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Using Network Effects to Strengthen International Institutions in a Time of Global Instability

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Using Network Effects to strengthen International Institutions in a Time of Global Instability

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Using Network Effects to strengthen International Institutions in a Time of Global Instability

Bryan Druzin

Abstract:

This article argues that policymakers can strengthen international institutions by using network effects to ‘lock’ States into organizations. The article proposes five strategies policymakers may employ to achieve this effect. While the extent to which these strategies can prevent institutional collapse is an open question, the effect may be sufficient in certain situations to tip the balance and prevent a faltering institution from unraveling. Thus, understanding how network effects undergird international institutions, and how to manipulate the effect, provides a potential tool to policymakers to help strengthen global governance in this period of significant disruption.

Keywords: International institutions; network effects; lock-in; global governance.

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1. Introduction

The Western institutional model forged by the US in the aftermath of WWII is now under its deepest and most sustained pressure since its inception. The ascendancy of China as a global power, a pervasive rise in populism, and a general retreat from multilateral governance is threatening to upend this governance structure. It would be a mistake to misjudge the stability of this order. While imperfect, this patchwork of intergovernmental organizations has helped maintain international security and facilitate the movement of goods, services, and investment across national borders for the past seventy years. Yet the constancy of this loose framework for global governance can no longer be taken for granted. As it achieves great power status, it is not unlikely that China will wish to renegotiate the rules of a liberal international order created by the US, and of which the US has been the primary beneficiary. The cardinal question of our age, therefore, is whether political and legal actors worldwide can navigate this period of transition and sustain the integrity of these institutions.¹ This article takes up this critical question,

¹ I use the term ‘international institution’ or simply ‘institution’ here to broadly refer to any *organizational arrangement that involves two or more States*. This may include intergovernmental organizations (IGOs) such as the United Nations and its agencies, yet it also includes trade agreements, security architectures, or any other kind of treaty regime. There is no widely accepted definition of the term ‘international institution’ in the literature. Indeed, “the international relations literature remains unnecessarily balkanized as adherents of different conceptions talk past one another.” John Duffield, *What are International Institutions?* 9 Int. Stud. Rev. 1, 2 (2007). Throughout the article, I use the terms ‘international institution’ and ‘international organization’ interchangeably.

proposing that policymakers can use network effects to reinforce and strengthen existing institutions of international governance.

A network effect occurs where the value of a product or service increases as the number of other agents using the same product or service grows. The classic example of a network effect is language: as a language grows in usage, so too does its usefulness, which encourages further growth in an increasing returns fashion.² For our purposes, the key dynamic produced by network effects is what is known as lock-in. Lock-in occurs when users become unable to abandon a network without incurring high transaction costs and as a result become ‘locked’ into the network. Douglass C. North argues that lock-in may occur in relation to institutions, a dynamic he termed ‘institutional lock-in’ (for which he won a Nobel Prize in 1993).³ North put forward the idea that institutional lock-in occurs because institutions generate massive increasing returns that cause them to become more entrenched over time and, as a consequence, difficult to dislodge.⁴ In the literature, lock-in is seen in a negative light—actors become ‘locked’ into a an institutional arrangement of some kind, unable to migrate to an alternative, more efficient one, creating a dynamic in which sub-optimal arrangements persist in a path dependent manner where they would otherwise be improved upon or replaced.

Building on North’s thesis, this article proposes that this dynamic may be used to strengthen international institutions. Unlike North, however, I am not concerned with organizations becoming locked into particular rules and norms; rather, I am interested in how actors become locked into organizations. I argue that, in the absence of external coercion, a core component of what gives international institutions cohesion is the institution’s network effect—what I call its *network strength*. By this I mean the extent to which actors enter into and remain within an institution as a consequence of network effect pressures.⁵ Absent a compelling reason to abandon an institution, this pressure can be quite robust. States may become locked into an institution

² For the foundational literature on network effects and its focus on path dependence, see P. David, *Clio and the economics of QWERTY*, 75 Am. Econ. Rev. 332 (1985); M. L. Katz, C. Shapiro, *Network Externalities, Competition, and Compatibility*, 75 Am. Econ. Rev. 424, 424 (1985); W. Brian Arthur, *Competing Technologies, Increasing Returns, and Lock-in by Historical Events*, 99 Econ. J. 116 (1989); W. B. Arthur, *Positive Feedbacks in the Economy*, 262 Scientific American 92 (1990); W. B. Arthur, *Increasing Returns and Path Dependence in the Economy* (1994); S. J. Liebowitz & S. E. Margolis, *Path Dependence, Lock-in and History*, 11 Journal Of Law, Economics And Organization 205 (1995). See also Paul A. David, *Why are institutions the ‘carriers of history’?: Path dependence and the evolution of conventions, organizations and institutions*, 5 Structural change and economic dynamics 205 (1994).

³ See Douglass C. North, *Institutions, Institutional Change and Economic Performance* 73-104 (1990) (positing that institutional development may produce a path-dependent pattern of development over time). See also the related work of Paul Pierson: P. Pierson, *Increasing Returns, Path Dependence, and the Study of Politics*, 94 Am. Pol. Science Rev. 251 (2000) (arguing that political institutions are particularly vulnerable to this process). See also P. Pierson, *Not Just What, but When: Timing and Sequence in Political Processes*, 14 Studies in American Political Development, 72 (2000); Kathleen Thelen, *How Institutions Evolve. Insight from Comparative- Historical Analysis*, in Comparative Historical Analysis in the Social Sciences, 208-240 (J. Mahoney & D. Rueschemeyer, ed., 2003) (discussing, among other things, the ‘feedback mechanisms’ that steer institutional and policy trajectories over time).

⁴ Douglass C. North, *Institutions, Institutional Change and Economic Performance* 95 (1990).

⁵ By ‘actors’ I mean State actors; however, this could also be understood as including private institutions or, in some cases, even individual agents.

because the cost of non-participation (in terms of loss of benefit and cost of switching) is high or because the institution is simply the only game in town, or both. Intensifying an institution's network strength may help stabilize an organizational arrangement because users become more deeply locked into an institution. To that end, this article proposes five strategies policymakers may employ to enhance an institution's network strength.⁶ The extent to which this can actually prevent institutional collapse is an open question—its impact is most likely to be felt along the margins. Small effects, however, can often be extremely consequential. In certain situations, increasing an institution's network effect may be enough to tip the balance, preventing a faltering institution from unraveling. Understanding how network effects undergird international institutions, and how to manipulate this effect, provides a tool to policymakers with which to help strengthen global governance in this period of disruption as the international system is buffeted by geopolitical shifts in power and sudden reversals in public opinion on the sub-national level.

I develop my argument in three parts. The first section sets out a more rigorous definition of the concept of network strength. The second section examines ways to gauge an institution's network strength. The third section—the most critical part of the article—then outlines the strategies that may be used to boost an institution's network strength. The final section concludes.

2. Defining Network Strength

The standard definition of a network effect is a situation in which the value of a product or service increases as the number of other agents using the product or service grows.⁷ There are numerous examples of network effects—telephone networks, railway gauges, credit cards, videotape standards, currencies, electrical outlets, screw thread sizes, even time zones.⁸ In each case, increasing returns causes users to coalesce around a specific network and then lock into use of that network unable to practically exit. Again, language illustrates this well. As a result of

⁶ Network lock-in has been explored to varying degrees in the legal literature; however, to my knowledge, no one has outlined specific strategies to manipulate network effects so as to intensify lock-in. See, e.g., Michael Klausner, *Corporations, Corporate Law, and Networks of Contracts*, 81 Va. L. Rev. 757 (1995); Mark A. Lemley, *Antitrust and the Internet Standardization Problem*, 28 CONN. L. REV. 1041 (1996); Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 Cal. L. Rev. 479 (1998); C. Gillette, *Lock-In Effects in Law and Norms*, 78 B.U. L. Rev. 813, 820 (1998); C. Gillette, *Harmony and Stasis in Trade Usage for International Sales*, 39 Va. J. INT'L L. 707, 711–12 (1999); DL Burk, *Law as a Network Standard*, 8 Yale JL & Tech. 63 (2006). See generally, David Grewal, *Network Power* (2008).

⁷ See SJ Liebowitz et al., 'Network Externalities' in Peter Newman (ed) *The New Palgrave Dictionary of Economics and the Law* (1998) 671, 671. Some of this section draws from forthcoming work by the author. See Andrea K. Bjorklund & Bryan Druzin, *Institutional Lock-in within the Field of International Investment Arbitration*, 39 U. Pa. J. Int'l L. (2018) (forthcoming).

⁸ For a very good overview of other network effect examples in a wide range of contexts, see Joseph Ferrell, Paul Klemperer, *Coordination and Lock-In: Competition and Switching Costs and Network Effects* 46-54 (2006). For other inquiries along these lines, see D. Foray, *The Dynamic Implications of Increasing Returns: Technological Change and Path Dependent Inefficiency*, 15 Int. J. Industrial Org. 733 (1997); James Simmie, *Path Dependence and New Path Creation in Renewable Energy Technologies* (2016).

network effects, people are locked into specific languages. Not only are there the obvious costs associated with learning a new language, if a person ceases speaking a specific language, they will lose access to that linguistic network.⁹ If you are, for example, the inhabitant of an isolated rural Chinese village that speaks only Mandarin, while you are free to speak any language you please, you are in practice locked into speaking Mandarin.

This dynamic may also be applied to institutions. In its most straightforward application, the benefits of institutional membership—be it economic integration, the setting of common standards, or the provision of security—increases with each additional member, which in turn draws in more members, until the benefits of participation (and the cost of non-participation) locks actors into the institution. While in the case of some institutions there may be disadvantages to over-expansion, this principle generally holds true.¹⁰ Like language, increasing returns generates network effects in the case of international institutions, producing different degrees of lock-in.

Douglass North offers a similar thesis; however, he adopts a very broad conception of institutions. For North, institutions “include any form of constraint that human beings devise to shape human interaction...”¹¹ North in fact distinguishes between institutions and organizations. Institutions represent the normative rules within which organizations—groups of agents “bound together by some common purpose to achieve certain objectives”¹²—operate. For North, institutions are the rules of the game and organizations are the various teams playing the game. North identifies several sources of increasing returns with respect to institutions: the high start-up costs involved in setting up alternative institutions from scratch; the significant learning effects for an organization; coordination effects driven by direct interconnection with other organizations and indirectly through complimentary activities; and the reduction in uncertainty regarding the permanency of the rules established by an institution.¹³ Collectively, these features, North argues, generate “...an institutional matrix [that] produces massive increasing returns”,¹⁴ bringing about institutional lock-in. North’s focus (and the focus of new institutionalism to which his work was a foundational contribution) is on institutional change, including the evolutionary inefficiencies that path dependency may produce as the result of actors being unable to abandon institutions, which may lead to societal stagnation and decline.

The present argument differs from North’s thesis. First, a semantic point. The term ‘institution’ is understood in this article in its more generic sense: as an organizational framework that regulates the interaction of its members, in this case, international institutions of global governance (I use the terms ‘international institution’ and ‘international organization’ interchangeably). Secondly—

⁹ I am ignoring for the moment the concept of ‘multi-homing’ (the ability to switch between networks), which in this case would take the form of bilingualism. I return to the concept of multi-homing later in the discussion.

¹⁰ Even in cases where over-enlargement of the network may begin to produce diminishing returns (e.g. a political-economic union like the EU), network effects will drive an institution’s expansion up to that point. The potential limits on the benefits that may be derived from network enlargement is discussed in greater detail in Section 3.

¹¹ Douglass C. North, *Institutions, Institutional Change and Economic Performance* 4 (1990).

¹² Douglas C. North, *Economic Performance Through Time*, 84 Am. Econ. Rev. 359, 361 (1994).

¹³ See Douglass C. North, *Institutions, Institutional Change and Economic Performance* 95 (1990).

¹⁴ Douglass C. North, *Institutions, Institutional Change and Economic Performance* 95 (1990).

and more crucially—unlike North, I am not concerned with organizations becoming locked into particular rules and norms. Rather, the focus here is on *how* actors become locked into institutional structures. The present thesis is, in this way, distinct from North's. With this understanding in hand, we may articulate a precise definition of the concept of network strength: network strength is a cohesive force that manifests with respect to any institution that exhibits a high degree of increasing returns so that users become locked into participating in the organization, either because the cost of non-participation (in terms of loss of benefit and cost of switching) is too high or because the institution is simply the only viable game in town, or both. Put more simply, network strength is the extent to which actors enter into and remain within an institution as a consequence of network effect pressures. Network strength may vary greatly from one organization to another, as it may be influenced by a variety of factors. From a theoretical standpoint, this may be quite useful. It is possible—albeit on a very general level—to look at these factors and gauge the network strength of an institution. It is to this idea that I now turn.

3. Gauging Network Strength

Network strength may vary greatly between institutions. An organization's network strength may range from a minor pulse to a powerful binding force. However, by virtue of their networked character, all international institutions possess some degree of network strength. There are indicators we can use to estimate this network strength, which taken together, allow us to make a broad-stroke assessment of its force. While it is difficult to assess an institution's network strength with pinpoint precision, it is possible to get an approximate fix on it where the differences between institutions are extreme. Below I discuss four indicators of network strength.

3.1 Network benefit and 'thickness'

Foremost among these is perhaps the most obvious: how crucial is the benefit that users gain from participating in the institution? This will vary depending on the nature of the institution and the purpose it serves. For example, there is a substantial difference between the benefit gleaned from membership in an institution that provides international security, such as the North Atlantic Treaty Organization (NATO) and an institution that merely establishes common postal standards, the mandate of the Universal Postal Union (UPU). Obviously, the network benefit is far more critical to national governments in the case of the former than the latter.¹⁵ The more crucial this network benefit, the greater the cost of abandoning the institution.

It is, however, not only a matter of the importance of the benefit; the number of benefits provided by an institution is also significant. I refer to this as an institution's *thickness*. A single institution typically provides multiple benefits to its members—one in fact would be hard-pressed to find an international institution that offered only a single benefit to its members. The thickness of

¹⁵ This is not to suggest, however, that the UPU does not possess significant network strength. It in fact boasts a fair degree of network strength due to its high level of *market consolidation* and the high need for coordination in postal delivery. I discuss both of these concepts below.

international institutions ranges greatly. For instance, the World Trade Organization (WTO), the European Union (EU), or the United Nations (UN) provide a deep well of benefits to its members that touch on a wide array of issue areas, many (if not most) of which are of critical importance. This may be contrasted with an institution such as the Nuclear Energy Agency (NEA), which assists member States in the peaceful development of nuclear energy. While the NEA indeed provides many benefits to its members, comparatively, the NEA is not as ‘thick’ as the EU or the UN. Typically, the richer the tapestry of interconnections created and the broader the range of issue areas addressed by an institution, the greater the number of network benefits it will provide to its members. The more benefits an institution creates, the greater an institution’s thickness—the greater the thickness, the greater its network strength.

3.2 Network size and ‘market’ share

The second variable is the size of the network. When it comes to network effects, size matters. In general, the bigger the network (in terms of the number of users), the stronger its network strength is likely to be. Again, language offers a convenient illustration. It is estimated that presently close to a fifth of humankind is conversant in English.¹⁶ As English is widely spoken, the value of plugging into this linguistic network and the cost of permanently unplugging from it is high. Compare this with Somali. Somali is a much smaller linguistic network and so provides little value to speakers in the larger international community. Somali’s network strength is thus less than that of English. Indeed, the standardization of English as the world’s de facto common tongue may, in large part, be attributed to the network effect pressures that underpin linguistic networks.¹⁷

Because network size is a relative concept, a crucial point here is how much of the international system is consolidated into the institution. We can understand this as ‘institutional market share’. Institutional market share is the extent to which the number of States that could in theory participate in the organization are in fact members of the institutional arrangement—that is, all the potential ‘consumers’ in the ‘institutional market’.¹⁸ As all the States in the international system are UN members, the UN may be said to have captured total institutional market share. This may be contrasted with, for example, the EU. The EU presently comprises 28 member States. Putting aside for the moment the EU’s obvious connection with the continent of Europe and considering it merely as a political and economic union, there are a remaining 167 States that, in principle, could join the EU.¹⁹ The EU therefore possesses less institutional market share than the UN. Yet the EU’s institutional market share is much higher than in the case of, for example,

¹⁶ The actual number is somewhere around 1.4 billion people, of which roughly 400 million are non-native speakers. C.M. Millward, Mary Hayes, *A Biography Of The English Language* 342 (2011).

¹⁷ While other factors, such as British colonialism and U.S. military and soft power have no doubt contributed to the linguistic dominance of English, powerful network effects lie at the heart of this linguistic expansion.

¹⁸ Thus, for example, the institutional market with reference to the NEA would comprise only States that are developing nuclear energy.

¹⁹ This is of course merely a thought experiment, as Article 49 TEU explicitly restricts EU membership to European States.

the Association of Southeast Asian Nations (ASEAN), which boasts only 10 member States. Because, there are 185 States that remain outside of this network, ASEAN possesses even institutional market share than the EU.

Institutional market share matters because it affects an organization's network strength. The greater an organization's institutional market share, the greater its network strength. This relates to North's argument regarding the high start-up costs involved in setting up alternative institutions. The more the market is consolidated into one institution the more difficult this 'start-up problem' will be. As it achieves great power status, China may challenge the Western institutional model created by the US and its allies. However, if a powerful State, such as China or another rising power, wishes at some point to replace an existing international organization with one that better serves its national interests, but the existing institution has consolidated the market, the break-away State will find this difficult to pull off notwithstanding its power and influence.²⁰ For example, take the case of the International Centre for Settlement of Investment Disputes (ICSID): with 161 signatory States and 153 States party to the ICSID Convention, ICSID possesses considerable institutional market share.²¹ While not impossible, a rival institution would find it difficult to challenge ICSID's market dominance because the degree to which ICSID has consolidated the institutional market is high, rendering it difficult to unseat.²²

While a State is, in principle, free to exit an institutional arrangement and establish an alternative one, in practice, a government will be as powerless to do this as an individual is to create their own currency or language. While it is possible, it requires large-scale coordination between many (if not a majority of) the existing institution's members. In network effect markets, a product "is only interesting for potential customers if a critical mass of consumers is reached such that the sum of original and derivative utility outweighs the respective costs"²³ of switching to the new product or service. Thus, if the installed base is too small, users will not adopt it; yet, so long as users will not adopt it, the installed base will remain small. If an international institution has achieved total market consolidation, this start-up problem will be formidable. For example, because of its total market consolidation, it would be difficult for a State or a band of States to unilaterally abandon the UN system and replace it with an alternative institutional arrangement. This would require a significant exogenous shock, such as the outbreak of WWII, which saw the

²⁰ See Shuanping Dai, *Networks of Institutions: Institutional Emergence, Social Structure and National Systems of Policies* 43 (2015).

²¹ *Int'l Ctr. for Settlement of Investment Disputes, Database of ICSID Member States*, <https://icsid.worldbank.org/en/Pages/about/Database-of-Member-States.aspx> [<https://perma.cc/XQL3-BS6C>].

²² See Andrea K. Bjorklund & Bryan Duzin, *Institutional Lock-in within the Field of International Investment Arbitration*, 39 U. Pa. J. Int'l L. (2018) (forthcoming) (arguing that, given the current market dominance of ICSID, the emergence of institutional competition from other regions of the world is constrained by network effects).

²³ A. Kemper, *Valuation of Network Effects in Software Markets: A Complex Networks Approach* 73-74 (2010). For this principle, see N. Economides & C. Himmelberg, *Critical Mass and Network Evolution in Telecommunications in Toward a Competitive Telecommunications Industry: Selected Papers from the 1994 Telecommunications Policy Research Conference* (G. Brock, ed., 1995). See also M. Clement et al., *Netzeffekte und Kritische Masse in Marketing Mit Interaktiven Medien – Strategien Zum Markterfolg* (S. Albers et al. ed., 1998); S. Choi and A. Whinston, *The Future of the Digital Economy in Handbook on Electronic Commerce* (M Shaw et al., 2000).

complete collapse of the League of Nations (LN) before the UN could be established as its institutional replacement in the ashes of the war.²⁴

3.3 Member status

A third factor that may affect an institution's network strength is the *status* of its member States. Status is understood here in a broad sense. It includes obvious factors such as a State's geopolitical and economic weight; however, factors such as political stability and a State's reputation as a reliable actor on the world stage will also come into play. Thus, for example, the US may be said to possess higher status than say Liberia. Status, however, may vary depending upon the nature of the institution in question. A State normally seen as wielding less international gravitas than another may possess a unique status with respect to a specific issue area. For instance, Sri Lanka's participation in the Indian Ocean Tuna Commission (IOTC) is more critical than that of the US simply because of Sri Lanka's geographical location. Thus, with respect to the IOTC, Sri Lanka may be understood as possessing higher status than the US. Similarly, with respect to a multilateral environmental agreement (MEA) addressing carbon dioxide emissions, Iran is a higher-status State than the UK, France, Canada, or Australia simply because Iran is a larger producer of CO₂ emissions than any of the latter four countries. An international institution with high-status members is more likely to enjoy robust network strength for two reasons. The first is that a high-status State will increase the value of an institution for all its members in a substantive sense—i.e. because of its economic, military, strength, etc. The second reason, however, is less obvious. There is an important signalling component to the participation of a high-status State. Their participation can help curate 'market' expectations, signalling to the international system that the institution boasts robust support. This helps shape perceptions regarding an institution's stability, which in turn can "drive market outcomes such that they become self-fulfilling."²⁵ This signalling component is fleshed out greater detail in section 3.

3.4 Synchronization benefit

²⁴ The LN never achieved a sufficiently robust level of network strength for many reasons. For one, the LN never carved out a high level of market consolidation—at its height, the LN boasted only 58 member States. Moreover, pivotal powers never joined the LN (namely the US), or did not overlap in their period of membership. This second point relates to the concept of member status, which I discuss in the section that immediately follows.

²⁵ Irina Suleymanova, et al., *On the Role of Consumer Expectations in Markets with Network Effects* (Dice Discussion Paper, Paper No. 13, 2010). On self-fulfilling prophecies, see Thomas C. Schelling, *Micromotives and Macrobehavior* 115-18 (1978, 2006 ed.).

A fourth variable that may speak to an institution's network strength is what is known in the literature as *synchronization value*.²⁶ Synchronization value arises where agents require common standards in order to coordinate their interactions. Again, language is a good example: in order to communicate (synchronize), speakers require common words with established meanings (common standards). Synchronization value may be distinguished from other kinds of network benefits that are not wholly tied to the element of synchronization. For instance, NATO's primary network benefit is that it provides collective security to its members. While this undoubtedly involves high degrees of synchronization, synchronization is not the principal benefit of NATO membership. This may be contrasted with the UPU. The UPU's primary benefit is its synchronization value (establishing universal postal standards so as to coordinate postal delivery between its member States). Its institutional function is essentially to solve a simple coordination game between States, i.e. facilitating postal delivery through the creation of common standards. While all institutions provide network benefits, synchronization does not always feature prominently as a benefit. Institutions whose primary or sole benefit is the provision of synchronization tend to be quite robust because the member States are not only locked into the existing standards, they have little incentive to abandon these standards. Such institutions more closely resemble pure coordination games—i.e. driving on the left side of the road is just as good as driving on the right so long as everyone is in agreement. Synchronization value may infuse an international institution with a substantial degree of network strength. International organizations whose primary benefit is establishing coordination standards tend to possess robust network strength. The more crucial the need to coordinate, the more intense this network strength.

While pinpoint precision is elusive, by considering such metrics as network benefit, thickness, network size, market consolidation, member status, and synchronization value, we can get a rough fix on an institution's network strength. These indicators, however, have to be weighed against one another. Strength in one may compensate for weakness in another. For instance, while the North American Free Trade Agreement (NAFTA) only comprises of three States (a small network size), it is a very thick institution that involves a high-status State (the US), and which offers significant economic benefits to its members. Thus, although it falls short in terms of network size, because it compensates for this in other areas, NAFTA's network strength is robust. In other cases, strength in one metric may be insufficient to compensate for weaknesses in another. For example, although the Paris Climate Agreement addresses a critical issue and boasts 195 signatories (all of the international community save one State), the US's withdrawal from the agreement has sapped it of substantial network strength, weakening the Paris Agreement as a viable scaffolding for future environmental cooperation, despite the importance of the agreement's network benefit, its large network size, as well as its market consolidation.

While an institution's network strength is difficult to assess between two institutions whose network strength differs only slightly, it is easier to distinguish when this difference is extreme. Slight differences in network strength are difficult to gauge—substantial differences are not. And although it may be hard to quantify precisely, we can, for instance, confidently make the claim that the UN possesses greater network strength than, for example, the International Commission

²⁶ For the concept of synchronization benefit, see S.J. Liebowitz & Stephen E. Margolis, *Should Technology Choice be a Concern of Antitrust Policy?* 9 Harvard Journal of Law & Technology 283, 292 (1996).

on Missing Persons (ICMP). The ICMP is not comparable to the UN in any of the metrics discussed above.

Having outlined how institutions may differ with respect to their network strength, we may now examine how to increase network strength. The section that follows outlines five strategies to do this.

4. Increasing Network Strength

Several of the dynamics discussed in the previous section can be manipulated to boost an institution's network strength. This is the core of our discussion for if we can enhance an institution's network strength, we can render it more resilient to collapse. This section offers a tool box of sorts—five strategies policymakers may adopt to achieve this. These five strategies are: (1) thickening, (2) network enlargement, (3) status management, (4) embedding coordinating standards, and (5) prohibiting multi-homing. The efficacy of these strategies will vary depending on the character of the institution in question. Yet, while the feasibility of these strategies differs between institutions, they all may be applied to some degree to most international organizations. This is because all international organizations are composed of individual member States linked together, and so, on a basic structural level, are networks.

4.1 Thickening

The first of these strategies, *thickening*, entails increasing the number of benefits member States derive from an institution. This can be done by expanding the scope of issue areas covered by the institution. The evolution of the EU from a rudimentary customs union focused simply on issues of industrial production to an organizational arrangement of ever-increasing economic, legal, and political complexity is an example of thickening. While the institutional strength of the European project remains the subject of perennial speculation, the broadening of the union and the deepening of its political and economic ties has made it more cohesive than it would have otherwise been. This is, however, not to suggest that thickening renders exit from a network impossible. Indeed, the case of Brexit clearly demonstrates otherwise. However, the fact that the UK's withdrawal from the EU is the cause of such enormous economic and socio-political upheaval illustrates the binding effect of thickening. Had the UK had joined the European Economic Community (EEC) in 1958 and left it a few years later, it would have hardly registered as a global event of such historic import as Brexit.

Another example of thickening is the UN's incremental expansion through the creation of new agencies or the incorporation of existing institutions as specialized agencies into the UN System. In the case of the UN, thickening has occurred gradually over three-quarters of a century. Specialized agencies, such as the World Bank Group (WBG) established in 1944, the World Health Organization (WHO) established in 1948, the International Atomic Energy Agency (IAEA) formed in 1957, the World Intellectual Property Organization (WIPO) established in

1967, the United Nations Industrial Development Organization (UNIDO) founded (as a specialized agency) in 1985, and the WTO²⁷ established in 1995 increased the UN's network strength by multiplying the benefits of UN membership while raising the costs of remaining outside of the UN system. Although not every UN member is also a member of these sub-agencies, the UN system as a whole is indirectly strengthened as its web of intra-institutional arrangements grows—that is, as the UN system thickens.²⁸ This gradual expansion has increased the UN's network strength.

The idea of thickening resembles the neofunctionalist theory of regional integration that underpins the EU (and in some respects is similar to the concept of complex interdependence in IR).²⁹ The idea, however, has particular resonance where network effects are at play because increasing ties intensifies lock-in—the more numerous the benefits, the greater the relative cost of exiting the network becomes. Not only is it more beneficial to remain within the institution, but exit entails a loss of those benefits. Members thus become progressively more committed to an institution because the relative price of leaving it grows higher with each new benefit. Although he does not explicitly reference switching costs and lock-in, John Ikenberry notes the effect: “as more of their activities are hooked into the institution and its operations...[agents] have a stake—or a vested interest—in the continuation of the institution.”³⁰ The result is that the “costs of disruption or change in the institutions grow over time.”³¹ Thus, as benefits proliferate, it becomes more difficult for States to reduce or withdraw their commitment to an organization.

It is not always logistically realistic—indeed often it is simply impossible—to augment the benefit actors glean from an institution; however, it is usually possible to increase the *number* of benefits on offer by broadening the range of issues areas the institution addresses. In fact, many if not most organizations tend to naturally thicken overtime as a consequence of institutional growth. However, thickening may also be implemented as a deliberate strategy to enhance an

²⁷ While the WTO is not a specialized agency of the UN, it has a close relationship with the UN and its various agencies, a partnership governed by the “Arrangements for Effective Cooperation with other Intergovernmental Organizations-Relations between the WTO and the United Nations” signed on 15, November 1995.

²⁸ A situation in which an actor gains benefit indirectly from network growth is known in the literature as an indirect network effect. For example, every new Tesla owner creates the impetus to build more charging stations in a city, which then indirectly benefits every other Tesla owner in that city. For a deeper explanation of the distinction between direct and indirect network effects, see Bryan Druzin, *Buying Commercial Law: Choice of Law, Choice of Forum, and Network Externalities* 18 Tulane J Int'l & Comp L 131, 149-53 (2009); Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 Am. Econ. Rev. 424, 424 (1985). See also M. Lemley & D. McGowan, *Legal Implications of Network Economic Effects*, 86 Cal. L. Rev. 479, 488-94 (1998) (distinguishing between what they term “actual networks,” “virtual networks,” and “positive feedback effects”).

²⁹ See Ernst B. Haas, *The Uniting of Europe: Political, Social, and Economic Forces, 1950-1957* (1958). For complex interdependence, see Robert Keohane and Joseph Nye, *Power and Interdependence: World Politics in Transition* (1977).

³⁰ Gilford John Ikenberry, *After Victory: Institutions, Strategic Restraint, and the Rebuilding of Order after Major Wars* 70 (2009).

³¹ Gilford John Ikenberry, *After Victory: Institutions, Strategic Restraint, and the Rebuilding of Order after Major Wars* 70 (2009).

institution's network strength. While the approach conforms better to some international institutions than others, it can be applied to most institutions to some degree.

4.2 Network enlargement

A second strategy policymakers may employ to strengthen an institution, *network enlargement*, is by increasing an institution's number of member States. This is because, while there are exceptions, an institution's network benefit generally grows as the size of the network increases. Thus, increasing the size of an institution's network is one way to increase its network benefit and thereby strengthen it.

Institutions whose primary benefit to its members is that it facilitates coordination will be particularly responsive to this approach because an increase in network size allows States to coordinate with a larger number of States. This is captured in the example of language: the more people who speak a language, the more useful it becomes because there are more speakers with which one can communicate.³² However, any institution whose benefits increase as its membership grows will be receptive to this strategy, which is the case with most institutions.

Network enlargement may also advantage an organization because it impedes institutional competition. The society of nations is a finite system with a limited number of State actors (only 195).³³ This finite character is an important point because it creates a zero-sum game in most cases: as an institution's market share increases, there are, by definition, less non-member States remaining in the system. This shrinks the pool of potential members to a rival institution, exacerbating the *start-up problem* discussed earlier.³⁴ If non-member States represent a minority, it will be difficult for a new institution to challenge an incumbent institution to which the majority of the international system belongs.³⁵ If the incumbent enjoys total market share, short of some powerful exogenous shock, it will be extremely difficult for an upstart institution to gain traction because States are locked into the incumbent both by the benefit it provides and the loss of that benefit should a State abandon the dominant institution and switch to the replacement.

The approach, however, should be applied judiciously. This is because in some instances, over-expansion may in fact undermine an institution's stability. For instance (to take an exaggerated example), if the EU were to suddenly fling open membership to all 54 African States, this would certainly weaken the EU (indeed, it would likely lead to its collapse). The mind reels at the

³² This assumes an agent is not limited in those with which she wishes to communicate.

³³ This figure is based upon the US Department of State's count of independent States.

³⁴ Institutional rivalry will likely arise wherever there is substantial similarity between two or more international organizations in terms of their primary objectives and purpose. Their specific form and function, however, need not be wholly identical for rivalry to take root. For instance, while the Warsaw Pact and NATO differed considerably in many respects, because their primary objectives were the same (and because they dealt with an issue of such import), intense institutional rivalry emerged.

³⁵ I have discussed the start-up problem in relation to international institutions, specifically ICSID, elsewhere. See Andrea K. Bjorklund & Bryan Duzin, *Institutional Lock-in within the Field of International Investment Arbitration*, 39 U. Pa. J. Int'l L. (2018) (forthcoming).

variables involved: political and economic forces, cultural heterogeneity, security considerations, etc. In other cases, network enlargement may strengthen an institution yet may start yielding diminishing returns beyond a certain threshold, rendering network enlargement a very effective strategy, but only to a specific level of expansion. With respect to many institutions, however, unlimited network expansion will clearly benefit an institution. This is the case, for instance, where free-riding is a problem, such as with MEAs or environmental organizations that address public goods and require significant upfront economic sacrifice. Non-member States free-riding off of member States' efforts may destabilize an MEA. As their membership increases, however, MEAs grow in strength because the pool of free-riding States shrinks commensurate with the network's enlargement. For instance, the network strength of the Global Environment Facility (GEF), which boasts a sizeable market share of 183 member States, would only increase if the remaining States in the international system (who are currently free-riding) joined the fund.

Network enlargement, however, may not always be feasible—particularly when the institution is already faltering (it is difficult to attract new investors when a business is failing). As a practical matter, therefore, it may be more prudent for policymakers to pursue this strategy while an institution is regarded as stable. Moreover, policymakers may need to consider such variables as when to expand, the rate of expansion, and which specific States to target as members. Depending upon the organization in question, such variables may be pivotal. While network enlargement will not translate into an increase in network strength in each and every case, as a *general* rule, the larger the network's size, the more robust the institution's network strength will be.

4.3 Status Management

A third strategy policymakers may employ to strengthen an institution relates to the status of its members. Because the value of an institution for each of its member States depends to some degree on the participation of other member States, institutions are vulnerable to bandwagoning behaviour. The exit of any member State from an institution will reduce the organization's value for its remaining members. This may in turn cause others to follow suit in a self-reinforcing manner. A “jumping ship” effect may occur, creating a death spiral towards collapse.³⁶ The choices of high-status States are especially consequential because their impact is greater than low-status States. This impact operates in two dimensions. The first is in terms of the substantive benefits they bring to an institution. The second is the effect they have on collective perceptions. The latter is arguably the more important of the two because, while the substantive impact of the behaviour of high-status States is not always clear or possible to correctly quantify, perceptions are constantly in operation whether they are accurate or not. Thus, in network effect markets, perceptions matter.³⁷ The loss of a high-status member can shatter collective confidence in an institution, which can trigger a dynamic of self-confirming expectations. To use Thomas

³⁶ I have written elsewhere on collective expectations. See Bryan Druzin, *The Parched Earth of Cooperation: How to solve the Tragedy of the Commons in International Environmental Governance*, 27 Duke J. Comp. & Int'l L. 73, 96 (2016). I draw from that article here.

³⁷ J. Farrell et al., *Coordination and Lock-in: Competition with Switching Costs and Network Effects*, in 3 Handbook of Industrial Organization 1967, 2025 (M. Armstrong, R. Porter ed., 2007).

Schelling's bank-run example: if people believe that a bank is on the verge of insolvency, they will hurry to withdraw their money, provoking the very insolvency they fear.³⁸

The value of some institutions, such as MEAs and other treaties that require collective action and/or are threatened by free-riding, are highly sensitive to the participation of high-status States, and particularly vulnerable to this pattern of collapse. The US's failure to ratify the Kyoto Protocol had a significant impact on the treaty's underlying network strength: it caused Canada to later withdraw, which effectively crippled the treaty (the US's withdrawal was itself a response to perceived free-riding by high-status polluters such as China and India). Although it did not collapse, Kyoto was so weakened that the international community was forced to negotiate the Paris Agreement in 2015. However, the US's announced withdrawal from the Paris Agreement in 2017 has infused the agreement with a sudden miasma of doubt and may yet prove to be a lacerating blow. In the wake of the loss of such a high-status State, the perception that commitment to the agreement may now also be flagging among other States may enervate compliance, becoming a self-fulfilling prophecy.³⁹ This, however, can work the other way as well. The participation of high-status States may strengthen an institution, triggering a positive bandwagon in which States, perceiving the institution as having grown more robust, join or, if already members, cleave even tighter to the organization.

Either way—positive or negative—high-status members boast an outsized importance. Policymakers can shape the collective expectations surrounding an institution by strategically acquiring or maintaining these actors as members. This may prove particularly effective in situations of institutional competition in which actors must choose between organizations. In such situations, as in any game with multiple equilibria, curating public perceptions are often decisive in 'tipping' a market.⁴⁰ In cases that involve a 'critical mass' dynamic, the behaviour of high-status States may be a matter of life or death for an institution. Institutions that possess an all-or-none flavour often exhibit a point at which a threshold is surpassed and the system suddenly 'tips' with States either flocking into the institution or abandoning it en masse.⁴¹

4.4 Embedding coordinating standards

A fourth strategy policymakers may pursue is to embed coordinating standards into an institutional framework. This tactic may not be possible to deploy in many cases; however, where an international organization is amenable to the approach, its network strength may be substantially increased. So long as some benefit is gleaned from coordination, then the

³⁸ I am paraphrasing Schelling here. Thomas C. Schelling, *Micromotives and Macrobehavior* 117 (1978, 2006 ed.).

³⁹ See Bryan Druzin, *The Coming Collapse of the Paris Agreement*, 45 Harv. J. on Legis. (2017).

⁴⁰ William Page et al., 'Network Externalities' in *Encyclopaedia of Law and Economics* 952, 960 (Boudwijn, Bouckaert, & DeGeest eds., 2000).

⁴¹ For the concept of critical mass and tipping, see Thomas C. Schelling, *Micromotives and Macrobehavior* 98-99, 101-110 (1978, 2006 ed.). The idea of 'tipping points' was first developed by Morton Grodzins. Morton Grodzins, *Metropolitan Segregation*, 197 *Scientific American* 33-47 (1957). See also the concept of 'phase transition' in physics and the study of complex systems.

introduction of more coordinating standards will increase that benefit and thereby increase an institution's network strength.

This strategy will yield its greatest impact on institutions that deal with issue areas that resemble pure coordination games (e.g. left-hand versus right-hand drive). In such cases, coordinating standards may produce a deeper lock-in effect simply because actors have little to no incentive to switch to other standards and every incentive to continue using the incumbent standard. Examples of such international institutions (although to different degrees) would include the UPU whose principal benefit is coordinating global postal delivery, the International Telecommunication Union (ITU), which provides common standards for international radio and telecommunications, and the International Labour Organization (ILO), which sets international labour standards. Because the principal benefit of these organizations lies in their setting of common standards that facilitate coordination, they are natural candidates for the strategy.

This is, however, less the case for international organizations that deal with issue areas that are more accurately described as mixed-motive games.⁴² In such cases, the lock-in effect of introducing additional coordinating standards will tend to be less pronounced because actors may have other concerns that will offset the benefits of coordination. The vast majority of international organizations address areas that resemble mixed-motive games rather than pure coordination games. However, even in these cases, there is benefit to be had in coordination, and so the introduction of more coordinating standards will still boost an institution's network strength—it will just do so to less powerful degrees. By dint of their networked structure, all international institutions provide at least some benefits from coordination. How much will depend on the institution in question.

It is in fact more accurate to speak in terms of international organizations as existing along a spectrum. Certain institutions—ones that deal in issue areas that hew closer to pure coordination games—will be more hospitable to the strategy. The approach's efficacy, however, will be less pronounced in the case of international institutions whose coordinating benefit is merely a collateral outcome and not its primary focus. For example, while international organizations such as the International Monetary Fund (IMF), the International Maritime Organization (IMO), the World Intellectual Property Organization (WIPO), and the WHO, all establish standards that enable coordination, coordination in these cases is merely a means to achieve the other benefits these organizations strive to provide rather than the benefit itself. For example, while a substantial degree of standardization is necessary for the functioning of the WHO, its primary benefits are mitigating the effects of disease, strengthening health services, the furnishing of aid in emergencies, the eradication of epidemics, and so on and so forth. Coordination merely helps achieve these ends; it is not the WHO's primary benefit. All international organizations, however, provide at least some benefit in the form of coordination and so the network strength of all

⁴² The prime example of such a game structure that may underpin an international organization would be the Battle of the Sexes. In a Battle of the Sexes, the parties' preferences are partly coincident and partly opposed. The classic example is a scenario in which a husband wants to attend a football game and the wife wants to see the opera, yet both would prefer to do the other's activity if the alternative is to do their activity alone. See Stanley Besen & Joseph Farrell, *Choosing how to Compete: Strategies and Tactics in Standardization* 8 J. Econ. Perspectives. 117, 124-6 (1994).

international institutions may be increased through the strategic introduction of coordinating standards—it is merely a question of to what extent and to what significance.

4.5 Prohibiting multi-homing

The fifth and final strategy I will propose relates to a concept called multi-homing. Multi-homing occurs when users in a networked system concurrently adopt two or more services. For example, merchants employing incompatible credit card payment systems such as Visa and MasterCard are multi-homing.⁴³ Likewise, Apple computers allowing users to switch between operating systems is another example of multi-homing. The ability to multi-home is significant because it frees actors from having to choose between competing networks. Released from this constraint, actors face little to no costs in switching to another network. This ease of adoption weakens the lock-in effect, allowing a new service or product to gain a foothold in a network effect market where users would otherwise be locked into the incumbent standard.⁴⁴

In situations in which an organization is facing institutional competition, prohibiting multi-homing can help lock in members. This is in fact a common business tactic commercial actors employ in network effect markets to maintain their dominant position.⁴⁵ Firms attempt to buttress their market position through a strategy of engineered incompatibility.⁴⁶ Institutional networks, in that they are networked systems, are no different, and indeed many international organizations pursue this strategy. For example, the Russian-led military alliance, the Collective Security Treaty Organization (CSTO), prohibits signatories from holding concurrent membership in other security arrangements.⁴⁷ Multi-homing also stymies institutional competition because it shrinks the potential user base available to a rival organization, creating barriers to entry.

Policymakers, however, must exercise caution in applying this strategy. Critical here is an organization's degree of market dominance. The strategy is effective only where the institution enjoys a substantial degree of market share. In such cases, unable to multi-home, members will be forced to a decision and, if all else is equal, will choose to remain in the incumbent institution. In situations where this is not the case, however, prohibiting multi-homing can produce the exact opposite effect—put to a decision, members may abandon an organization and flock to the more robust network.

⁴³ See J. Farrell J & P. Klemperer, *Coordination and lock-in: Competition with switching costs and network effects*, in *Handbook of Industrial Organization* 2009, 2032, 2051 (Mark Armstrong & Robert Porter, ed., 2007).

⁴⁴ Joseph Ferrell, Paul Klemperer, *Coordination and lock-in: Competition with Switching Costs and Network Effects* 44, 51 (C.E.P.R. Discussion Papers, No. 5798, 2006).

⁴⁵ M. Katz, C. Shapiro, *Systems Competition and Network Effects*, 8 *J. Econ. Perspectives* 93, 110, 111 (1994).

⁴⁶ Hans-Werner Gottinger, *Economies Of Network Industries* 93 (2003).

⁴⁷ Marcel De Haas, *Russia's Foreign Security Policy in the 21st Century* 40 (2010). Although less explicitly, Article 8 of NATO establishes a similar constraint (dual membership must conflict with a State's obligations under NATO).

5. Conclusion

There are certain limitations to the thesis that should be noted. First, the extent to which increasing an organization's network strength may prevent collapse is difficult to say with confidence. There are a slew of factors that may contribute to institutional collapse making it hard to draw a straight line from a strategy's implementation to its impact. A strategy's effectiveness can only be clearly assessed in cases where it fails. Where an institution remains stable, we can never be certain that this can be attributed to the strategy and not to some other factor or factors.

Second, these strategies may simply not apply in some cases, and where they do, a wide range of variables may distort their effect. In other cases, a strategy may be highly effective yet other considerations beyond institutional stability may take priority. For example, while network enlargement may increase the institutional cohesion of NATO, clearly, there are important geopolitical implications to expanding NATO that would need to be carefully weighed. To take another example, prohibiting multi-homing may effectively bolster the market dominance of the World Food Programme (WFP), but the world's hungry may be better served by the existence of multiple organizations that promote food security.

Indeed, institutional competition may in fact not be a bad thing. An argument could be made that a degree of 'institutional fluidity' should be preserved because it allows institutions to evolve. Artificially fortifying institutions hobbles the force of competition, which, the argument goes, drives institutions towards greater efficiency.⁴⁸ Indeed, this is the primary concern of the new institutionalists: lock-in can cause sub-optimal arrangements to persist.⁴⁹ Given this, locking States into current institutional arrangements by ratcheting up network effect pressures may, in the long-run, impede the positive development of international order.

Some may object to the foundational premise, upon which the model rests—that there exists a 'market' for international institutions. To this point, it should be noted that there is, in a certain respect, nothing structurally unique about States. They are concentrations of organizational power that cooperate to form larger institutional configurations when it suits their purposes and disband when they do not. Methodologically, it makes little difference if the actor in question is an individual, a firm, or a national government—all that is required is that, when acting on the international stage, the agent behaves as a unified entity (States meet this criterion), the agent acts (generally) in its rational self-interest, and that the agent's choices inform the decisions of other actors within the system, producing a macro-level effect that no single agent controls. If these elements are present, a market model, albeit loosely defined, may be applied.

Finally, there is a normative question of whether preserving the current international institutional order is in fact what we want. While this discussion made mostly descriptive claims, there was

⁴⁸ Perhaps the most well-known exponent of this efficiency argument is Hayek. *See, e.g.*, F.A. Hayek, *The Constitution of Liberty* 58-63 (1960, 1978 ed.).

⁴⁹ *See, e.g.*, Douglass C. North, *Institutions, Institutional Change and Economic Performance* 73-104 (1990); Avner Greif, *Cultural Beliefs and the Organization of Society: A Historical and Theoretical Reflection on Collectivist and Individualist Societies*, 102 *J. Pol. Econ.* 912 (1994); Gary Hamilton & Robert Feenstra, *The Organization of Economies*, in *The New Institutionalism in Sociology*, 153, 172-73 (Mary Brinton & Victor Nee, ed., 1998).

throughout an implicit normative assertion being made that the current US-led rules based order should be maintained. A rising power such as China as well as many other governments around the world might disagree, seeing the international model as favouring the US and the West more generally. Some may argue that preserving the current architecture of international institutions means preserving an implicit ideological bias. For instance, many may contend that institutions such as the WTO and the IMF represent and promote specific ideologies and values that may be unjust towards weaker actors in the international system. Protecting the liberal international order may stifle socio-economic pluralism, such as challenges to the global trading system initiated from below by regional economic blocs. A more interactionist approach would advocate an international legal order that grows from a less deliberate and more spontaneous process, and that takes into account the social costs of blindly preserving existing international structures.⁵⁰

I leave these questions to the reader to consider. What was offered here was a suite of strategies policymakers may deploy to strengthen the current network of international institutions; however, whether this is desirable, and with respect to which institutions, are questions not taken up here. Yet as State sovereignty vigorously reasserts itself and the US withdraws further into self-centred isolation, the question of whether the current liberal institutional model will falter, and what to do about it if anything, is fast pressing down on us. It is a question we have no choice but to address.

⁵⁰ On the connection between an interactionist approach to law and legal pluralism, see Lon Fuller, *The Morality of Law*, 123-129 (1969); Philippe Nonet and Philip Selznick, *Law and Society in Transition: Toward Responsive Law*, 95-103 (1978). With reference to international trade law, see Moshe Hirsch, *Invitation to the Sociology of International Law* 37-38 (2015).