhas, Hoff & Ward, 2016). A separate contribution of this article is in combining concern for such complex processes with a network framework, for example, endogeneous network processes (Boehmke, Chyzh & Thies, 2016). In this sense, the networks game, developed in this article, is sufficiently general to help inform future research even beyond the current application to the trade–human rights relationship.

Conceptualizing operations costs as the level of democracy suggests, for example, that democratization waves should coincide with increases in the density of the cooperative interstate networks (e.g. trade density increasing with decreasing transportation costs). Global wars, economic crises, or other processes that undermine cooperative interstate networks, on the other hand, should also trigger reversals in the affected states' respect for the rule of law and human rights, democratic backsliding, and/or other risk factors. The theoretical model and its extensions also generate a number of intriguing predictions regarding, for example, the types of intermediary states, the types of goods that these states are likely to channel, or the types of firms that would use the services of intermediaries.

Replication data

Replication datasets, command files, and the Online appendix are available from http://www.prio.org/jpr/datasets and www.olgachyzh.com. All analyses were conducted using RSiena package in R.

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