QUANTIZING GEOECONOMICS: EMERGING GEOECONOMICS IN INTERNATIONAL ECONOMIC LAW THROUGH A QUANTUM WORLDVIEW

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ABSTRACT

Geoeconomics captures anomalies in neoliberalism, represented by the resurgence of national security protection and regional competition in the global economic order since 2016. Yet, several aspects of geoeconomics have been criticized. Inspired by the recent developments in quantum theories in international relations, we aim to create a theoretical framework for the quantization of geoeconomics by using quantum measurement and holism at the analogical and ontological levels, respectively, to better conceptualize geoeconomics within the scope of international economic law. The article analyzes geoeconomics on the premise of a holographic ontology with features of the probabilities of wave functions, as evidenced by the practices of China and the US under cooperative and competitive geoeconomics. This work is the first attempt to "travel" quantum theories to international economic law.

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It calls for collective endeavors to transcend the limitations of a quantum worldview and develop new scholarships to expand the outreach of international law.

KEYWORDS: *geoeconomics, national security protection, quantum theories, quantum international relations, global economic order, international economic law*

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I. INTRODUCTION

Economic activities have been used as powerful tools for geostrategies ever since the formation of the contemporary society of nations. Geoeconomics, as an international relations (hereinafter "IR") theory, was therefore established near the end of the Cold War to demonstrate power competitions in the economic arena. In the field of international economic law, geoeconomics has been widely adopted by scholars since the intensified US-China rivalry in 2016, to describe the incremental disintegration of the neoliberal interest-oriented organic system and the resurgence of national security protection and regional competition.[1] Geoeconomics is significant in providing justifications for anomalies of neoliberalism. It is also forming a new paradigm for practice in international economic relations and international economic law—as advocated by the geoeconomics project. Despite this, the study of geoeconomics has been criticized as inadequate for several reasons including its vague definition, negative assertions, and overt focus on the intensified US-China rivalry after 2016.[2] Scholars have attempted to tackle these problems from within the IR or international law space, as represented by differentiating geoeconomics from geopolitics,[3] analyzing states' geoeconomic strategies,[4] and anticipating consequences of the recalibration of economics and security and the growing US-China rivalry for global economic governance.[5] However, the field needs fresh

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[1] *See, e.g.*, Geraldo Vidigal, *A Really Big Button that Doesn't Do Anything? The Anti-NME Clause in US Trade Agreements Between Law and Geoeconomics*, 23(1) J. INT'L ECON. L. 45 (2020); Anthea Roberts et al., *Toward a Geoeconomic Order in International Trade and Investment*, 22(4) J. INT'L ECON. L. 655 (2019); Sören Scholvin & Mikael Wigell, *Power Politics by Economic Means: Geoeconomics as an Analytical Approach and Foreign Policy Practice*, 37(1) COMPAR. STRATEGY 73 (2018); Lindsey Giggy, Investing in the Future World Order: Geoeconomic Strategy and Foreign Direct Investment (June 1, 2017) (thesis, Maxwell Air Force Base) (on file with Defense Technical Information Center); ROBERT D. BLACKWILL & JENNIFER M. HARRIS, WAR BY OTHER MEANS: GEOECONOMICS AND STATECRAFT (2016).

[2] *See, e.g.*, Harlan Grant Cohen, *Nations and Markets*, 23(4) J. INT'L ECON. L. 793 (2020); Gregory C. Shaffer & Henry Gao, *A New Chinese Economic Order?*, 23(3) J. INT'L ECON. L. 607 (2020); Mikael Mattlin & Mikael Wigell, *Geoeconomics in the Context of Restive Regional Powers*, 14(2) ASIA EUR. J. 125 (2015).

[3] *See, e.g.*, Cheng-Chwee Kuik, *The Twin Chessboards of US-China Rivalry: Impact on the Geostrategic Supply and Demand in Post-Pandemic Asia*, 45(1) ASIAN PERSP. 157 (2021); Sami Moisio, *Towards Geopolitical Analysis of Geoeconomic Processes*, 23(1) GEOPOLITICS 22 (2018); Mikael Wigell & Antto Vihma, *Geopolitics Versus Geoeconomics: The Case of Russia's Geostrategy and Its Effects on the EU*, 92(3) INT'L AFFS. 605 (2016).

[4] *See, e.g.*, Dong Jung Kim, *The Perils of Geoeconomics*, 42(1) WASH. Q. 153 (2019); Mikael Wigell, *Conceptualizing Regional Powers' Geoeconomic Strategies: Neo-Imperialism, Neo-Mercantilism, Hegemony, and Liberal Institutionalism*, 14(2) ASIA EUR. J. 135 (2016).

[5] *See, e.g.*, Garth L. le Pere, *US-China Geoeconomic Tensions: Implications for the African Continental Free Trade Area*, 45(1) ASIAN PERSP. 147 (2021); Tanguy Struye de Swielande, *The Biden Administration: An Opportunity to Affirm a Flexible and Adaptive American World Leadership*, 184(2) WORLD AFFS. 130 (2021); Geoffrey Gertz & Miles M. Evers, *Geoeconomic Competition: Will State Capitalism Win?*, 43(2) WASH. Q. 117 (2020); Roberts et al., *supra* note 1;

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perspectives from both scholarships and through the adoption of methodologies that originated in different disciplines in order to stimulate curiosity and exploration, and to further the understanding of geoeconomic implications for the making, interpretation, and application of international economic law.

Quantum theories emerged in the 1900s and were deeply rooted in both physics and philosophy.[6] They were expected to advance technological development through quantum mechanics and offer support for philosophical thought on the nature of existence, human relations, and social events.[7] Because "physics envy" among the social sciences waned in the early twentieth century and today's science and social science are well-established independent research domains, the latter function of quantum theories was never given a fair shot until the scholarship of quantum IR—recognized as a landmark contribution of Alexander Wendt in 2015[8]—which has proven to be a "rising star" that embraces, at least, an inspirational value for an "as if" speculation towards the classically defined social sciences, and at most, a potential to bring a quantum turn in specific fields with a focus on relations.[9] IR scholars have made attempts to "quantize IR" to the extent that the field is undergoing a "permanent quantum revolution," which has ignited heated debates on the ontological and epistemological bases for IR and on the virtues of quantum theory for international security matters.[10] Against this backdrop, we intend to "travel" a quantum worldview in order to apprehend the emerging global economic order in international economic law.

Shaffer & Gao, *supra* note 2.

[6] James Der Derian & Alexander Wendt, *'Quantizing International Relations': The Case for Quantum Approaches to International Theory and Security Practice*, 51(5) SEC. DIALOGUE 399, 401 (2020).

[7] For an overview of how philosophies influence quantum physics, see generally FRITJOF CAPRA, THE TAO OF PHYSICS: AN EXPLORATION OF THE PARALLELS BETWEEN MODERN PHYSICS AND EASTERN MYSTICISM (4th ed. 2000). For a discussion on how modern science represents a new meaning of ontology, see generally Patrick A. Heelan, *Phenomenology, Ontology, and Quantum Physics*, 18(2) FOUNDS. SCI. 379 (2013). For philosophers' interactions with physics on quantum theories, see generally JIMENA CANALES, THE PHYSICIST AND THE PHILOSOPHER: EINSTEIN, BERGSON, AND THE DEBATE THAT CHANGED OUR UNDERSTANDING OF TIME (2015); ARTHUR I. MILLER, DECIPHERING THE COSMIC NUMBER: THE STRANGE FRIENDSHIP OF WOLFGANG PAULI AND CARL JUNG (2009).

[8] *See generally* ALEXANDER WENDT, QUANTUM MIND AND SOCIAL SCIENCE: UNIFYING PHYSICAL AND SOCIAL ONTOLOGY (2015).

[9] *See, e.g.*, Chengxin Pan, *Enfolding Wholes in Parts: Quantum Holography and International Relations*, 26 EUR. J. INT'L RELS. (SPECIAL ISSUE) 14 (2020); Michael P. A. Murphy, *Quantizing Post-critique: Entangled Ontologies and Critical International Relations*, 49(1) MILLENNIUM: J. INT'L STUDS. 175 (2020); Der Derian & Wendt, *supra* note 6; Marcus Holmes, *Re-Evaluating Theory and Methods in Diplomatic History: Bringing in Psychology, Neuroscience, Micro-Sociology, and Quantum*, 1 DIPLOMATICA 19 (2019); Alexander Wendt, *The Mind–Body Problem and Social Science: Motivating a Quantum Social Theory*, 48 J. THEORY SOC. BEHAV. 188 (2018).

[10] *See generally* Der Derian & Wendt, *supra* note 6.

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This article establishes a theoretical framework to better conceptualize the paradigm shift of geoeconomics within international economic law, which is represented by the resurgence of national security protection and regional competition after the US-China tech and trade wars. In the first part, I look at the growing literature on the national security protection and regional competition, acknowledging that this domain provides an important but limited account for the changing order in international economic law. Geoeconomics theory can offer a better framework to explain the fall of neoliberalism and the rise of a new world order, despite the three points of criticism mentioned above. In the second section, I offer a historically construed neutral formation for geoeconomics as its definition. Then, I use the quantum measurement and holism theories at the analogical and ontological levels, respectively, to synthesize a theoretical framework to analyze geoeconomics in international economic law. I argue that the quantum measurement theory provides methodological clarity to explain why geoeconomics owns both negative (competitive) and positive (cooperative) potentials and how we should think about states' geoeconomic strategies in international economic practices, and that the quantum holism theory provides an ontology for the proper understanding of the geoeconomic order. This framework of quantizing geoeconomics fundamentally affects our understanding of the geoeconomic implications for international economic law, the states' geoeconomic strategies in practice, and their consequences. In the third section, I experiment with the proposed framework by analyzing geoeconomics in international economic law on the premise of a holographic ontology with features of the probabilities of wave functions, as evidenced by the practices of China and the US under cooperative and competitive geoeconomics. This study focuses on whole-part relations in the geoeconomic hologram, with the whole as the geoeconomic wave function and the parts as state practice at the national, regional, and international levels. It shows that, on the one hand, the parts and the whole are almost identical in that all states will be subject to a geoeconomic order once it becomes the dominant paradigm or at least a popular frame for state conduct in the international economic arena, and states' unique choices and actions that do not fit in the frame of geoeconomics will mostly wash out in practices that establish the geoeconomic order. On the other hand, it shows that the parts and the whole are not identical, which calls for a careful examination of the parts that can be distinguished into the "active," "passive," and "dominant" modes, supported by the practices of China and the US under cooperative and competitive geoeconomics. Finally, I present the limitations of this theoretical framework, and call upon international scholars and students to confront and transcend the limitations of "quantizing something," and to

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engage in future research through the use of different methodologies to expand the scope of international economic law.

II. GEOECONOMICS: THE RISING PARADIGM OF INTERNATIONAL ECONOMIC LAW

There is a crucial disconnection between the everyday understanding of the dysfunction of international economic law as a "failure" or a broken system, and the scholarly understanding of the field as a natural course of development that is evolving to adapt to states' recalibrated priorities. Scholars of international economic law are equipped with a sharp eye that is trained to identify problems, which implies that they are likely to envisage it more within the former sense than within the latter. Thus, when they contemplate ways to fix or rebuild the system, they fail to see how it works. The emergence of the anomalies of neoliberalism and the resurgence of national security protection since 2016 inspired scholars who felt the pressing need to rationalize the unstable reality, and to propose geoeconomics as one of the popular frames to capture the changing paradigm of international economic law. This can be summarized as the reclamation of national security and the rise of regionalism. A key challenge, therefore, is to render the implications of geoeconomics by asking "what does it mean to say that international economic law is subject to a geoeconomic order?"

The literature situating international economic law in geoeconomics has developed two broad approaches to this question. The first calls for an analysis of national security protection and regional competition phenomena in a tightly networked global economy and an examination of their disciplinary significance from a rather formalistic approach. Heath identified the expansion of national security policy as a result of a wide range of risks and vulnerabilities in the twenty-first century,[11] and noted the systematic absence of discussions on the new national security challenges and their implications for international economic law in mainstream journals, despite several attempts to address individual security threats.[12] Cohen acknowledged the absence of clarifications on the relationship between

[11] J. Benton Heath, *The New National Security Challenge to the Economic Order*, 129 YALE L.J. 1020, 1031-50 (2020); J. Benton Heath, *Trade and Security Among the Ruins*, 30(2) DUKE J. COMPAR. & INT'L L. 223, 226-45 (2020).

[12] *See, e.g.*, Jaemin Lee, *The Coronavirus Pandemic and International Investment Arbitration—Application of "Security Exceptions" Clauses in Investment Agreements*, 13 CONTEMP. ASIA ARB. J. 185 (2020); Jason Jacobs, *Tiptoeing the Line Between National Security and Protectionism: A Comparative Approach to Foreign Direct Investment Screening in the United States and European Union*, 47(2) INT'L J. LEGAL INFO. 105 (2019); Joel Slawotsky, *The National Security Exception in US-China FDI and Trade: Lessons from Delaware Corporate Law*, 6(2) CHINESE J. COMPAR. L. 228 (2018); Shin-yi Peng, *Cybersecurity Threats and the WTO National Security Exceptions*, 18(2) J. INT'L ECON. L. 449 (2015).

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economics and national security, specifically on whether economics and national security are partners or rivals. As Cohen argued, economics and national security operate as claims rather than subjects and the current debate between them reflects a far more fundamental choice in international law and IR, between the "logic of markets" and the "logic of state," which drives competing models for international economic law with different normative justifications.[13] Research on economic regionalism by Wang[14] and Shaffer and Gao [15] has focused on China's rise in international economic governance, through a close investigation of how China is selectively reshaping international economic governance and creating a Sino-centric global legal order. These studies do not directly attribute the changing landscape of international economic law to geoeconomics, but rather approach the geoeconomic phenomena from the perspective of the classical international law discourse, which comprises a problem-centric examination supported by case studies.

However, accounting for the realism of international law that recognizes its political open-endedness,[16] it is possible to embrace theories from other disciplines that are relevant to international economic law, such as IR, in order to investigate the current shift in the global economic order. The reason is that despite the main disciplinary difference between IR and international law, with the former studying actions and behaviors of players while the latter studying the normative values of these actions and behavior, mostly, world politics and international law vigorously interact in empirical areas, particularly international economy. [17] Considering the sustainable development of international economic law, it is inevitable for scholars to regard it as the result of the active response of decision-makers who thrive to solve practical problems in the context of complex and uncertain variables, rather than merely technical regulations separated from power and society.[18] The second approach in the literature has therefore been promising as it has adopted geoeconomics, an IR theory defined as "the geostrategic use of economic power,"[19] as a theoretical framework to analyze state practices *vis-à-vis* national security protection and regional competition in the field of international economic law. Roberts, Moraes, and Ferguson noted that the

[13] Cohen, *supra* note 2, at 794-95.

[14] *See generally* Heng Wang, *Selective Reshaping: China's Paradigm Shift in International Economic Governance*, 23(3) J. INT'L ECON. L. 583 (2020).

[15] Shaffer & Gao, *supra* note 2.

[16] MARTTI KOSKENNIEMI, FROM APOLOGY TO UTOPIA: THE STRUCTURE OF INTERNATIONAL LEGAL ARGUMENT 563-65 (2005).

[17] Other main areas include the use of force, human rights, international crimes, and environmental protection. DAVID ARMSTRONG ET AL., INTERNATIONAL LAW AND INTERNATIONAL RELATIONS 1-3 (2007).

[18] Meanwhile, it is crucial to resist the pull of excessive formalism or excessive realism. *See generally* KOSKENNIEMI, *supra* note 16.

[19] Wigell, *supra* note 4, at 135, 147.

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current international economic order is transitioning away from a neoliberal order towards a geoeconomic one, and contended that the features of geoeconomics constitute the recalibrated focus on relative gains over absolute ones, competition over cooperation, and security over economic rationality, with the US and China visualized as the two top players.[20] Puig noted that the new geoeconomic world order will be characterized by great power rivalry between the US and China, and explained that international economic law in a geoeconomic order implies a limit on the role of law and an increase in the use of power.[21] IR scholars such as Wigell developed the theory of geoeconomics extensively by drawing from the 1990 Luttwakian "geo-economics" neologism, which discloses the underlying logic of conflict in the grammar of commerce,[22] to a more workable framework to suit the current world order. This is deemed to operate under the logic of selective accommodation, implying that nations and regions provide economic inducements selectively to some actors and in some economic sectors and not others.[23] Wigell contributed towards the development of analytical tools of neo-imperialism, neo-mercantilism, hegemony, and liberal institutionalism to compare the geoeconomic strategies of regional powers, and instead of focusing on the US-China rivalry (yet), he examined Brazil, the EU, Germany, and Russia.[24] These works show that geoeconomics has become a possible frame for international economic law scholars to rely on while conducting theoretical and empirical research on state practice around national security and regionalism since 2016.

There is a strong conflict between geoeconomics and neoliberalism, and by claiming that the world order is shifting to a geoeconomic one, a Kuhnian paradigm shift in the global economic order is indicated, in that the increasing violations against neoliberalism have induced the disintegration of the neoliberal order and engendered a revolution to the hierarchy of goals underlying economic laws and policies.[25] Neoliberalism considered trade and investment liberalization as the goal and rejected economic policies pertaining to socialism, Marxism, Keynesian interventionism, and

[20] *See generally* Roberts et al., *supra* note 1.
[21] *See generally* Sergio Puig, *The United States-Mexico-Canada Agreement: A Glimpse into the Geoeconomic World Order*, 113 AJIL UNBOUND 56 (2019).
[22] *See generally* Edward N. Luttwak, *From Geopolitics to Geo-Economics: Logic of Conflict, Grammar of Commerce*, 20 NAT'L INT. 17 (1990).
[23] *See generally* Wigell & Vihma, *supra* note 3.
[24] *See generally* Wigell, *supra* note 4.
[25] For Kuhnian paradigm shift, see generally THOMAS S. KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS (3d ed. 1996). For a policymaking paradigm shift that is determined by a radical change of the hierarchy of goals behind the policy, see generally Peter A. Hall, *Policy Paradigms, Social Learning, and the State: The Case of Economic Policymaking in Britain*, 25(3) COMPAR. POL. 275 (1993).

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Embedded Liberalism,[26] and as many political scholars have noted, neoliberalism had become a ubiquitous constructivist project for the global order in its dominant years from the 1980s to the 2000s, as it developed from a system of economic policies to an underlying philosophy that organized and rewarded these policies and transcended the market.[27] In a neoliberal order, "all contemporary existence is submitted to an economic rationality."[28] Thus, we describe this neoliberal order as an interest-oriented organic system, in that it not only offers an ontology that all aspects of human life can be reduced to calculus, but also makes the evolution, permeation, and legalization of neoliberalism an ongoing task.

The question is, then, has the paradigm shift from Neoliberalism to Geoeconomics already happened? If so, what are the geoeconomic requirements for the making and application of international economic law? Presently, there is no answer yet to the first question. However, drawing on Roberts, Moraes, and Ferguson,[29] we are at least in the process of transitioning to a point where an abnormal unravelling of neoliberal rules and policies can easily be captured. Newly established transnational agreements and domestic regulations are marked by a greater focus on relative rather than absolute gains that are more concerned about security interests, procedural and distributive justice, human rights, and environmental protection.[30] Policies are made based on national concerns instead of international cooperation, as exemplified by President Trump's "America first" plan (2016-2020) that marked the onset of the US-China tech/trade wars and catalyzed the UK's Brexit schedule (since 2013). The COVID-19 pandemic (from January 2020 to date) aggravated the breakdown of the neoliberal world order,[31] as it imposed an urgent security threat to all nations and pushed them to enact various countermeasures associated with socialism, Marxism, and Keynesian interventionism. These phenomena show that the neoliberal order is in a state of crisis that is imbued with

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[26] Or as Margaret Thatcher's famous articulation on Neoliberalism, "[t]here is no such thing as society." *Interview for* Woman's Own *("No Such Thing as Society")*, MARGARET THATCHER (Sept. 23, 1987), https://www.margaretthatcher.org/document/106689. Corinne Blalock, *Neoliberalism and the Crisis of Legal Theory*, 77(4) L. & CONTEMP. PROBS. 71, 72-73 (2014). Also, see generally John Linarelli, *How Trade Law Changed: Why It Should Change Again*, 65 MERCER L. REV. 621 (2014); ANDREW LANG, WORLD TRADE LAW AFTER NEOLIBERALISM: RE-IMAGINING THE GLOBAL ECONOMIC ORDER (2011).

[27] *See, e.g.*, ROBERT GILPIN, GLOBAL POLITICAL ECONOMY: UNDERSTANDING THE INTERNATIONAL ECONOMIC ORDER (2001); WENDY BROWN, EDGEWORK: CRITICAL ESSAYS ON KNOWLEDGE AND POLITICS ch. 3 (2009).

[28] BROWN, *supra* note 27 at 40.

[29] *See generally* Roberts et al., *supra* note 1.

[30] *See generally* Heath, *The New National Security Challenge to the Economic Order*, *supra* note 11; Roberts et al., *supra* note 1.

[31] *See generally* Dali L. Yang, *The Covid-19 Pandemic and the Estrangement of US-China Relations*, 45(1) ASIAN PERSP. 7 (2021); Julian Arato et al., *The Perils of Pandemic Exceptionalism*, 114(4) AM. J. INT'L L. 627 (2020); Lee, *supra* note 12.

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revolutionary possibility, which has led to the formation of a new paradigm.[32] According to Lakatos, such a transition is driven by two types of research programs, namely the positive "progressive" and the negative "degenerating" ones.[33] Whereas the progressive program advances new theories to resolve anomalies, the degenerating one, which is still the mainstream and strongly supported by scholars whose vested interests lie within it, continues to use old theories, such as by offering linguistic reinterpretations.[34] Although some defend the notion that "mutant neoliberalism" still has significance in global economic governance,[35] we take the progressive program's position and argue that, at a minimum, the paradigm shift from neoliberalism to geoeconomics is ongoing. It is worth then to be clear about the second question: what are the geoeconomic implications or requirements for the making and application of international economic law.

Three key points, yet one readily forgotten, are that we still lack a clear definition of geoeconomics, that geoeconomic implications are endowed with negative assertions, and that the overt focus on the US-China rivalry is inadequate to demonstrate the entire picture of the evolving geoeconomic order. Geoeconomics is often used without much critical reflection on its meaning in the current world order, and this has created great confusion regarding the concept itself.[36] Wigell and Wesley relied on the use of jargon and abstractions that they thought were self-explanatory, such as "the geostrategic use of economic power"[37] and "securitization of economic policy and economization of strategic policy."[38] However, they have only left behind more questions than answers for scholars outside the field of IR. Others have avoided the task of defining the subject and have simply offered what they deemed as features of geoeconomics and counted on readers to draw their own conclusions. Roberts, Moraes, and Ferguson present one such example.[39] The failure to establish a well-defined and neutral concept creates doubts and breeds negative assertions towards the emerging geoeconomic order. Owing to the lack of a proper definition of geoeconomics, we may be confused about whether the current mix of economics and national security in a geoeconomic order is worth encouraging or fighting, and then, prompted by disappointment towards the

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[32] *See generally* KUHN, *supra* note 25.
[33] Imre Lakatos, *Criticism and the Methodology of Scientific Research Programmes*, 69 PROC. ARISTOTELIAN SOC'Y 149, 169 (1968).
[34] *Id.* at 164.
[35] *See generally* MUTANT NEOLIBERALISM: MARKET RULE AND POLITICAL RUPTURE (William Callison & Zachary Manfredi eds., 2019).
[36] For literature review on Geoeconomics, see generally Mattlin & Wigell, *supra* note 2.
[37] Wigell, *supra* note 4, at 135.
[38] MICHAEL WESLEY, AUSTRALIA AND THE RISE OF GEOECONOMICS 4 (2016), https://bellschool.anu.edu.au/sites/default/files/uploads/201705/australia_and_the_rise_of_geoeconomics.pdf.
[39] *See generally* Roberts et al., *supra* note 1.

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accumulating obstacles for international economic law and global economic governance, there is a slippery slope to negative assertions that are exemplified by descriptive words in scholars' works, such as "weaponize,"[40] "manipulate and coerce,"[41] and "equivalent to the Cold War era."[42] These words disseminate two stereotypes: first, that geoeconomics indicates a level of stability as the logic of conflict provides a comparatively predictable condition for the disposition of geoeconomic measures; and second, that geoeconomics embraces a competitive nature that will have an adverse effect on the global order. However, national security has transformed into a "multifaceted, risk-based concept that embraces nonstate actors and nonhuman factors,"[43] which shows that the emerging geoeconomics has features of our time that differ from geoeconomics in history. Thus, any return to stability may be unlikely. There are other potential forms of geoeconomics, such as the positive and cooperative ones.[44] They have been significantly overlooked because the competitive geoeconomic order has been taken for granted.

The heavy focus on the US-China rivalry is inadequate to apprehend both the geoeconomic and global orders. Heath argued against regarding geoeconomics as the only account for new national security challenges, criticizing that most scholars have improperly situated the US-China rivalry at the center of geoeconomics with third states either choosing sides or mediating conflicts. The theory itself is not limited to the US-China competition and other states have adopted geoeconomic strategies for reasons that are entirely unrelated to the great power rivalry.[45] Shaffer and Gao concluded that the US-China trade war would not split the globe into competitive economic blocs as most states will make great efforts to navigate the tensions between the US and China so that they could maintain robust economic ties with both.[46] It is efficient to assume that the US-China competition determines the degree of geoeconomics, especially as this assumption also aligns with the Luttwakian "geo-economics" proposition that the outcomes of economic tensions within the principal states determine

[40] *See generally* Henry Farrell & Abraham L. Newman, *Weaponized Interdependence: How Global Economic Networks Shape State Coercion*, 44(1) INT'L SEC. 42 (2019).
[41] Gertz & Evers, *supra* note 5, at 117; Roberts et al., *supra* note 1, at 660.
[42] Kuik, *supra* note 3, at 157; Puig, *supra* note 21, at 56.
[43] Heath, *The New National Security Challenge to the Economic Order*, *supra* note 11, at 1049; or called "non-traditional security," see generally Zha Daojiong, *Non-Traditional Security and China-US Relations*, 45(1) ASIAN PERSP. 75 (2021).
[44] Mikael Wigell and Antto Vihma recognize that positive geoeconomics is under-researched compared to negative geoeconomics, and they describe positive geoeconomics as the proverbial "carrot" and negative geoeconomics as the "stick." Wigell & Vihma, *supra* note 3, at 608.
[45] *See generally* Heath, *The New National Security Challenge to the Economic Order*, *supra* note 11.
[46] *See generally* Shaffer & Gao, *supra* note 2.

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the degree of the geoeconomic order.[47] Research on the geoeconomic implications of international economic law requires sophisticated theoretical frameworks and problem-centric empirical work to provide clear directions for the making and application of national, regional, and international regulations. Thus, before any geoeconomic implications can be suggested, it is necessary to address these three key points.

To investigate the emergence of geoeconomics in international economic law rather than merely geoeconomics as a critical object, I argue that the theory of quantum IR offers a theoretical framework to systematically conceptualize geoeconomics, particularly the adoption of quantum measurement and holism both at analogical and ontological levels in understanding the geoeconomic order. Without quantizing geoeconomics, it is not a coincidence that international law scholars are drawn only to negative assertions of the geoeconomic order. Even when they recognize the difficulties in international economic law caused by the emergence of geoeconomics as a part of the natural process of the development of the global economic order, they tend to fall back into old habits of fixing and rebuilding, rather than understanding obstacles through fresh perspectives. Quantum IR by Wendt[48] and Zanotti[49] has paved the way for research to grow to the extent that the field of IR is undergoing a "permanent quantum revolution."[50] Using quantum theories as metaphors and ontologies, quantum IR reconceptualizes the ways in which we imagine how the world is, who we are, how we fit in the world, and how things relate to one another, which have all proven to have value for the formulation of political agencies and decisions.[51] By extension, a quantum worldview in international economic law would have significance for the apprehension of the world order, the geoeconomic impacts on international economic law, and geoeconomic state practice, specifically by identifying quantum-like features and applying a quantum ontology. In spite of these potential merits, the adoption of a quantum worldview in international economic law, or international law itself, has been limited.[52] We mark the first attempt at

[47] Luttwak, *supra* note 22, at 23.
[48] *See generally* WENDT, *supra* note 8.
[49] *See generally* LAURA ZANOTTI, ONTOLOGICAL ENTANGLEMENTS, AGENCY, AND ETHICS IN INTERNATIONAL RELATIONS: EXPLORING THE CROSSROADS (2019).
[50] Der Derian & Wendt, *supra* note 6, at 409. *See also* Holmes, *supra* note 9.
[51] Şengül Yıldız-Alanbay, *The Matter of Affect in the Quantum Universe*, 49(1) MILLENNIUM: J. INT'L STUDS. 151, 151 (2020).
[52] *See, e.g.*, Markus G. Puder, *Brexit—Disentangling the Quantum in Law and Politics*, 52(1) GEO. WASH. INT'L L. REV. 101, 102 (2020); Yana Stoeva, *The 'Uncertainty Hypothesis' in International Economic Law*, 2(1) CHINESE J. GLOB. GOVERNANCE 44 (2016). *See also* Anthony D'Amato, *Groundwork for International Law*, 108(4) AM. J. INT'L L. 650, 668 n.78 (2014); Chantal Thomas, *What Does the Emerging International Law of Migration Mean for Sovereignty*, 14(2) MELB. J. INT'L L. 392 (2013); Necati Polat, *International Law, the Inherent Instability of the International System, and International Violence*, 19(1) OXFORD J. LEGAL STUDS. 51, 57-58 (1999).

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quantizing geoeconomics in the hope of clarifying the geoeconomic implications for international economic law.

In this article, I show how the theorization and analysis of the geoeconomic order in international economic law can be elaborated on further in dialogue with quantum theories. Defining geoeconomics as a historically constructed neutral formation in the setting of the present multipolar international community, I analyze the probabilities and holism of geoeconomics by quantum theories, as characterized by the collapse of a shared wave function and the structure of a holograph, as evidenced through the US and China and their practice of cooperative and competitive geoeconomics. This augments the present literature on geoeconomics and quantum IR by examining what quantizing geoeconomics brings to the table *vis-à-vis* international economic law, while also drawing attention to a quantum worldview in the field. It highlights the ways in which the emerging geoeconomics paradigm positions the making and application of international economic law.

III. A QUANTUM FRAMEWORK FOR CONCEPTUALIZING GEOECONOMICS

Quantum theories have output an ample and multidimensional account of IR as a conceptual structure of relationality, social order and system, agencies, and human beings,[53] which are achieved through what Murphy called "three courses": analogy, actuality, and quantizing post-critique.[54] When one takes up the conceptual tools of quantum theories, do they suggest that quantum theories can offer analogies and metaphors to understand the social order in the same way as the "weak quantum" approach employed by most IR scholars?[55] Or, do they suggest that the social structure is an actual quantum system at the ontological level, like how Wendt[56] and Pan[57] proposed? Or, do they only refer to quantum analogy while reviewing past theories as a mode of critical research like Zanotti's?[58] The quantum IR conversation takes place within a pluralist community with many quantum approaches that possibly own revolutionary outcomes within and beyond the

[53] *See generally* Chris McIntosh, *Writing Quantum Entanglement into International Relations: Temporality, Positionality, and the Ontology of War*, 49(1) MILLENNIUM: J. INT'L STUDS. 162 (2020).
[54] Murphy, *supra* note 9, at 176.
[55] *See, e.g.*, Der Derian & Wendt, *supra* note 6; Holmes, *supra* note 9; JOHN KEANE, POWER AND HUMILITY: THE FUTURE OF MONITORY DEMOCRACY ch. 10 (2018); Ali Asghar Kazemi, *Quantum Politics New Methodological Perspective*, 12(1) INT'L STUDS. J. 89 (2015); James Der Derian, *Quantum Diplomacy, German–US Relations and the Psychogeography of Berlin*, 6(3) HAGUE J. DIPL. 373 (2011).
[56] *See generally* WENDT, *supra* note 8.
[57] *See generally* Pan, *supra* note 9.
[58] *See generally* ZANOTTI, *supra* note 49.

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IR domain.[59] Here, I build on quantum IR approaches and establish a systematic quantum framework to conceptualize geoeconomics in international economic law. After defining geoeconomics as a historically constructed neutral formation, I rely on the analogy route by using quantum measurement theory to suggest different probabilities for the geoeconomic wave function, including the competitive and cooperative ones. Next, I follow the ontology path and argue that the geoeconomic order is a quantum system characterized by its holographic nature, which indicates a requirement for a quantum framework for properly understanding the geoeconomic implications for international economic law. Finally, I pursue the quantizing post-critique course to investigate the limitations and potentials of quantizing geoeconomics. This systematic quantum framework is constructive as it assumes that quantum theories are the fundamental "law" for existence, signals an identification with a quantum worldview in international economic law, and makes a subjective investment in justifying geoeconomics as the new paradigm for the global economic order.

The concept of geoeconomics comes from Luttwakian "geo-economics." Here, "economics" is deemed as the nations' primary arena of power competition following the Cold War. The word "geo" represents the priority for all nations: entering this arena of competition does not entail multilateral cooperation but economic security and development within their territorial boundaries.[60] Luttwakian "geo-economics," as Sparke noted, is state-centric, historicist, and realist,[61] thus implying that the 1990 Luttwakian "geo-economics" is an immature theoretical prototype that requires adjustments to suit the present world order. Considering that the present world order has changed dramatically because of the increasing interdependency brought about by globalization and technological advancements, as well as the rising regional power that results from the formation of a multi-polarized power structure,[62] I interpret the

[59] The promising future of quantum social theories is strongly advocated, highlighting the potential of a quantum worldview in research of nations' external relations and security issues. *See generally* Der Derian & Wendt, *supra* note 6.

[60] Luttwak, *supra* note 22, at 20.

[61] Matthew Sparke, *Geopolitical Fears, Geoeconomic Hopes, and the Responsibilities of Geography*, 97(2) ANNALS ASS'N AM. GEOGRAPHERS 338, 339-40 (2007).

[62] For an overview of the changes of international economic governance, see generally TRANSNATIONAL LEGAL ORDERING AND STATE CHANGE (Gregory C. Shaffer ed., 2012); Gregory C. Shaffer, *Introduction: International Economic Law in a Time of Change*, 20(2) MINN. J. INT'L L. 1 (2011). For the rising of regional governance and a multi-polarized power structure, see generally AHMET DAVUTOĞLU, SYSTEMIC EARTHQUAKE AND THE STRUGGLE FOR WORLD ORDER: EXCLUSIVE POPULISM VERSUS INCLUSIVE DEMOCRACY ch. 4 (2020); Julien Chaisse & Richard Pomfret, *The RCEP and the Changing Landscape of World Trade: Assessing Asia-Pacific Investment Regionalism Next Stage*, 12(1) L. & DEV. REV. 159 (2019); Pasha L. Hsieh, *Reassessing the Trade–Development Nexus in International Economic Law: The Paradigm Shift in Asia-Pacific Regionalism*, 37(3) NW. J. INT'L L. & BUS. 321 (2017); Eyal Benvenisti, *Democracy Captured: The Mega-Regional Agreements and the Future of Global Public Law*, 23(1) CONSTELLATIONS 58 (2016).

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geographical aspect of geoeconomics as comprising the territorial boundaries that separate one nation from another, and the regional partnerships that differentiate one region from another. I use geoeconomics as a generalization of the emerging world order and a possible substitution of neoliberalism in order to analyze its implications for international economic law. Thus, "economics" is better understood as the study of international economic activities and instruments used by states and regions, which usually include trade, investment, and financial practice. Thus, I present the following definition: as an IR theory, geoeconomics is a study of international economic activities and instruments that are established to promote national and regional interests and power; as a form of statecraft (a foreign policy approach), geoeconomics is the use of international economic activities and instruments to defend national and regional interests and strengthen national and regional power; and as a kind of geostrategy, geoeconomics does not seek to establish power over territories of other nations and regions, but uses economic methods to pursue economic domination.

To present geoeconomics as a neutral formation and resist the slippery slope to negative assertions, we draw on the logic of selective accommodation by Wigell and Vihma,[63] meaning that nations and regions provide economic incentives selectively to some actors and not others, and in some economic sectors and not others. Thus, geoeconomics does not impose high threats that produce counterbalancing behavior, but rather generates low or medium threats that bring about unbalancing behavior in targeted economic sectors by different nations and regions.[64] This overview of geoeconomics is neither a simple retreat to protectionism or unilateralism, nor an advance to mutually advantageous economic relations and multilateral economic cooperation. If we draw a spectrum of popular theoretical descriptions of the global order, we can see that geoeconomics is somewhere in the middle, with the potential to come towards each end and manifest approximate (though not exact) characteristics. That is, geoeconomics does not indicate an inherently and completely negative and competitive order as most scholars have suggested; instead, cooperative geoeconomics with liberal preferences exists, but sometimes, is unnoticeable because we are tempted to "slip" into the "exciting" ongoing confrontations that are accused of changing our world order.[65]

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[63] *See generally* Wigell & Vihma, *supra* note 3.

[64] *Id.*

[65] We subtly quote a saying from Mr. Clair Wilcox, Director of International Trade Policy Office of Department of State and the head of US delegation of General Agreement on Tariffs and Trade [hereinafter GATT] negotiation, that "conflict is exciting, and agreement is dull. It is the hope of my delegation that the proceedings of this Committee will be dull. We shall do everything in our power to make them so." U.N. Economic & Social Council, *Journal of the Preparatory Committee of the*

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I present a historically construed neutral formation of geoeconomics in the context of international economic law, wherein states seek to reclaim national and regional economic security as the highest goal while designing and applying economic rules and policies. By economic security, I mean the security of economic interests and power. However, the state practice of geoeconomics in international economic law is pluralist. Here, we not only refer to various geoeconomic strategies that are employed by states, but also highlight certain complexities in the geoeconomic order—sometimes, states exercise competitive geoeconomics to achieve cooperation, and at other times, they exercise cooperative geoeconomics to increase economic competitiveness. Focusing on a historically construed neutral formation by an interpretive approach is insufficient. There needs to be a theoretical framework at work that provides a testable, conceptual path. To establish and examine this framework, we use quantum measurement and holism theories at the analogical and ontological levels, respectively.

A. Quantum Measurement

The quantum measurement theory notes that all phenomena in the world are not accidents, but are probabilities folded into existence by perception.[66] When people measure or observe things, they learn the properties of the relevant material objects and forces. In quantum theory, these properties are only the probabilities of finding properties when they are measured and observed. Such quantum probabilities of reality, which are known as "wave functions," constantly change with different potentials; measurement or observation, therefore, makes the wave function collapse into just a single outcome.[67] The quantum measurement theory challenges the claim that people can safely assume that objects only have one momentum or position when they are not observing,[68] and thus, it highlights probabilities and uncertainties rather than one fixed state of reality.

Quantum measurement theory has been at work in international law through demonstrations of observer effects[69] and the uncertainty principle[70]

International Conference on Trade and Employment—London—No. 4, at 19, U.N. Doc. ECOSOC_JOURNAL/1946-04 (Oct. 18, 1946).

[66] BRUCE ROSENBLUM & FRED KUTTNER, QUANTUM ENIGMA: PHYSICS ENCOUNTERS CONSCIOUSNESS, 203-20 (2d ed. 2011).

[67] WENDT, *supra* note 8, at 3.

[68] Quantum theory suggested Schrödinger's unobserved cat was simultaneously alive and dead until it was observed. ROSENBLUM & KUTTNER, *supra* note 66, at 13; JIM BAGGOTT, THE QUANTUM STORY: A HISTORY IN 40 MOMENTS 66-67, 71 (2011); JOHNJOE MCFADDEN & JIM AL-KHALILI, LIFE ON THE EDGE: THE COMING OF AGE OF QUANTUM BIOLOGY 72-75 (2016).

[69] *See, e.g.*, Rafael Domingo, *Roman Law and Global Constitutionalism*, 21(1) SAN DIEGO INT'L L.J. 217, 236-37 (2019).

[70] *See, e.g.*, Stoeva, *supra* note 52; D'Amato, *supra* note 52, at 650; Thomas, *supra* note 52; Polat, *supra* note 52, at 58.

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as metaphors to explain the interconnectedness and indeterminacy of national-international relations and how these complexities influence the making of and compliance with international law. As there is a debate on whether quantum knowledge of atomic and subatomic levels of reality can be extrapolated to larger-scale reality,[71] a key part of the quantum measurement, wave functions that emphasize probabilities, has reluctantly been "banished" from interactions with international law. It has long been recognized that Newtonian classical physics is a limiting case of quantum mechanics,[72] and after a hundred years of experiments since the inception of the quantum revolution on 14 December 1900,[73] quantum mechanics is deemed to be the "correct theory of nature" that applies at all scales,[74] meaning that quantum theories are more fundamental and all-encompassing in their scope. A quantum worldview applies to everything, in that it is not only a theory of objects in a micro-world but rather the abstract formalization of a universal type of description that applies to any epistemic situation in which things are influenced or determined by complex relations with other non-local and invisible ones.

Quantum measurement theory provides methodological clarity to explain both why geoeconomics owns negative (competitive) and positive (cooperative) potentials and how we should think about states' geoeconomic strategies in international economic law: Geoeconomics emerges as a shared wave function (a total abstraction) that collapsed through state practice that prioritized national or regional economic securities for actions of law and policies. As geoeconomics is pluralist in international economic law, various probabilities are revealed by individual geoeconomic strategies under particular circumstances, which justifies what Wigell developed as an ideal-typical taxonomy of regional geoeconomic strategies by identifying whether the regional power adopts a competitive or cooperative strategic frame and the regional power treats economic power as a means to achieve other strategies or as a goal in itself.[75] The former may be simple to determine: if a regional power has a preponderance of economic power resources *vis-à-vis* neighboring countries, and prepares to act unilaterally even when it is clear that it may have negative effects upon minor neighboring powers, then the

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[71] *See generally* Alexander Wendt, *Flatland: Quantum Mind and the International Hologram*, *in* NEW SYSTEMS THEORIES OF WORLD POLITICS pt. V (Mathias Albert et al. eds., 2010).

[72] Max Born, *Physical Aspects of Quantum Mechanics*, 119 NATURE 354, 355 (1927).

[73] Max Planck presented his quantum research (known as the "Planck constant") to the German Society of Physics on Dec. 14, 1900. This day is generally acknowledged as the start of the quantum revolution. BAGGOTT, *supra* note 68, at 15; MCFADDEN & AL-KHALILI, *supra* note 68, at 66; Niels Bohr, *The Rutherford Memorial Lecture 1958: Reminiscences of the Founder of Nuclear Science and of Some Developments Based on His Work*, 78(6) PROC. PHYSICAL SOC'Y 1083, 1086 (1961).

[74] KAREN MICHELLE BARAD, MEETING THE UNIVERSE HALFWAY: QUANTUM PHYSICS AND THE ENTANGLEMENT OF MATTER AND MEANING 85 (2007); Michel Bitbol, *The Quantum Structure of Knowledge*, 21(2) AXIOMATHES 357, 370 (2011); ROSENBLUM & KUTTNER, *supra* note 66, at 257.

[75] *See generally* Wigell, *supra* note 4.

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strategic frame is competitive; alternatively, if a regional power is prepared to act to achieve collective goals for regional grouping, then the strategic frame is cooperative.[76] The latter may not always be easy to observe: when a regional power is prepared to invest a significant amount of economic resources in exchange for political influence without any clear prospect of economic gain, then a geoeconomic strategy is employed as an approach to political goals; alternatively, when a regional power only uses its economic power to further its commercial interests, then its incentives and objectives are narrow as in economy rather than more broadly as in political sense.[77] As competitive and politically driven geoeconomics is widely recognized, I highlight the cooperative mindset of geoeconomics wherein states can exercise cooperative geoeconomics in the sense of a strategic plan to strengthen political power and a faithful long-term pursuit to achieve common economic development.

B. Quantum Holism

The quantum holism theory suggests that the structure of reality is dualist, in that there are ordinary and supervening levels of reality, and all existence in the dualist reality is unified and indivisible. This theory eases tensions between quantum mechanics (atomic-level) and general relativity theory (planet-level) by proposing that the universe is a holographic projection: "[w]hat appears on the surface is encoded information on what lies on the inside."[78] The holographic ontology, which means applying holism to philosophically study the nature of being and existence, establishes that an object is "part of the whole while it simultaneously contains the whole."[79] Quantum holism theory thus generates an ontology for the whole-part relation that what we see, as a particle is an approximate "abstraction of a much greater totality of structure."[80]

The quantum holographic ontology has advanced a new intellectual excursion on the relational ontological foundation of IR, which as Pan endorsed, in spite of the shortage of empirical work, contributes towards: first, both a clearer differentiation between internal and external relations and a renewed emphasis on wholeness and whole-part duality for conducting foreign relations; second, new conceptual tools to rethink IR as holographic relations involving the dynamic processes of enfoldment and unfoldment; and third, significantly transforming the way we think about identity,

[76] *Id.* at 140.
[77] *Id.*
[78] Pan, *supra* note 9, at 15-16; Zeeya Merali, *Theoretical Physics: The Origins of Space and Time*, 500 NATURE 516, 516-17 (2013).
[79] Wim Van Daele, *Food as the Holographic Condensation of Life in Sri Lankan Rituals*, 83(4) J. ANTHROPOLOGY 645, 651 (2018).
[80] DAVID BOHM, WHOLENESS AND THE IMPLICATE ORDER 234 (2002).

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relationship, and responsibility.[81] Converse to what has been achieved by the quantum holographic ontology in IR, such an ontological foundation has not yet been picked up by international law scholars in deliberating the negotiation and compliance of agreements in a geoeconomic world order. Geoeconomics in a classical sense is reducible to state actors and their interactions concerning the use of economic activities and instruments in order to defend national and regional interests and strengthen national and regional power. There is no higher reality of the order existing above them. Yet, as will be discussed towards the end of this piece, it is precisely by adopting a quantum holographic ontology that the geoeconomic implications for international economic law can be understood properly: the geoeconomic order is irreducible because of its holographic character, in which states within the geoeconomic order are not fully separable from the geoeconomics' wave function, but is constituted in irreducibly relational terms by their co-participation in a discursive form including languages and practices of philosophy, policy, and law.

Having now established a quantum framework to conceptualize geoeconomics, particularly by using quantum measurement and holism as an analogy and an ontology, respectively, the next section turns to an examination of the theoretical framework in question, demonstrating that quantizing geoeconomics fundamentally affects our understanding of the geoeconomic implications for international economic law, the states' geoeconomic strategies in practice, and their analytical consequences. Whereas the geoeconomic order is irreducible to an individual state or action, I analyze it on the premise of a holographic ontology with features of wave functions' probabilities, as evidenced by the practices of China and the US under cooperative and competitive geoeconomics.

IV. CONCEPTUALIZING GEOECONOMICS THROUGH A QUANTUM FRAMEWORK

A. Whole of the Geoeconomic Order

The holographic ontology connotes that the whole (here, the geoeconomic order) is approximately present in the parts (here, the many states' geoeconomic actions at the national, regional, and international levels), rather than exactly comprising them, and that each part approximately replicates the whole.[82] By "approximate," I, on the one hand highlight the fact that the parts and the whole are almost identical as

[81] *See generally* Pan, *supra* note 9.

[82] *See generally* Ton Otto & Nils Bubandt, *Beyond Cultural Wholes? Introduction to Part 2*, *in* EXPERIMENTS IN HOLISM: THEORY AND PRACTICE IN CONTEMPORARY ANTHROPOLOGY 89 (Ton Otto & Nils Bubandt eds., 2010).

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geoeconomics is suspected to triumph over neoliberalism in order to become the dominant paradigm or at least a popular frame for state conduct in the economic domain, given that all states in the international community are subject to the geoeconomic order, and with the partial exception of principal economies, states' unique choices and actions that do not fit in the frame of geoeconomics will mostly wash out in practices that achieve the geoeconomic order. Although commentators have suggested that the US-China rivalry would not immediately split the world into competing economic blocs and a geoeconomic variant of the Cold War,[83] a new geoeconomic order is forming in that the room to arrive at multilateral agreements or for one power to force a multilateral agreement over the objections of another great power on core interests will narrow down, which will consequently lead to what Roberts, Moraes, and Ferguson called selective multilateralism and multilateralism-minus-one.[84]

As power becomes more divided between non-likeminded great powers, multilateral agreements will be reduced to areas that do not intrude upon the core interests of the great powers or arenas of competition between them; thus the occurrence of selective multilateralism.[85] One example can be seen in the comparison between the interpretation of national security exceptions under the General Agreement on Tariffs and Trade (hereinafter "GATT") and Regional Comprehensive Economic Partnership (hereinafter "RCEP").[86] It takes the GATT/World Trade Organization (hereinafter "WTO") dispute settlement panel from 1947 to 2016 to offer definitive answers on the invocation of national security exceptions to protect essential security interests by first, rejecting that the interpretation of Article XXI(b)(iii) of GATT 1994, "taken in time of war or other emergency in international relations," is completely self-judgmental, and that this provision is non-justiciable, concluding that Article XXI(b) "vest[s] in panels the power to review whether the requirements of the enumerated subparagraphs are met, rather than leaving it to the unfettered discretion of the invoking Member"; second, confirming that a member state is not free to elevate any concern to that of an "essential security interest," and rather, "the discretion of a Member to designate particular concerns as national security interests is limited by its obligation to interpret and apply Article XXI(b)(iii) of GATT 1994 in good faith"; and third, clarifying that measures taken by states "which it considers necessary" are demanded to meet the minimum requirement of plausibility that "they are not implausible as measures

[83] Shaffer & Gao, *supra* note 2, at 635.
[84] Roberts et al., *supra* note 1, at 670-72.
[85] *Id.* at 671-72.
[86] Although such a clarification should be unnecessary, GATT is a fruitful product of the Anglo-American settlement in the making of the post-war international economic order, and Regional Comprehensive Economic Partnership (RCEP).is signed in 2020 by Association of Southeast Asian Nations (ASEAN), China, Japan, Korea, Australia, and New Zealand.

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protective of those interests," and are thus subjected to the judicial review of the panel.[87] In contrast, no limitations have been imposed in RCEP even though one may think that lessons must be learned in order to negotiate an advanced partnership. Considering the power wrestling and ongoing debates over national security protection in the international economic field, which is intensified by the US-China tech/trade war, the best they can do at the law-making stage, as China does, is to uncommonly privilege a defensive strategy over an offensive one, by stating:

China reserves rights to adopt or maintain any measure it considers necessary to protect its essential security interests against another Party, including screening of investments, if that other Party reserves right to adopt or maintain a measure it considers necessary to protect its security interests in its Schedule in Annex II or Annex III.[88]

China would not actively adopt measures based on national security interests. It only has the right to do so if other parties choose to play competitively. However, no restraint on the protection of essential security interests beyond this is established in RCEP. How members invoke national security exceptions can be analyzed only when they engage in disputes, with a focus on whether such invocations are well-justified. The questions of what qualifies as an "essential security interest" and whether the measure at issue is necessary, are left to the discretion of invoking states as they touch upon the core interests of nations, especially those operating under Cohen's idea of the "logic of state."[89]

In a holographic geoeconomic order, most countries must work to overcome the tensions between the biggest and second-biggest economies to sustain close economic ties with both.[90] In doing so, they inevitably become vulnerable to the logic of selective accommodation under geoeconomics that consequentially leads to multilateralism-minus-one, an approach involving the development of quasi-multilateral rules through participation in a relatively large and representative group of third countries to impose greater pressure on the other major power.[91] Examples include swing votes operated by third powers to mediate conflicts: in WTO reform, the EU works with China to promote procedural reforms to counter the US while working with it to promote substantive reforms to counter China;[92] in developing regional

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[87] Panel Report, *Russia — Measures Concerning Traffic in Transit*, ¶¶ 7.102, 7.132, 7.138, WTO Doc. WT/DS512/R (adopted Apr. 26, 2019). *See generally WTO Analytical Index: GATT 1994—Article XXI (Jurisprudence)*, WORLD TRADE ORG., https://www.wto.org/english/res_e/publications_e/ai17_e/gatt1994_art21_jur.pdf (last visited Mar. 5, 2022).

[88] *RCEP Text*, AUSTRALIAN GOV'T DEP'T FOREIGN AFFS. & TRADE, https://www.dfat.gov.au/trade/agreements/in-force/rcep/rcep-text (last visited Mar. 5, 2022) (annex II & III, Schedule of China).

[89] *See generally* Cohen, *supra* note 2.

[90] Shaffer & Gao, *supra* note 2, at 635.

[91] Roberts et al., *supra* note 1, at 672.

[92] *Id.*

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partnerships, Japan signed RCEP, which was considerably encouraged and influenced by China while taking the lead in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) after the withdrawal of the US, following standards that were mostly designed by the US.[93] Thus, the holographic ontology reveals a formation of a geoeconomic order that results in selective multilateralism and multilateralism-minus-one in the making, interpreting, and applying of international economic law.

The holographic ontology that emphasizes that the parts and the whole are almost identical also refutes the assertion by Heath that the focus on the US-China rivalry is improper because other states have adopted geoeconomic strategies with reasons unrelated to the great power rivalry.[94] Geoeconomic strategies have been cast by countries and institutions before the US-China rivalry began, typically including at least seven economic tools as geopolitical applications analyzed by Blackwill and Harris,[95] such as trade and investment policies; economic and financial sanctions; cyber, aid, financial, and monetary policies; and energy and commodities. Their analyses took place before the US-China competition became heated after the tech/trade war, which has amounted to a great power rivalry that catalyzed the emergence of the present geoeconomic order with a holographic character. Within the holographic structure of geoeconomics in the global order, no states are entirely separable from the power turbulence that induces heightened concerns over national and regional economic security. Even when they adopt geoeconomic strategies that seem unconnected with the US-China rivalry, they are still somehow subject to its general political and economic influences, which is analogous with the non-local influence of other quantum photons in entanglement, [96] meaning that near-simultaneous interconnectivity creates entanglements that produce "spillover" and "butterfly" effects.[97]

Overall, the ontological pattern that the parts (here, the many states' geoeconomic actions at national, regional, and international level) and the whole (here, the geoeconomic order) are almost identical with holographical character contributes to the conceptualization of geoeconomics as a frame that will wash out non-geoeconomics actions by states both through narrowing the room for reaching and forcing multilateral agreements and through entanglements between essential parts, such as the US-China rivalry.

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[93] The Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) is deemed as an agreement with the highest standards for economic liberalization.

[94] Heath, *The New National Security Challenge to the Economic Order*, *supra* note 11, at 1049.

[95] BLACKWILL & HARRIS, *supra* note 1, at 49-92.

[96] *See generally* Paul-Antoine Moreau et al., *Imaging Bell-type Nonlocal Behavior*, 5(7) SCI. ADVANCES 1 (2019).

[97] The former refers to that events in one context occur because of something else in a seemingly unrelated context; the latter refers to that a very small change in one state can result in large differences in a later state. KEANE, *supra* note 55, at 302.

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Yet, as indicated here, parts as the "approximate abstraction" of the whole on the other hand implies "not identical," which also deeply shaped the geoeconomic order in ways we now turn to.

B. Parts of the Geoeconomic Order

As approximations, the parts in quantum holography do not always mirror the whole and are intrinsically entangled and mutually involved, even in the absence of formal or explicit connections,[98] which urges a careful examination of parts (different states' geoeconomic strategies at national, regional, and international levels), and in doing so, we suggest three distinctions following Wendt's discussion of the "active," "passive," and "dominant" monads.[99] In the "active" mode, states adopt and apply geoeconomic strategies at the national, regional, and international levels to exercise geoeconomics. In the "passive" mode, states are concerned with other affairs. Some states in the "dominant" mode have economic preponderances in certain regions and partnerships and are more likely to take measures in the "active mode," whereas states defer to the dominant one, and give them the "first mover" status in collapsing the geoeconomic wave function while giving up their rights to choose their collapsing path. Whereas states in the "passive" mode can revert to the "active" mode by practicing geoeconomics and generating new entanglements to affect the geoeconomic wave function, they do not necessarily become "dominant" ones that fundamentally change the spectrum of the geoeconomic order.

Examples of the three distinctions are evident in China's practice of cooperative geoeconomics over the last six years, when China acted to achieve collective goals for its partnerships as both strategic plans and faithful long-term pursuits of economic liberalization, instead of acting unilaterally. China abandoned its earlier position on maintaining the non-malleability of investment regulations in its free trade agreements (FTAs)[100] and on resisting investor-state arbitration.[101] It began to strengthen its investment liberalization by increasing the predictability and transparency of permitting foreign direct investments (FDIs) and granting more substantive rights to investors, such as the pre-establishment national treatment and negative lists approach, where foreign investors and their investments are treated in accordance with the standards that apply to domestic investors and their investments, unless listed as restricted in the agreement.[102] While

[98] Pan, *supra* note 9, at 19; WENDT, *supra* note 8, at 269.
[99] WENDT, *supra* note 8, at 269-70.
[100] Heng Wang, *The RCEP and Its Investment Rules: Learning from Past Chinese FTAs*, 3(2) CHINESE J. GLOB. GOVERNANCE 160, 163-74 (2017).
[101] Shaffer & Gao, *supra* note 2, at 634.
[102] Zhonghua Renming Gonghe Guo Waishang Touzi Fa [Foreign Investment Law of the People's Republic of China] (promulgated by the Standing Comm. Nat'l People's Cong., Mar. 15, 2019,

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legalizing such a policy as Article 4 of the Foreign Investment Law, which came into force on 1 January 2020, and shifting from being a major recipient to becoming one of the world's largest providers of foreign investments, China was in the "active" mode and began to exercise cooperative geoeconomics. Alternatively, when the National People's Congress of China passed the Civil Law, which entered into force on 1 January 2021, China was in the "passive" mode because it was busy with a decision-making process of a non-geoeconomic matter.

China also clearly acts in the "dominant" mode in a geoeconomic order by virtue of its economic preponderance in partnerships and takes the lead in collapsing the shared geoeconomic wave function, which underlies cooperative geoeconomics in neighboring nations and regions. Although China officially recognizes the importance of multilateralism and sees itself as the champion of the multilateral trading system at times,[103] it has exercised cooperative geoeconomics by expanding its network of strategic partnerships and bilateral agreements to enhance its options in a geoeconomic order. Through programs such as the Belt and Road Initiative and by leading positions as that in RCEP, China has built a geoeconomic model that is "based on pragmatic, incremental development policy grounded in infrastructure development, innovation, and webs of memoranda of understanding, contracts, and treaties,"[104] and by creating new options for other countries and itself in addition to defending the multilateral system, China is also creating a Sino-centric transnational geoeconomic order based on economic ties and "soft law" ordering with maximum flexibility rather than strong legal obligations under public international law,[105] as opposed to the US-centric model that is characterized by economic integration and the transplantation of domestic regulations to regional and international laws.[106] Other neighboring countries in partnerships that are subject to China's economic preponderance are profoundly influenced by the cooperative geoeconomic position that has already been collapsed (or exercised) by the multi-layered and comprehensive Sino-centric architecture, and by benefiting from economic and political advantages brought about by such an architecture, other

effective Jan. 1, 2020), art. 4, 2019 STANDING COMM. NAT'L PEOPLE'S CONG. GAZ. 347, 349 (China).

[103] *Full Text: Special Address by Chinese President Xi Jinping at the World Economic Forum Virtual Event of the Davos Agenda*, XINHUANET (Jan. 25, 2021, 8:51 PM), http://www.xinhuanet.com/english/2021-01/25/c_139696610.htm.

[104] Shaffer & Gao, *supra* note 2, at 632.

[105] GREGORY C. SHAFFER, EMERGING POWERS AND THE WORLD TRADING SYSTEM: THE PAST AND FUTURE OF INTERNATIONAL ECONOMIC LAW 314 (2021); Roberts et al., *supra* note 1, at 672-73; Ming Du & Qingjiang Kong, *Explaining the Limits of the WTO in Shaping the Rule of Law in China*, 23(4) J. INT'L ECON. L. 885, 899-901 (2020); Heng Wang, *China's Approach to the Belt and Road Initiative: Scope, Character and Sustainability*, 22(1) J. INT'L ECON. L. 29, 29, 42 (2019).

[106] Shaffer & Gao, *supra* note 2, at 632.

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countries both defer to and expand on China's practice of cooperative geoeconomics.

When other countries develop rather than merely observe China's practices of cooperative geoeconomics, they revert to an "active" mode in the geoeconomic order with their potential to collapse the shared geoeconomic wave function. Yet, they hardly become "dominant" in ways that determine the whole, that is, the overall geoeconomic order. Acting in an "active" mode, the Trade Development Authority of Pakistan signed a Memorandum of Understanding with the Alibaba Group as a strategy to promote the export of Pakistani small and medium-sized enterprises' wares by establishing e-commerce infrastructure, which aligns with the Digital Silk Road initiative undertaken by China to achieve greater connectivity with Belt and Road countries in the cyber-sphere.[107] A similar case but in exercising competitive geoeconomics can be made of the US Clean Network alliance of more than forty countries with the aim of restricting the use of Huawei's services:[108] when Australia introduced a policy to ban Huawei's investment completely and the UK compromised and agreed to ban Huawei's service from their core system, they acted in "active" modes that collapsed the shared geoeconomic wave function into a competitive one. Pakistan, Australia, and the UK, nonetheless, were not in "dominant" modes that operated to shift the overall spectrum of the geoeconomic order, as most scholars and specialists have argued that the next twenty years will contain two distinct orders: a US-led and a China-led one.[109]

Combining these distinctions, then, the parts (here, the states' geoeconomic practices at the national, regional, and international levels) are conceptualized in the whole (here, the geoeconomic order) with the holographic characteristic—investigated through geoeconomic modes of active, dominant, and reversion from passive to active, which constantly collapse the shared geoeconomic wave function into variant positions of cooperative and competitive geoeconomics, as approaches to pursue either economic and political strategies or pure economic advantages. Evidently, together with the holographic ontology that emphasizes that the parts and the whole are almost identical, geoeconomics provides a foundational order for the making, interpretation, and application of international economic law in the 2020s, which prioritizes national security protection and aggravates regional competition. However, geoeconomic practices by states continue to

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[107] *Full Text: Joint Communique of Leaders Roundtable of Belt and Road Forum*, XINHUANET (May 15, 2017, 11:39 PM), http://www.xinhuanet.com//english/2017-05/15/c_136286378.htm.

[108] U.S. DEP'T STATE, FISCAL YEAR 2020 AGENCY FINANCIAL REPORT 4-5 (2020), https://www.state.gov/wp-content/uploads/2020/12/FY-2020-Agency-Financial-Report.pdf.

[109] Adam Segal, *When China Rules the Web: Technology in Service of the State*, 97(5) FOREIGN AFF. 10, 10 (2018); Isobel Asher Hamilton, *Google's Ex-CEO Eric Schmidt Says the Internet Will Split in Two by 2028*, BUS. INSIDER (Sept. 21, 2018, 6:07 PM), https://www.businessinsider.com/eric-schmidt-internet-will-split-in-two-2028-china-2018-9.

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demonstrate positive and cooperative possibilities by operating in pluralist ways of strategic plans and economic partnerships, which encourages a more pluralistic, flexible, and open structure for international economic law.

V. CONCLUSION: LIMITS AND BEYOND

This article aimed to conceptualize the emerging geoeconomic order in international economic law and examine its consequences to inform how a quantum worldview represents geoeconomics in international economic law. In this effort, it has elaborated a historically constructed neutral definition of geoeconomics to understand the probabilities of the geoeconomic order, reflecting the drawbacks of extant research on geoeconomics. It has also established a theoretical framework for the quantization of geoeconomics to further the analysis using quantum measurement and holism theories at the analogical and ontological levels, respectively, thus demonstrating how a geoeconomic order can be apprehended through a dialogue with quantum theories supported by the practices of cooperative and competitive geoeconomics, particularly by China and the US in the making, interpretation, and application of international economic law over the past six years.

Quantizing geoeconomics highlights the whole-part relation in the holographical order, with the whole as the shared geoeconomic wave function and the parts as the states' geoeconomic practices at national, regional, and international levels. It presents that the whole is almost identical in the parts, meaning that the increasing geoeconomic strategies will substitute states' actions that violate the geoeconomic order; conversely, the parts are not identical to the whole, meaning that states have different probabilities of collapsing the geoeconomic wave function into cooperative or competitive conditions. Yet, such a framework cannot fully understand the implications of the emerging geoeconomics for international economic law, nor the cooperative and competitive geoeconomics as strategic plans or economic partnerships in which states are engaged, nor can it deliberate how a reconciliation between national security protection and economic liberalization can be achieved in a geoeconomic order, because we represent the first attempt to experiment with a quantum worldview, or quantum IR, in the setting of international economic law in the geoeconomic era. The issue is not necessarily about the limitations of the theoretical framework of quantizing geoeconomics, but rather the temporary lack of additional theoretical analysis and empirical research on questions of quantum theories in international law. Scholarship aimed at quantizing geoeconomics in international economic law has brought new perspectives to the table. However, it is not to be celebrated uncritically. Rather, it invites the interrogation of its argumentative structures, evidence, and rationale, and its

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prospective implications for research methodologies in the field of international law.

The whole-part relation in a hologram is elaborated as the constant holomovement of enfoldment (the transition from whole to part) and unfoldment (the transition from part to whole).[110] This emphasizes that the geoeconomic order with the holographic character is not static, but dynamic and interactive in its formation. Geoeconomics (the whole) and states' geoeconomic practices (the parts) embrace uncertain potentials. By virtue of their entanglements within parts in the geoeconomic hologram and with other international affairs such as human rights, environmental protection, and the pandemic, they generate an unstable and unpredictable global economic order that poses great challenges to prevailing international economic law. "What is it?" is the process of becoming itself,[111] and hence urges a collective research program on the emergence and development of the geoeconomic order through various forms of scholarship and methodologies other than quantizing geoeconomics, with a focus on the geoeconomic implications and requirements for the advancement of the international economic legal order from the 2020s onwards.

We recall Bohr's famous statement: "[t]here is no quantum world. There is only an abstract quantum description,"[112] which reminds us that quantum theory is not a theory for objects in a micro-world, but a universal abstraction that applies to any situation of knowledge, and even "everything." The quantum worldview has a substantially limited application in international law. Compared with the promising scholarship on quantum IR that has been debated, it presents a huge gap worth "diving into." Building on the scholarship around quantum IR, our goal is to offer a trial run, through the theoretical framework of quantizing geoeconomics, for quantum theories in international economic law in the geoeconomic era. Thus, this article probably poses more questions than provides answers. However, with some solace from a quote that is usually credited to Schopenhauer, "[t]ruth passes through three stages. First, it is ridiculed. Second, it is violently opposed. Third, it is accepted as being self-evident,"[113] we courageously stand by the theoretical framework to better conceptualize the geoeconomic order in international economic law. If we can reach a point at which all international law students are trained to understand the global order through a quantum

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[110] Pan, *supra* note 9, at 23; BOHM, *supra* note 80, at 233.
[111] BOHM, *supra* note 80, at 61.
[112] ROSENBLUM & KUTTNER, *supra* note 66, at 131; BAGGOTT, *supra* note 68, at 110.
[113] According to "Quote Investigator," Arthur Schopenhauer's writings do not contain any matching adage. However, Schopenhauer did state three-stage of truth, "[t]o truth only a brief celebration of victory is allowed between the two long periods during which it is condemned as paradoxical, or disparaged as trivial." Mohandas Gandhi et al., *First They Ignore You, Then They Laugh at You, Then They Attack You, Then You Win*, QUOTE INVESTIGATOR (Aug. 13, 2017), https://quoteinvestigator.com/category/arthur-schopenhauer/.

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worldview and be at peace with the countless unpredictable and uncertain challenges that the international legal order faces, either geoeconomic or non-geoeconomic ones, then we are on the glory path to better apprehend and expand the outreach of international law.

臺灣大學學術期刊資料庫

REFERENCES

Books

ARMSTRONG, DAVID ET AL. (2007), INTERNATIONAL LAW AND INTERNATIONAL RELATIONS.

BAGGOTT, JIM (2011), THE QUANTUM STORY: A HISTORY IN 40 MOMENTS.

BARAD, KAREN MICHELLE (2007), MEETING THE UNIVERSE HALFWAY: QUANTUM PHYSICS AND THE ENTANGLEMENT OF MATTER AND MEANING.

BLACKWILL, ROBERT D. & JENNIFER M. HARRIS (2016), WAR BY OTHER MEANS: GEOECONOMICS AND STATECRAFT.

BOHM, DAVID (2002), WHOLENESS AND THE IMPLICATE ORDER.

BROWN, WENDY (2009), EDGEWORK: CRITICAL ESSAYS ON KNOWLEDGE AND POLITICS.

Callison, William & Zachary Manfredi (eds.) (2019), MUTANT NEOLIBERALISM: MARKET RULE AND POLITICAL RUPTURE.

CANALES, JIMENA (2015), THE PHYSICIST AND THE PHILOSOPHER: EINSTEIN, BERGSON, AND THE DEBATE THAT CHANGED OUR UNDERSTANDING OF TIME.

CAPRA, FRITJOF (2000), THE TAO OF PHYSICS: AN EXPLORATION OF THE PARALLELS BETWEEN MODERN PHYSICS AND EASTERN MYSTICISM, 4th ed.

DAVUTOĞLU, AHMET (2020), SYSTEMIC EARTHQUAKE AND THE STRUGGLE FOR WORLD ORDER: EXCLUSIVE POPULISM VERSUS INCLUSIVE DEMOCRACY.

GILPIN, ROBERT (2001), GLOBAL POLITICAL ECONOMY: UNDERSTANDING THE INTERNATIONAL ECONOMIC ORDER.

KEANE, JOHN (2018), POWER AND HUMILITY: THE FUTURE OF MONITORY DEMOCRACY.

KOSKENNIEMI, MARTTI (2005), FROM APOLOGY TO UTOPIA: THE STRUCTURE OF INTERNATIONAL LEGAL ARGUMENT.

KUHN, THOMAS S. (1996), THE STRUCTURE OF SCIENTIFIC REVOLUTIONS, 3d ed.

LANG, ANDREW (2011), WORLD TRADE LAW AFTER NEOLIBERALISM: RE-IMAGINING THE GLOBAL ECONOMIC ORDER.

MCFADDEN, JOHNJOE & JIM AL-KHALILI (2016), LIFE ON THE EDGE: THE COMING OF AGE OF QUANTUM BIOLOGY.

MILLER, ARTHUR I. (2009), DECIPHERING THE COSMIC NUMBER: THE STRANGE FRIENDSHIP OF WOLFGANG PAULI AND CARL JUNG.

ROSENBLUM, BRUCE & FRED KUTTNER (2011), QUANTUM ENIGMA: PHYSICS ENCOUNTERS CONSCIOUSNESS, 2d ed.

臺灣大學學術期刊資料庫

SHAFFER, GREGORY C. (2021), EMERGING POWERS AND THE WORLD TRADING SYSTEM: THE PAST AND FUTURE OF INTERNATIONAL ECONOMIC LAW.

Shaffer, Gregory C. (ed.) (2012), TRANSNATIONAL LEGAL ORDERING AND STATE CHANGE.

WENDT, ALEXANDER (2015), QUANTUM MIND AND SOCIAL SCIENCE: UNIFYING PHYSICAL AND SOCIAL ONTOLOGY.

ZANOTTI, LAURA (2019), ONTOLOGICAL ENTANGLEMENTS, AGENCY, AND ETHICS IN INTERNATIONAL RELATIONS: EXPLORING THE CROSSROADS.

Articles

Arato, Julian et al. (2020), *The Perils of Pandemic Exceptionalism*, 114(4) AMERICAN JOURNAL OF INTERNATIONAL LAW 627.

Benvenisti, Eyal (2016), *Democracy Captured: The Mega-Regional Agreements and the Future of Global Public Law*, 23(1) CONSTELLATIONS 58.

Bitbol, Michel (2011), *The Quantum Structure of Knowledge*, 21(2) AXIOMATHES 357.

Blalock, Corinne (2014), *Neoliberalism and the Crisis of Legal Theory*, 77(4) LAW AND CONTEMPORARY PROBLEMS 71.

Bohr, Niels (1961), *The Rutherford Memorial Lecture 1958: Reminiscences of the Founder of Nuclear Science and of Some Developments Based on His Work*, 78(6) PROCEEDINGS OF THE PHYSICAL SOCIETY 1083.

Born, Max (1927), *Physical Aspects of Quantum Mechanics*, 119 NATURE 354.

Chaisse, Julien & Richard Pomfret (2019), *The RCEP and the Changing Landscape of World Trade: Assessing Asia-Pacific Investment Regionalism Next Stage*, 12(1) LAW AND DEVELOPMENT REVIEW 159.

Cohen, Harlan Grant (2020), *Nations and Markets*, 23(4) JOURNAL OF INTERNATIONAL ECONOMIC LAW 793.

D'Amato, Anthony (2014), *Groundwork for International Law*, 108(4) AMERICAN JOURNAL OF INTERNATIONAL LAW 650.

Der Derian, James & Alexander Wendt (2020), *'Quantizing International Relations': The Case for Quantum Approaches to International Theory and Security Practice*, 51(5) SECURITY DIALOGUE 399.

Der Derian, James (2011), *Quantum Diplomacy, German–US Relations and the Psychogeography of Berlin*, 6 THE HAGUE JOURNAL OF DIPLOMACY 373.

Domingo, Rafael (2019), *Roman Law and Global Constitutionalism*, 21(1) SAN DIEGO INTERNATIONAL LAW JOURNAL 217.

Du, Ming & Qingjiang Kong (2020), *Explaining the Limits of the WTO in Shaping the Rule of Law in China*, 23(4) JOURNAL OF INTERNATIONAL ECONOMIC LAW 885.

臺灣大學學術期刊資料庫

Farrell, Henry & Abraham L. Newman (2019), *Weaponized Interdependence: How Global Economic Networks Shape State Coercion*, 44(1) INTERNATIONAL SECURITY 42.

Gertz, Geoffrey & Miles M. Evers (2020), *Geoeconomic Competition: Will State Capitalism Win?*, 43(2) THE WASHINGTON QUARTERLY 117.

Hall, Peter A. (1993), *Policy Paradigms, Social Learning, and the State: The Case of Economic Policymaking in Britain*, 25(3) COMPARATIVE POLITICS 275.

Heath, J. Benton (2020), *The New National Security Challenge to the Economic Order*, 129 THE YALE LAW JOURNAL 1020.

Heath, J. Benton (2020), *Trade and Security Among the Ruins*, 30(2) DUKE JOURNAL OF COMPARATIVE AND INTERNATIONAL LAW 223.

Heelan, Patrick A. (2013), *Phenomenology, Ontology, and Quantum Physics*, 18(2) FOUNDATIONS OF SCIENCE 379.

Holmes, Marcus (2019), *Re-Evaluating Theory and Methods in Diplomatic History: Bringing in Psychology, Neuroscience, Micro-Sociology, and Quantum*, 1 DIPLOMATICA 19.

Hsieh, Pasha L. (2017), *Reassessing the Trade–Development Nexus in International Economic Law: The Paradigm Shift in Asia-Pacific Regionalism*, 37(3) NORTHWESTERN JOURNAL OF INTERNATIONAL LAW & BUSINESS 321.

Jacobs, Jason (2019), *Tiptoeing the Line Between National Security and Protectionism: A Comparative Approach to Foreign Direct Investment Screening in the United States and European Union*, 47(2) INTERNATIONAL JOURNAL OF LEGAL INFORMATION 105.

Kazemi, Ali Asghar (2015), *Quantum Politics New Methodological Perspective*, 12(1) INTERNATIONAL STUDIES JOURNAL 89.

Kim, Dong Jung (2019), *The Perils of Geoeconomics*, 42(1) THE WASHINGTON QUARTERLY 153.

Kuik, Cheng-Chwee (2021), *The Twin Chessboards of US-China Rivalry: Impact on the Geostrategic Supply and Demand in Post-Pandemic Asia*, 45(1) ASIAN PERSPECTIVE 157.

Lakatos, Imre (1968), *Criticism and the Methodology of Scientific Research Programmes*, 69 PROCEEDINGS OF THE ARISTOTELIAN SOCIETY 149.

le Pere, Garth L. (2021), *US-China Geoeconomic Tensions: Implications for the African Continental Free Trade Area*, 45(1) ASIAN PERSPECTIVE 147.

Lee, Jaemin (2020), *The Coronavirus Pandemic and International Investment Arbitration—Application of "Security Exceptions" Clauses in Investment Agreements*, 13 CONTEMPORARY ASIA ARBITRATION JOURNAL 185.

Linarelli, John (2014), *How Trade Law Changed: Why It Should Change Again*, 65 MERCER LAW REVIEW 621.

臺灣大學學術期刊資料庫

Luttwak, Edward N. (1990), *From Geopolitics to Geo-Economics: Logic of Conflict, Grammar of Commerce*, 20 THE NATIONAL INTEREST 17.
Mattlin, Mikael & Mikael Wigell (2015), *Geoeconomics in the Context of Restive Regional Powers*, 14(2) ASIA EUROPE JOURNAL 125.
McIntosh, Chris (2020), *Writing Quantum Entanglement into International Relations: Temporality, Positionality, and the Ontology of War*, 49(1) MILLENNIUM: JOURNAL OF INTERNATIONAL STUDIES 162.
Merali, Zeeya (2013), *Theoretical Physics: The Origins of Space and Time*, 500 NATURE 516.
Moisio, Sami (2018), *Towards Geopolitical Analysis of Geoeconomic Processes*, 23(1) GEOPOLITICS 22.
Moreau, Paul-Antoine et al. (2019), *Imaging Bell-type Nonlocal Behavior*, 5(7) SCIENCE ADVANCES 1.
Murphy, Michael P. A. (2020), *Quantizing Post-critique: Entangled Ontologies and Critical International Relations*, 49(1) MILLENNIUM: JOURNAL OF INTERNATIONAL STUDIES 175.
Otto, Ton & Nils Bubandt (2010), *Beyond Cultural Wholes? Introduction to Part 2, in* EXPERIMENTS IN HOLISM: THEORY AND PRACTICE IN CONTEMPORARY ANTHROPOLOGY 89 (Ton Otto & Nils Bubandt eds.).
Pan, Chengxin (2020), *Enfolding Wholes in Parts: Quantum Holography and International Relations*, 26 EUROPEAN JOURNAL OF INTERNATIONAL RELATIONS (SPECIAL ISSUE) 14.
Peng, Shin-yi (2015), *Cybersecurity Threats and the WTO National Security Exceptions*, 18(2) JOURNAL OF INTERNATIONAL ECONOMIC LAW 449.
Polat, Necati (1999), *International Law, the Inherent Instability of the International System, and International Violence*, 19(1) OXFORD JOURNAL OF LEGAL STUDIES 51.
Puder, Markus G. (2020), *Brexit—Disentangling the Quantum in Law and Politics*, 52(1) THE GEORGE WASHINGTON INTERNATIONAL LAW REVIEW 13.
Puig, Sergio (2019), *The United States-Mexico-Canada Agreement: A Glimpse into the Geoeconomic World Order*, 113 AJIL UNBOUND 56.
Roberts, Anthea et al. (2019), *Toward a Geoeconomic Order in International Trade and Investment*, 22(4) JOURNAL OF INTERNATIONAL ECONOMIC LAW 655.
Scholvin, Sören & Mikael Wigell (2018), *Power Politics by Economic Means: Geoeconomics as an Analytical Approach and Foreign Policy Practice*, 37(1) COMPARATIVE STRATEGY 73.
Segal, Adam (2018), *When China Rules the Web: Technology in Service of the State*, 97(5) FOREIGN AFFAIRS 10.
Shaffer, Gregory C. & Henry Gao (2020), *A New Chinese Economic Order?*, 23(3) JOURNAL OF INTERNATIONAL ECONOMIC LAW 607.

臺灣大學學術期刊資料庫

Shaffer, Gregory C. (2011), *Introduction: International Economic Law in a Time of Change*, 20(2) MINNESOTA JOURNAL OF INTERNATIONAL LAW 1.

Slawotsky, Joel (2018), *The National Security Exception in US-China FDI and Trade: Lessons from Delaware Corporate Law*, 6(2) THE CHINESE JOURNAL OF COMPARATIVE LAW 228.

Sparke, Matthew (2007), *Geopolitical Fears, Geoeconomic Hopes, and the Responsibilities of Geography*, 97(2) ANNALS OF THE ASSOCIATION OF AMERICAN GEOGRAPHERS 338.

Stoeva, Yana (2016), *The 'Uncertainty Hypothesis' in International Economic Law*, 2(1) THE CHINESE JOURNAL OF GLOBAL GOVERNANCE 44.

Struye de Swielande, Tanguy (2021), *The Biden Administration: An Opportunity to Affirm a Flexible and Adaptive American World Leadership*, 184(2) WORLD AFFAIRS 130.

Thomas, Chantal (2013), *What Does the Emerging International Law of Migration Mean for Sovereignty*, 14(2) MELBOURNE JOURNAL OF INTERNATIONAL LAW 392.

Van Daele, Wim (2018), *Food as the Holographic Condensation of Life in Sri Lankan Rituals*, 83(4) ETHNOS 645.

Vidigal, Geraldo (2020), *A Really Big Button that Doesn't Do Anything? The Anti-NME Clause in US Trade Agreements Between Law and Geoeconomics*, 23(1) JOURNAL OF INTERNATIONAL ECONOMIC LAW 45.

Wang, Heng (2017), *The RCEP and Its Investment Rules: Learning from Past Chinese FTAs*, 3(2) THE CHINESE JOURNAL OF GLOBAL GOVERNANCE 160.

Wang, Heng (2019), *China's Approach to the Belt and Road Initiative: Scope, Character and Sustainability*, 22(1) JOURNAL OF INTERNATIONAL ECONOMIC LAW 29.

Wang, Heng (2020), *Selective Reshaping: China's Paradigm Shift in International Economic Governance*, 23(3) JOURNAL OF INTERNATIONAL ECONOMIC LAW 583.

Wendt, Alexander (2010), *Flatland: Quantum Mind and the International Hologram*, *in* NEW SYSTEMS THEORIES OF WORLD POLITICS pt. V (Mathias Albert et al. eds.).

Wendt, Alexander (2018), *The Mind–Body Problem and Social Science: Motivating a Quantum Social Theory*, 48 JOURNAL FOR THE THEORY OF SOCIAL BEHAVIOUR 188.

Wigell, Mikael & Antto Vihma (2016), *Geopolitics Versus Geoeconomics: The Case of Russia's Geostrategy and Its Effects on the EU*, 92(3) INTERNATIONAL AFFAIRS 605.

臺灣大學學術期刊資料庫

Wigell, Mikael (2016), *Conceptualizing Regional Powers' Geoeconomic Strategies: Neo-Imperialism, Neo-Mercantilism, Hegemony, and Liberal Institutionalism*, 14(2) ASIA EUROPE JOURNAL 135.

Yang, Dali L. (2021), *The Covid-19 Pandemic and the Estrangement of US-China Relations*, 45(1) ASIAN PERSPECTIVE 7.

Yıldız-Alanbay, Şengül (2020), *The Matter of Affect in the Quantum Universe*, 49(1) MILLENNIUM: JOURNAL OF INTERNATIONAL STUDIES 151.

Zha, Daojiong (2021), *Non-Traditional Security and China-US Relations*, 45(1) ASIAN PERSPECTIVE 75.

Internet Sources

Full Text: Joint Communique of Leaders Roundtable of Belt and Road Forum, XINHUANET (May 15, 2017, 11:39 PM), http://www.xinhuanet.com//english/2017-05/15/c_136286378.htm.

Full Text: Special Address by Chinese President Xi Jinping at the World Economic Forum Virtual Event of the Davos Agenda, XINHUANET (January 25, 2021, 8:51 PM), http://www.xinhuanet.com/english/2021-01/25/c_139696610.htm.

Gandhi, Mohandas et al., *First They Ignore You, Then They Laugh at You, Then They Attack You, Then You Win*, QUOTE INVESTIGATOR (August 13, 2017), https://quoteinvestigator.com/category/arthur-schopenhauer/.

Hamilton, Isobel Asher, *Google's Ex-CEO Eric Schmidt Says the Internet Will Split in Two by 2028*, BUSINESS INSIDER (September 21, 2018, 6:07 PM), https://www.businessinsider.com/eric-schmidt-internet-will-split-in-two-2028-china-2018-9.

Interview for Woman's Own *("No Such Thing as Society")*, MARGARET THATCHER (September 23, 1987), https://www.margaretthatcher.org/document/106689.

RCEP Text, AUSTRALIAN GOVERNMENT DEPARTMENT OF FOREIGN AFFAIRS AND TRADE, https://www.dfat.gov.au/trade/agreements/in-force/rcep/rcep-text.

WTO Analytical Index: GATT 1994 – Article XXI (Jurisprudence), WORLD TRADE ORGANIZATION, https://www.wto.org/english/res_e/publications_e/ai17_e/gatt1994_art21_jur.pdf.

Other Sources

Giggy, Lindsey, Investing in the Future World Order: Geoeconomic Strategy and Foreign Direct Investment (June 1, 2017) (thesis, Maxwell Air Force Base) (on file with Defense Technical Information Center).

Panel Report, *Russia — Measures Concerning Traffic in Transit*, WTO Doc. WT/DS512/R (adopted April 26, 2019).

臺灣大學學術期刊資料庫

United Nations Economic and Social Council, *Journal of the Preparatory Committee of the International Conference on Trade and Employment—London—No. 4*, U.N. Doc. ECOSOC_JOURNAL/1946-04 (October 18, 1946).

UNITED STATES DEPARTMENT OF STATE, FISCAL YEAR 2020 AGENCY FINANCIAL REPORT (2020), https://www.state.gov/wp-content/uploads/2020/12/FY-2020-Agency-Financial-Report.pdf.

WESLEY, MICHAEL (2016), AUSTRALIA AND THE RISE OF GEOECONOMICS, https://bellschool.anu.edu.au/sites/default/files/uploads/2017-05/australia_and_the_rise_of_geoeconomics.pdf.

Zhonghua Renming Gonghe Guo Waishang Touzi Fa [Foreign Investment Law of the People's Republic of China] (promulgated by the Standing Comm. Nat'l People's Cong., March 15, 2019, effective January 1, 2020), 2019 STANDING COMM. NAT'L PEOPLE'S CONG. GAZ. 347 (China).

臺灣大學學術期刊資料庫