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THE CHAOS MACHINE: THE WTO IN A SOCIAL ENTROPY MODEL OF THE WORLD TRADING SYSTEM

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ABSTRACT: This article applies social entropy theory to international trade law, suggesting that observed shifts in world trading system towards disorder are the consequence of insufficient “energy” inputs in the form of an effective, centralized legal framework. In support of this claim, the article draws attention to recognized and substantive deficiencies in the World Trade Organization (‘WTO’). These include trade round negotiation impasse, the rise of bilateralism, indeterminacy in the treaty texts and inadequate enforcement procedures. These problems represent increasing disorganization, or entropy, in the world trading system, a phenomenon characterized most notably by growing income inequality between states and failure to achieve progress in further trade liberalization. While this article does not propose either specific predictions or practical solutions to the dilemma of social entropy in the world trading system, it does suggest that a more robust, authoritative and trade-focused WTO is essential to counter the entropic tendencies within the supra-national trading system. This should help to ensure future growth and achieve the fuller distribution of economic prosperity through global trade.

1. INTRODUCTION: SOCIAL ENTROPY THEORY AND WORLD TRADE LAW

The study of international trade law can be enriched through the application of descriptive and prescriptive models derived from the sciences and social sciences. In this regard, the second law of thermodynamics states that all physical processes are irreversible (meaning one-directional) because some energy is always spent or dissipated as heat. The amount of dissipated energy in a system is referred to as entropy. At equilibrium, the point of maximum entropy, a system has become totally disorganized. Entropy therefore measures the progression of relatively closed systems, meaning those with no exogenous inputs of energy, towards equilibrium which is characterized by a state of random disorder. Stable systems can

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maintain organization or order, therefore, only by importing sufficient energy from outside. In the social sciences of sociology and anthropology social entropy theory states that complex modern societies are themselves systems that have a number of distinct features which operate to ensure that entropy levels remain below the maximum or equilibrium, meaning that they remain organized and do not devolve into chaos or anarchy.

By importing the principles of physics, social entropy can be described as a scientific theory of society. As a scientific theory, social entropy can be applied to explain more fully actual phenomena, namely specific social systems. It can also be tested by reference to various indicia of disorder that emerge over time. Social entropy theory is therefore a descriptive model for understanding the phenomenon in which social systems and the institutions within them tend towards a state of disorganization.¹ Inasmuch as any social system is deprived of energy to counter this tendency towards entropy, social entropy theory is also a predictive model because it anticipates that social systems that lack sufficient energy, however this may be measured, will ultimately degenerate into chaos. This may be characterized by such manifestations as lawlessness, poverty, inequality, and lower life expectancy.

Based on the above theoretical constructs, this article will propose the world trading system as a model of social entropy, examining how the law of the World Trade Organization ('WTO') is failing to counter the entropic tendencies that are beginning to emerge in the system of international trade. Such indicia of disorder consist of the following phenomena: the growing inequality observed among and within trading countries; uncertainty in the relationship between the law of the WTO and international law and associated problems of the interpretation of indeterminate WTO Agreements; the prominence of bilateralism and regionalism over multilateralism in international trade law leading to regulatory confusion

¹ L.G. Zucker, 'Where Do Institutional Patterns Come From? Organizations as Actors in Social Systems' in L.G. Zucker ed. *Institutional Patterns and Organizations* (Cambridge, MA, USA, Ballinger, 1988)

and incoherence; the lack of effective sanction for breach of WTO Agreements representing a lack of institutional authority; and the dispersal of the WTO's core mandate in regulating international trade which has led in part to a rise in global trade protectionism.

From the outset it must be established that the purpose of this article is not to explore specific structural, institutional weaknesses of the WTO, nor to identify theoretical flaws in the logic of liberalized trade and comparative advantage. This article will not attempt to propose reforms in world trade governance, either at the WTO or via the increasingly numerate Preferential Trading Agreements (PTAs). These issues have been discussed extensively and exhaustively by others.² This article does not purport to engage comprehensively with the foundations of social systems theory, nor will it address any of the macro-sociological foundations of social entropy theory, such as systems theory generally or the concept of social equilibrium.³ Before embarking upon an analysis of the features of the world trading system that conform to a model of social entropy with the WTO as a faltering source of ordering energy, it is first necessary to establish that the global community of trading states comprising the (near universal) membership of the WTO can itself be described as a social system.

2. THE WORLD TRADING COMMUNITY AS A SOCIAL SYSTEM

Social entropy theory identifies eight basic levels of living systems: the cell, the organ, the organism (individual), group, organization, community, society and the supranational system.⁴ The collective of nations that engage in trade of goods and services with one

² E.g. Robert Lawrence, "Rulemaking Amidst Growing Diversity: A Club of Clubs Approach to WTO Reform and New Issue Selection" 9:4 *Journal of International Economic Law* 823 (2006) and James Thuo Gathii, "Process and Substance in WTO Reform" 56 *Rutgers Law Review* 885 (2004)

³ Kenneth Bailey, 'Towards a Nonequilibrium Analysis of Complex Social Systems' 35:1 *The British Journal of Sociology* 1 at 3 (1984)

⁴ JL Miller and JG Miller, "Greater Than the Sum of Its Parts" 37 *Behavioural Science* 1 (1992)

another subject to the same rules may be viewed as the final of these categories: a supranational system, meaning one with a high level of both economic and regulatory integration that extends beyond the sphere of influence of individual nation states. Indeed world trade itself is regularly referred to as a “system” in academic commentary, perhaps most notably John Jackson’s treatise on the law of the WTO: *The World Trading System*.⁵ Indeed, the language of “system” is evident in the foundational materials of the WTO. For example, the Marrakesh Agreement establishing the WTO refers to the desire to create a more favourable and open “multilateral trading system” for the benefit and welfare of the world.⁶ The community of trading states may be seen as a system in that it contains a number of inter-dependent elements, namely national governments, national and international laws and a dispute resolution mechanism, each of which is essential to its overall functionality.

Sociologists have further established that social systems must satisfy a number of critical functions in order to slow or halt the increase of entropy. Each social system possesses a set of six characteristics that are crucial to serve this purpose: Population (P), Information (I), Level of Living (L), Organization (O), Technology (T) and Space (S).⁷ Thus a plausible application of this metric to the world trading system is as follows. Population is the number of Member states of the WTO which is 157 as of mid-2012. Alternatively, Population could be seen as the aggregate population of all of the Member states of the WTO, giving the total number of people who in theory benefit (or suffer) from trading with other Member nations. Given that only a few countries remain outside the WTO, this figure would effectively cover most of the world’s 7 billion people. Population is obviously essential for the world trading system to function because people both produce and consume traded goods and services. Information is the law of the WTO, meaning its covered multilateral treaties

⁵ John Jackson, *The World Trading System: Law and Policy of International Economic Relations* (2nd ed, MIT Press, 1997)

⁶ Art 2 (15 April 1994)

⁷ Forming the acronym PILOTS: JG Miller, *Living Systems* (McGraw-Hill, New York, 1978)

which contain rules that facilitate the trading of goods and services across international borders. Importantly the Information category should not include bilateral and regional trade agreements because these do not govern all of the global population in the system, but rather discreet groups within it. In the system of world trade the Level of Living should be viewed as the measureable benefits resulting from liberalized trade as achieved by the law of the WTO. The best method of capturing this variable is GDP per capita, either of the system as a whole (all WTO Members) or of each Member State. Crucially, however, this data does not capture the distribution of wealth within the system, which is arguably more indicative of a functioning society. Organization is the WTO itself which fulfils the role as an institution of governance in international economic relations.¹¹ It is both a forum for negotiation among Members, an authoritative source of trade rules, and a seat of dispute settlement. Technology in the system of world trade consists of the capacity to exchange traded goods and services, increasing the number and frequency of transactions. This is achieved through modern telecommunications, most importantly the internet. Advancement in containerization and the automation of sea ports has also improved the capacity of shipping to enlarge international trade. Finally, Space should be seen as the geographic area of the globe that engages in world trade either through the production or consumption of traded products and services. Given that membership of the WTO now comprises most countries in the world, Space therefore consists of most of the economically productive regions of the planet, including its land and oceans, without which the production and consumption of traded goods and services would be impossible.

Since the focus of this article is the WTO, the two entropy-resisting functions above that will be explored are those that are performed by the WTO, namely Information (law) and Organization (the institution of the WTO itself including its dispute settlement mechanism).

¹¹ E.g. Sol Picciotto who refers to the WTO as a “node of global governance”: *Regulating Global Corporate Capitalism* (Cambridge University Press, 2011) at 299

As noted above, all social systems require energy to resist natural decay to entropic equilibrium or chaos. In this regard, law is classic tool by which to counteract social entropy.¹² In the construction of a social entropy model of world trade, the substantive and procedural rules of the WTO are the primary source of law, or energy that acts as a buttress against the devolution into disorder.

Having proposed the world trading system as a social system, this article will now outline features of this system which demonstrate a drift towards entropy as a consequence of insufficient or ineffective inputs of energy in the form of ordering law from the WTO.

3. ENTROPIC TENDENCIES IN THE WORLD TRADING SYSTEM

a) Economic Inequality

Social inequality is a classic metric of social entropy.¹⁴ Indeed economists have used the concept of entropy to describe societies in which there is a high level of diversity in terms of race, religion and income, particularly where this heterogeneity manifests societal dysfunction such as crime, high mortality rates, or inability to achieve self-sufficiency.¹⁵ In the context of the world trading system it not so much the unequal distribution of wealth but rather the *randomness* of this distribution in the system that is indicative of entropy. If some nations are able to accrue wealth while others lose it, this is should not necessarily be viewed as disorder, provided that the allocation is the result of efficiency, namely the comparative advantage that one nation has over another one in the production of some good or service,

¹² Detlev Vagts and NG Onuf, 'Book Review: Jurisprudence: A Descriptive and Normative Analysis of Law by Anthony D'Amato' 80 American Journal of International Law 730 at 732 (1986)

¹⁴ Kenneth Bailey, Social Entropy Theory chapter 8.

¹⁵ Robert J Oxby, 'Cognitive Dissonance, Status and Growth of the Underclass' 114: 498 The Economic Journal 727 at 744 (1994) and Howard Odum, 'Folk Sociology as a Subject Field for the Historical Study of Total Human Society and the Empirical Study of Group Behavior' 31:3 Social Forces 193 at 213 (1953)

even if this is based upon natural resource endowments. This process underlies the purpose of the WTO and trade liberalization in general.¹⁶

The Gini Index, which measures the degree of inequality in income for a given geographic region, demonstrates the movement towards entropy in the world trading system. Worldwide, Gini Indices have been increasing steadily since the latter part of the 20th Century even as GDPs per capita have grown. This may be due to a number of factors, including population increases without corresponding improvements in technology, such as sanitation and agricultural yield.¹⁷ Rising global income inequality appears to be contemporaneous with the implementation of liberalized trading rules under the General Agreement on Tariffs and Trade ('GATT') and the WTO, although this is not to say that a correlation between the two must be inferred. The observed trend of growing inequality in wealth distribution must be viewed in the context of the overall increase in international trade that has been observed over the period of implementation of the GATT and the WTO agreements. While there was a modest decline during the recent global recession, the volume of traded goods and services has continued to rise steadily each year.²⁰ While trade has increased, the wealth generated by this process has not been enjoyed equally across the community of the world trading system.

It should be noted that the role played by the WTO in increasing world trade has not been firmly established. According to some economists, the impact of the WTO and the GATT before it on international trade has been minimal if not negative in terms of increasing international trade flows. One study concluded that countries belonging to the GATT/WTO do not have significantly different levels of trade from non-members.²² More significantly,

¹⁶ See e.g. Peter Van Den Bossche, *The Law and Policy of the World Trade Organization* (2nd ed, Cambridge University Press, 2008) at 15-24

¹⁷ Evan Hillebrand, "Poverty, Growth and Inequality Over the Next 50 Years" Food and Agriculture Association of the United Nations: Economic and Social Development Department at 7
<<http://ftp.fao.org/docrep/fao/012/ak968e/ak968e00.pdf>> (last accessed Oct 2012)

²⁰ Source: UNCTAD Stat, Exports and Imports of Goods and Services, annual, 1980-2011
<<http://unctadstat.unctad.org/TableView/tableView.aspx?ReportId=25116>> (last accessed September 2012). Volume for this measure dropped in 2009 and 2010 but had recovered by 2011.

²² Adam Rose, "Do We Really Know that the WTO Increases Trade" (NBER Working Paper No. 9273, 2004)

recent studies have demonstrated that while the WTO has a significant positive effect on trade, this effect is uneven. Large industrialized nations have enjoyed increases in trade upon joining the WTO, whereas developing countries have in many cases seen their levels of trade decline.²³ This outcome would be perhaps less troubling were it not at least partially the result of selective liberalization under WTO rules such as the elimination of trade barriers in manufacturing but not in agriculture and textiles.²⁴

The increasing imbalance of wealth among trading nations is an expression of the WTO's failure to re-adjust income inequalities both within individual societies (nations) as well as among societies (WTO Members). This is not to suggest that the WTO has fostered a form of economic globalization in which developed countries have prospered at the expense of the developing ones, nor is it to posit that an ordered state of the world trading system is one in which the entire global economic system is re-oriented towards a development purpose. However, a more balanced regime of trade liberalization that is responsive to the economic needs and developmental status of each Member state may yield greater results in terms of economic growth in poorer states.²⁵ This could be achieved, for example, by scaling each Member's individual concessions according to their economic strength.²⁶ Such an approach would be in keeping with the WTO's mandate of raising the standards of living worldwide²⁷ suppressing the disorder of all of the population of the social system through a more equitable distribution of the world's wealth.

b) Impasse in Doha Round Negotiations

²³ A Subramanian and S Wei, "The WTO Promotes Trade, Strongly But Unevenly" 72 *Journal of International Economics* 151 (2007)

²⁴ Michael Trebilcock, *Understanding Trade Law* (Edward Elgar, 2011) at 178-184

²⁵ Capital controls may also be required to cultivate economic growth in developed countries: see e.g. Joseph Stiglitz, "Capital Market Liberalization and Exchange Rate Regimes: Risk Without Reward" 2002 *Annals of the American Academy of Political and Social Science* 579 at 219.

²⁶ Sonia E Rolland, *Development at the WTO* at 298-303

²⁷ Preamble to the Marrakesh Agreement Establishing the World Trade Organization (15 April 1994)

The capacity of a social system to control levels of conflict among its population is indicative of its resistance to entropy.²⁸ Disharmony within a social system may be equated with growing disorder because the lack of consensus frustrates the society's ability to effectuate change that serves its collective best interests, or at least the best interests of the majority. Energy is lost in conflict that could be put towards better uses, such as increased productivity. On the other hand, some sociologists point out that it is consensus, rather than discord, which characterizes social entropy. Under this interpretation, the process of contestation is itself the emancipator from chaos.²⁹ This is because without the benefit of constant debate and dissent, societal progress would become paralyzed, effectively the social entropy of sclerotic unanimity, even if it manifests itself in harmony.³⁰ The need for contestation may explain the dominance of democracy as among the most effective forms of governance in most modern societies.³¹

From the perspective of the order-imposing legal framework of the WTO, consensus or near consensus among the Ministerial Conference and the WTO General Council is vital to facilitate the proper functioning and advancement of the world trading system. By default decisions at the WTO are made by consensus – a decision will be made if no member present formally objects.³² Only if no consensus can be reached is a decision submitted to the member's vote, with a majority of votes cast generally sufficing to adopt a decision that will bind all members. Under the single undertaking approach to tariff reductions, nothing is agreed upon until all members agree to all aspects the negotiations, which results in a single package of multilateral commitments. Regular negotiation must occur among all WTO

²⁸ Kenneth Cloke, 'Journeys Into the Heart of Conflict' 4 *Pepperdine Dispute Resolution Law Journal* 219 at 234(2004)

²⁹ Mas'ud Zavarzadeh, 'Pun(k) Deconstruction and the Postmodern Political Imaginary' 22 *Cultural Critique* 5 at 16 (1992)

³⁰ Dietrich Schwanitz, 'Systems Theory According to Niklas Luhmann: Its Environment and Conceptual Strategies' 30 *Cultural Critique* 137 at 152 (1995)

³¹ See e.g. Arend Lijphart, *Patterns of Democracy: Government Forms and Performance in Thirty-Six Countries* (2nd edition, Melior, 2012) and the discussion of "consensus democracies".

³² Art IX:1 of the WTO Agreement

Members in order for tariffs to be lowered and new liberalization commitments to be made. This is the cornerstone of the WTO's function as a forum of multilateral engagement in the sphere of international trade.

The failure of the current round of negotiations to make significant progress towards deeper liberalization demonstrates that the WTO as a consensus building forum is not fulfilling its role in resisting entropy. In this context entropy may be seen as the failure to achieve greater levels of international trade among WTO Members, as well as the recent observed rise in protectionism.³³ While it is not the place to discuss the problems of ongoing trade negotiation comprehensively here, the Doha Round of multilateral negotiations, which began in November 2001, remains stalled because of several key issues. These include agricultural subsidies, non-agricultural market access, and further liberalization of services through GATS specific commitments, as well as rules on anti-dumping, subsidies and countervailing duties.³⁴ The requirement of consensus decision-making among all 157 WTO Members, as well as the format of the single undertaking render the conclusion of a trade round with meaningful results on these issues almost impossible. In social systems terms, the Population parameter has become too large for the Organization function to administer. This represents an institutional deficiency in the WTO as the instrument of delivery of the balancing energy of international trade rules to its Members. A shift towards plurilateralism, wherein WTO Members choose the agreements to which they wish to be bound, as for example with the Agreement on Government Procurement, may resolve the difficulty with the all-or-nothing approach of multilateralism and help achieve liberalization at more measured pace over time.

³³ Pascal Lamy, Speech to the Thai Chamber of Commerce, Bangkok, 30 May 2012 <http://www.wto.org/english/news_e/sppl_e/sppl232_e.htm> (last accessed November 2012). See also European Commission Directorate-General For Trade, Ninth Report on Potentially Trade Restrictive Measures, September 2011 – May 2012, The European Commission, 6 June 2012. This study acknowledges the major role of the global financial crisis in causing protection.

³⁴ Michael Trebilcock, *Understanding Trade Law* (Edward Elgar, 2011) at 104-105

c) Interpretive Confusion and Weak Dispute Settlement

The prevalence of disputes regarding legal entitlements has been identified as a key contributor to social entropy.³⁸ Just as in science entropy is viewed as measurement of the loss of energy due to random motion, in the social context it is a measurement of the loss of the capacity to detect and prevent destructive conflicts before they occur. Conflict resolution mechanisms protect societies against social entropy by dissipating the wasteful energy of disputes into higher levels of unity and cohesiveness. In this way, conflict resolution serves social systems by allowing them to adapt to changes in their environment and reach higher levels of development.³⁹ A properly functioning legal system may not only resolve disputes that bring about disorder, it may actually re-adjust relationships to a higher level of order than before the conflict arose. In the words of one commentator: “conflict resolution techniques can thus be considered a hedge against social entropy, and a method for translating the chaos of conflict into social evolution.”⁴⁰ A given legal system may achieve this goal by the refinement of its own procedures as well as the content and meaning of its rules, bringing clarity and therefore predictability to the laws governing relationships between parties within the social system. However, because resolution is a more highly ordered state than conflict, it requires energy to create and maintain. Thus, entropy predicts that without any additional effort, it will be easier for resolution to break down and result in conflict, than for conflict to break down and result in resolution.⁴¹

³⁸ D.C. Wadhwa, ‘Guaranteeing Title to Land’ 37:47 Economic and Political Weekly 4699 at 4721 (2002) (referring specifically to registration of title to land)

³⁹ Kenneth Cloke, ‘Journeys Into the Heart of Conflict’ 4 Pepperdine Dispute Resolution Law Journal 219 at 234(2004)

⁴⁰ Kenneth Cloke, ‘Journeys Into the Heart of Conflict’ 4 Pepperdine Dispute Resolution Law Journal 219 at 233(2004)

⁴¹ Kenneth Cloke, ‘Journeys Into the Heart of Conflict’ 4 Pepperdine Dispute Resolution Law Journal 219 at 233(2004)

In the context of the world trading system, conflict resolution is achieved through application of the substantive laws contained in the WTO Agreements to disputes between Member states by the WTO Panels and Appellate Body, as specified by the procedural rules of the Dispute Settlement Understanding. While Panels and Appellate Body reports are not binding precedents they provide clarification regarding the meaning of the WTO agreements in order to preserve the rights and obligations of Members.⁴² This is a critical means of strengthening the multilateral trading system because it helps ensure predictability, allowing for trading parties to organize their activities with the confidence that their legal entitlements will be observed.⁴³ The process of contestation of legal entitlements may itself be viewed as a vital component of a functioning society.⁴⁴ Indeed the judicialization of the world trading system through the WTO dispute settlement system should be viewed as achievement because it has contributed to the de-politicization of trade disputes, preventing the escalation of trade barriers to armed conflict while preserving diplomatic relations between states.⁴⁶

However, in fulfilling this function neither the Panels nor the Appellate Body have been able to offer a clear picture of the interpretive principles that should resolve inherent uncertainties in the language of the treaties and in that sense the integrity of the conflict resolution system of the world trading system has been compromised.⁴⁷ In addition to the ambiguity of trade-specific concepts such as “likeness” for the purposes of Most Favoured Nation⁴⁸ and National Treatment⁴⁹ analysis and the prohibition of measures that are a “disguised restriction on international trade” for the purposes of General Exceptions to the

⁴² Dispute Settlement Understanding Art 3.2

⁴³ Art 23

⁴⁴ Mas’ud Zavarzadeh, ‘Pun(k) Deconstruction and the Postmodern Political Imaginary’ 22 Cultural Critique 5 at 16 (1992)

⁴⁶ John Jackson, *Sovereignty, the WTO and Changing Fundamentals of International Law* (Cambridge University Press, 2006) at 147.

⁴⁷ See e.g. Andrew Mitchell, *Legal Principles in WTO Disputes* (Cambridge, 2008)

⁴⁸ Art I:1, as examined for example in *Spain-Unroasted Coffee*, Panel Report [4.6] – [4.9]

⁴⁹ Art III:2, as examined for example in *Japan-Alcoholic Beverages*, Appellate Body Report at 114

GATT⁵⁰, tests involving proportionality, necessity and balancing are also not clearly delineated in WTO law. These latter more general concepts are crucial to the interpretation of the GATT, the GATS as well as the Agreement on Sanitary and Phytosanitary Measures (SPS Agreement) and the Agreement on Technical Barriers to Trade (TBT Agreement).⁵¹ The manner in which these vital tools of conflict resolution are applied by WTO tribunals is often rooted in competing values and interests, such as economic efficiency, health or sustainable development. But although this exercise accords a degree of flexibility and dynamism to the dispute settlement system, the lack of a more coherent conceptual framework for applying these principles threatens the conflict resolution procedure's stability and predictability. Given the absence of specific rules on numerous sensitive issues and the centrality of the dispute settlement process in forming WTO law the importance of interpretive principles can only increase in the future.⁵²

Furthermore, the critical relationship between WTO law and international law remains complex and controversial. The extent to which WTO panels and the Appellate Body take into account non-WTO law is uncertain, exacerbating interpretive conflicts resulting from the ambiguity of treaty texts and unsettling the system's capacity for conflict resolution. While the law of the WTO may be considered *lex specialis* in that WTO Members agree to suspend the application of certain rules of international law when they accede to the WTO's single undertaking, it is still very much part of the wider system of public international law.⁵³ Accordingly the Panels and Appellate Body consider other international commitments undertaken by Members following the interpretive principles of

⁵⁰ Art XX, as examined for example in US-Gasoline, Appellate Body Report, at 20-21

⁵¹ GATT Art XX, GATS Art XIV, SPS Art 5, TBT Art 2

⁵² See e.g. Mads Andenas and Stefan Zleptnig, "Proportionality in WTO Law: In Comparative Perspective" 42 Texas International Law Journal 371 (2007) at 377-378

⁵³ Joost Pauwelyn, "The Role of Public International Law in the WTO: How Far Can We Go?" 95 *American Journal of International Law* 535 (2001)

customary international law as expressed by the Vienna Convention on the Law of Treaties.⁵⁵ Yet precisely how and when this should be done remains a source of confusion for the panels and Appellate Body as well as much debate within the academic community.⁵⁷ In particular commentators have argued that there has been excessive reliance on dictionary definitions to establish the “ordinary meaning” of terms, a technique that hides prior interpretive choices by the editors of dictionaries.⁵⁸ Commentators have cautioned that there has been a degree of openness to interpret WTO agreements via non-WTO law, such as other international treaties and decisions of international courts, even where the basis for doing so under the Vienna Convention on the Law of Treaties is not obvious.⁵⁹ The lack of coherence in the process of application of norms derived from other sources of international law to world trade law has contributed to the organization’s “legitimacy crisis” undermining its role as an authoritative locus of world economic governance.⁶¹ The problem of legal indeterminacy may be in part the consequence of the fact that the drafters of the Dispute Settlement Understanding did not intend to endow the WTO’s dispute settlement system with such reach.

Another strong indication of disorder within the WTO’s dispute settlement system is its incapacity to deal with complaints brought by smaller private parties who typically seek monetary damages against states. As suggested above the Population of the world trading

⁵⁵ Vienna Convention on the Law of Treaties Arts 31 and 32, 8 ILM (1969) 679, as referenced in the Dispute Settlement Understanding Art 3.2, *US-Gasoline*, Appellate Body Report, WT/DS2/AB/R (adopted 20 May 1996) at 16; *US-Shrimp*, Appellate Body Report, WT/DS58/AB/R (adopted 6 November 1998); and *European Communities – Biotech Products*, Panel Reports, United States (WT/DS291/R), Canada (WT/DS292/R), and Argentina (WT/DS293/R) (adopted 29 September 2006)

⁵⁷ See e.g. Gabrielle Marceau, “Conflicts of Norms of Jurisdictions: The Relationship between the WTO Agreement and MEAs and Other Treaties” (2001) 35 *Journal of World Trade* 1081 and Joost Pauwelyn, *Conflict of Norms in Public International Law: How WTO Law Relates to Other Rules of International Law* (2003)

⁵⁸ Andrew Mitchell, at 78 referring to Article 31(1) of the Vienna Convention. But see *EC-Biotech* in which the Panel stated that rules of international law may themselves provide evidence of the ordinary meaning of terms like dictionaries do, at [7.92]

⁵⁹ Isabelle Van Damme, “What Role is there for Regional International Law in the Interpretation of the WTO Agreements?” in Lorand Bartels and Federico Ortino, eds, *Regional Trade Agreements and the WTO Legal System* (New York: Oxford University Press, 2006) 553 at 575. For example the Appellate Body has cited a decision of the International Centre for the Settlement of Investment Disputes (ICSID): *US – Stainless Steel*, Appellate Body Report, WT/DS344/AB/R, n. 313, (adopted 20 May 2008)

⁶¹ Andrew Michell, *Legal Principles in WTO Disputes* (Cambridge University Press, 2008) at 267; Andrew Lang, *World Trade Law After Neoliberalism* (Oxford University Press, 2011) at 313-317.

system may be viewed as all of the trading parties within the WTO Member states, not simply the states themselves. The WTO's failure to address this key manifestation economic conflict has undermined its role as a forum for the settlement of international disputes and has contributed to the appearance of trade-oriented disputes disguised as investor-state disputes under bilateral investment treaties.⁶⁴ The state-to-state nature of WTO dispute settlement system is best suited to the needs of large or well organized suppliers who are able to effectively lobby their governments to bring claims on their behalf, leaving smaller suppliers often without representation.⁶⁵ This procedure is even less inclusive today given the modern tendency of international business to be conducted by smaller entities which are able to serve more disparate markets because of the global penetration of the internet and other technological advancements.⁶⁶ Private parties suffering from unlawful trade barriers will be achieve inadequate redress in the event that a measure adversely affecting their activities is deemed to be WTO-inconsistent by the Dispute Settlement Body because the WTO does not provide monetary damages under its forward-looking remedial structure.⁶⁸ Thus the dispute settlement system does not truly compensate injured businesses, the Population of the world trading system, for who the removal of the WTO-incompatible law has limited practical utility, especially in the short term.

d) The Rise of Bilateralism and Regionalism

⁶⁴ E.g. *Pope & Talbot v Government of Canada*, 41 ILM (2002) 1347 (ICSID Award, 31 May 2002) and *Merrill Ring Forestry L.P. v The Government of Canada* (Award) (ICSID Administered Case, 31 March 2010) relating to softwood lumber matters.

⁶⁵ Mark Movesian, "Enforcement of WTO Rulings: An Interest Group Analysis" 32 *Hofstra Law Review* 1 (2003). Of course, the lack of effective representation for non-state parties is a central feature of public international law.

⁶⁶ See e.g. Manuel Castells, *The Rise of the Network Society*, (Blackwell, London, 2010) and Tatiana Manlova, "Small Multinationals in Global Competition: An Industry Perspective" in Hamid Etemad and Richard Wright eds. *Globalization and Entrepreneurship: Policy and Strategy Perspectives* (Edward Elgar, Cheltenham, 2003)

⁶⁸ Art 3.7 Dispute Settlement Understanding: "the first objective of the dispute settlement system mechanism is usually to secure the withdrawal of the measures concerned".

Social entropy has been defined as the in-built tendency of any mass organization to be dominated by local groups rather than by any central leadership with more general and long-term goals.⁶⁹ The clear analogy in the context of the world trading system is the decentralization of the law governing trade, namely the WTO, from the global to the regional or bilateral. According to social entropy theory any energy that is not present in the system that offsets the drift towards disorder must be imported from outside the system.⁷¹ Since law is a form of energy in society that counteracts degradation towards chaos, PTAs could therefore be said to address a gap in world trade law, namely a deficiency in the WTO to fulfil its role in governing the trading relations among its Members. World trade law is therefore being displaced by international trade law as the primary means by which the social system of world trade repels entropy, or the lawlessness of trading relations (effectively unilateralism). Social entropy theory further states that exogenous, disaggregated sources of energy, while countering entropic effects, may themselves unsettle the society into which it is brought.⁷³ Applying this model, a number of commentators have observed that the congruence of PTAs with the WTO's multilateral system is believed to constitute one of the most significant and enduring challenges to the world trading system in the coming years.⁷⁴ Most problematically, the preference for bilateral and regional trade law as opposed to that promulgated by a central authority can undermine the economic efficiency that should accrue from global trade liberalization.

⁶⁹ Tom Garvin, 'Defenders, Ribbonmen and Others: Underground Political Networks in Pre-Famine Ireland' 96 *Past and Present* 133 at 152 (1982). However, the homogenization of regional characteristics has also been viewed as a form of social entropy, especially when it occurs in shorter time frames because of technological advancements: see D.N. Perkins, "The Fingertip Effect: How Information-Processing Technology Shapes Thinking" 14:7 *Educational Researcher* 14 at 14-15 (1985), a surprisingly prescient observation from the pre-internet age.

⁷¹ JG Miller, *Living Systems* (McGraw-Hill, New York, 1978)

⁷³ Kenneth Bailey, *Social Entropy Theory* (SUNY Press, 1990)

⁷⁴ Michael Trebilcock, *Understanding Trade Law* (Edward Elgar, 2011) at 52 and Jagdish Bhagwati, *Termites in the Trading System*, (Oxford, 2008)

Almost 500 preferential trade agreements have been notified to the GATT/WTO, including more than 350 since 1990.⁷⁵ There is extensive academic literature on the growth of PTAs and their primarily adverse effect on world trade.⁷⁶ Generally PTAs have been criticized by commentators, most notably for their contribution to a highly complex, often confusing assortment of rules which raises compliance costs, as well as the resulting trade diversion, meaning that inefficient suppliers from within PTAs will be chosen to source goods and services rather than more efficient suppliers from outside.⁷⁷ To the extent that bilateralism preferences non-competitive suppliers over competitive ones, it operates as a market distortion, facilitating the wasteful provision of traded goods which acts as a loss to social welfare. Bilateralism can therefore be seen to add to the entropy of the world trading system.

From a standpoint of consistency with the global trade framework of the WTO, the adaptability of bilateral rules to the WTO framework is both poorly articulated and ineffectively enforced. Under the GATT, the internal requirement for a PTA specifies that duties and other restrictive regulations of commerce be eliminated with respect to “substantially all the trade” between constituent countries.⁷⁸ However the legal meaning of “substantially all the trade” has never been clearly established and remains highly contested. Furthermore, the external requirement requires that duties and other regulations of commerce on third parties should not be higher or more restrictive after the creation of the PTA than before.⁷⁹ For customs unions, which entail the creation of a common external tariff, duties or other regulations of commerce must not be higher or more restrictive “on the whole” after the

⁷⁵ R Fiorentino, J Crawford and C Toqueboeuf, ‘The Landscape of Regional Trade Agreements and WTO Surveillance’ in R Baldwin and P Low eds *Multilateralizing Regionalism* (Cambridge U Press, 2009)

⁷⁶ E.g. Kyle Bagwell and Petros Mavroidis, *Preferential Trade Agreements: A Law and Economics Analysis* (Cambridge University Press, New York, 2011) and Jagdish Bhagwati, *Termites in the Trading System* (Oxford University Press, 2008)

⁷⁷ E.g. Jagdish Bhagwati, *Termites in the Trading System* (Oxford U Press, 2008)

⁷⁸ GATT Art XXIV:8

⁷⁹ GATT Art XXIV:5

creation of a PTA than before, a phrase which has also yet to be elucidated clearly. While the capacity for compliance with GATT PTA rules is to be assessed judicially by the Panels and Appellate Body, no complaints have been brought by WTO Members on the basis of a PTA's non-compliance with GATT, suggesting a reluctance of Members to challenge these arrangements because of the uncertainty in the laws that govern them. Clearly the vagueness of the language in the GATT and the methodology for reviewing compliance of PTAs within the WTO is legally ambiguous as well as potentially economically harmful, emphasizing the disordering effect of their contribution to the decentralization of world trade law.

e) The Problem of Enforcement of WTO Law

Social entropy may be characterized by “the amount of socially un-patterned behaviour to be permitted” within the understanding of public order in the community. The greater the quantity or degree of such behaviour that is permitted to occur, the less ordered that society is seen to be.⁹⁰ Thus under a social entropy model of world trade law, increasing entropy may be characterized both by the behaviour of WTO Members that breach WTO law and yet suffer inadequate sanction as a consequence and by the unilateral retaliation by affected Members against the breach of others as opposed to the authorized suspension of concessions.

WTO Members agree to use the Dispute Settlement System as the exclusive remedy for all violations of WTO⁹¹, meaning that they effectively “contract-out” of conventional public international law remedies, such as full reparation.⁹² In many respects this restricts a

⁹⁰ Jack Blimes, ‘Rules and Rhetoric: Negotiating the Social Order in a Thai Village’ 32:1 Journal of Anthropological Research 44 at 52 (1976)

⁹¹ Art 23. See also US-Certain EC Products, Appellate Body Report WT/DS164/AB/R (adopted 10 January 2001) at [111]

⁹² As indicated in Art 31 of the Articles on Responsibility of States for Internationally Wrongful Acts, International Law Commission. 53rd Session, General Assembly resolution 56/83 of 12 December 2001, and corrected by document A/56/49(Vol. I)/Corr.4. and Art 55 on *lex specialis*, outlining that the Articles do not apply when special rules of international law govern the conduct of states, and commentary to Art 55 which specifically refers to the WTO Dispute Settlement Understanding, Art 55(3).

Member's capacity to achieve full redress for wrongs that it has suffered as a result of a WTO treaty breach by another state, as noted above in relation to the lack of monetary damages. This is therefore a significant concession required as a consequence of membership in the WTO community. Under the WTO Dispute Settlement Understanding, if a Member fails to comply with a final ruling in a dispute, the winning party may retaliate by suspending trade concessions that it owes the offending member.⁹³ This retaliation can continue until the offending member implements the Panel or Appellate Body report as adopted by the WTO Dispute Settlement Body by bringing its laws into conformity with its WTO obligations, after a reasonable period of time for compliance. Yet some commentators have argued that the retaliation remedy is too weak and unpredictable to be effective, particularly in asymmetric disputes between large and small economies. If an economically weak country suspends concessions against another country, it may simply harm its own economy, most notably its consumers, by restricting key imports. Suspending trade concessions also hurts innocent firms that find their products subject to higher tariffs.⁹⁴ Clearly retaliation may also reinforce income disparities between large and small countries and in that sense it exacerbates inequality within the world trading system.

Retaliation is itself a form of trade protectionism in that it constitutes derogation from negotiated trade commitments. Such "vigilante justice" is particularly noted in the context of anti-dumping duties and countervailing duties in response to subsidization. One study has shown that WTO Members that have the capacity to initiate meaningful (harmful) retaliation against a Member that is in breach of WTO anti-dumping or subsidies rules will tend to do so instead of pursuing a multilateral remedy through the WTO Dispute Settlement Body. This is because a unilateral retaliation tends to achieve greater results in terms of economic benefits

⁹³ Art 22

⁹⁴ E.g. Mark Movesian, "Enforcement of WTO Rulings: An Interest Group Analysis" 32 Hofstra Law Review 1 (2003). This issue was considered by the Arbitrators in EC-Bananas III (Ecuador) WT/DS27/ARB/ECU (24 March 2000)

to the injured country at lesser expense.⁹⁵ Likewise, the observance of self-defence training and the purchase of weapons as an alternative to law enforcement through police departments is considered to be symptomatic of social entropy.⁹⁶ Citizens must seek their own remedies where the state fails to provide this for them.

Even in instances where the multilateral dispute settlement system is used by Members, the record of compliance with WTO dispute settlement body recommendations is far from perfect, with a third of disputes resulting in non-compliance to some degree.⁹⁷ Imperfect compliance may be inescapable given the different competing and highly politically fluid interests of all WTO Members.⁹⁸ It may also be the consequence of the world trading system lacking a meaningful enforcement mechanism other than reputational sanction and ineffectual countermeasures. While the value of reputation-based compliance is viewed by some as significant, it is difficult to empirically assess the extent to which reputational sanction motivates Members to comply with WTO rulings.⁹⁹ Clearly non-compliance conveys a lack of respect for the rules of the WTO, an indication of disorder within the world trading system.

f) Lack of Institutional Focus or “Mission Creep”

Sociologists have argued that an economy that is not based primarily upon market exchanges but is instead characterized by redundant institutional or bureaucratic elements is indicative

⁹⁵ Chad Brown, “Trade Remedies and World Trade Organization Dispute Settlement: Why Are So Few Challenged?” 34:2 *Journal of Legal Studies* (Chicago) (2005)

⁹⁶ Bailey Kuklin, ‘On the Knowing Inclusion of Unenforceable Contract and Lease Terms’ 56 *University of Cincinnati Law Review* 845 fn 79

⁹⁷ Gary Horlick and Judith Coleman, “A Comment on Compliance with WTO Dispute Settlement Decisions” in *WTO Governance, Dispute Settlement and Developing Countries* (PUBLISHING COMPANY, 2008), finding rates of 67% for full compliance, 24% for partial compliance and 9% for total non-compliance) at 771

⁹⁸ Juscelino Corales, “The Limits of WTO Adjudication: Is Compliance the Problem?” 14:2 *Journal of International Economic Law* 403 at 431 (2011)

⁹⁹ Matthew Turk, “Why Does the Complainant Always Win at the WTO? A Reputation-Based Theory of Litigation at the World Trade Organization” 31 *Northwestern Journal of Law and Business* 385 (2011) and Andrew Guzman, *How International Law Works: A Rational Choice Theory* (Oxford University Press, 2008) at 71-117

of growing social entropy.¹⁰⁰ Given that Organizations are critical for the channelling of sustaining energy within a social system (recall the O in the six functions of a social system), this view of entropy appears to contemplate administrative structures that have become over-large relative to their purpose as facilitators of energy-producing economic activity through the promulgation of laws (such those relating to property or contractual rights). Sociologists further claim that change within an institution often requires an attendant increase in social entropy.¹⁰¹ Thus as a given institution adapts to fit a new economic or social environment, perhaps by expanding to take on new tasks as a consequence of population growth or technological progress, the process of adaptation itself is unsettling to the social system.

Applying this model to the world trading system, social entropy in the form of an observed increase in global trade protectionism¹⁰² may be in part the result of WTO's lack of focus on its primary mandate to minimize barriers to market exchanges. Obfuscation of institutional purpose at the WTO has occurred because WTO Members continue to add new issues and table proposals in relation to investment, competition and government procurement, with numerous working groups established to consider and debate the further extension of the WTO's ambit.¹⁰³ Some commentators urge that even extending the original GATT to cover spheres of activity such as intellectual property, health protection, and services was inappropriate given the language and context of trade bargaining that had begun under the GATT. They claim that this enlargement resulted in the marginalization of other the international organizations that had direct responsibility over the issues in question, such

¹⁰⁰ Sergio Conti, 'The Network Perspective in Industrial Geography: Towards a Model' 75:3 *Geografiska Annaler* 115 at 116 (1993)

¹⁰¹ Elisabeth S Clemens and James M Cook, 'Politics and Institutionalism: Explaining Durability and Change' 25 *Annual Review of Sociology* 441 at 448 (1999)

¹⁰² Pascal Lamy, Speech to the Thai Chamber of Commerce, Bangkok, 30 May 2012 <http://www.wto.org/english/news_e/sppl_e/sppl232_e.htm> (last accessed November 2012). See also European Commission Directorate-General For Trade, Ninth Report on Potentially Trade Restrictive Measures, September 2011 – May 2012, The European Commission, 6 June 2012 <http://trade.ec.europa.eu/doclib/docs/2012/june/tradoc_149526.pdf> (last accessed November 2012). The rise in trade protectionism is also linked to the global financial crisis.

¹⁰³ E.g. the Working Group on Trade, Debt and Finance, the Working Group on Transfer of Technology, The WTO Committee on Trade and the Environment

as the World Intellectual Property Organization, as well as specific services industry regulators, like the International Telecommunications Union.¹⁰⁴ In this regard, the WTO's attempt to liberalize trade in services through the GATS is a questionable extension of its initial mandate contained in the GATT to liberalize trade in goods. Indeed the regulation of trade in services has been problematic from the standpoint of national autonomy because the barriers to trade in services are not border measures such as tariffs or quotas, but internal domestic regulations often associated with maintaining complete delivery and level of quality in various specific sectors. Negotiations for greater liberalization under the GATS, often involving many layers of government are very resource and time intensive and to date have done little more than capture the status-quo.¹⁰⁵

Cooperation between the WTO and other international organizations critical to the delivery of its primary function of liberalizing trade has been slow to develop. Among the most obvious most obvious failures in this regard is the ongoing dilemma of competitive currency devaluation, as generally prohibited by the International Monetary Fund (IMF). The WTO's inadequate response to strategic currency devaluation has rendered its achievements in the sphere of trade liberalization in many ways illusory. Although the IMF's currency devaluation rules are reinforced by provisions in the GATT¹⁰⁹, the WTO has failed to treat these as anti-trade manoeuvres capable of sanction by the Panels and Appellate Body. Rather, the WTO has constrained individual countries' capacity to respond to currency appreciation directly by providing relief through harmful protectionist measures such as quotas and tariffs. This failing of the WTO is particularly acute because the WTO is a more suitable forum for the enforcement of currency manipulation than the IMF, which lacks a

¹⁰⁴ Sol Picciotto, *Regulating Global Corporate Capitalism* (Cambridge University Press, 2011) at 313

¹⁰⁵ Panagiotis Delimatsis, *International Trade In Services and Domestic Regulations* (Oxford University Press, 2007) at 287

¹⁰⁹ GATT Art XV

judicial mechanism for the resolution of disputes between member countries.¹¹⁰ WTO Members' need to respond to competitive currency devaluation has led to greater filing of claims through WTO dispute settlement on the basis of other breaches of WTO law during periods of currency appreciation because there is no other tool, at the WTO or elsewhere, available to countries that have been injured by competitive currency policy of their trading partners.¹¹¹ The result is confusing, unpredictable and ineffective and undermines the WTO's capacity to fulfil its mandate of the efficient functioning of the world trading system.

A plausible explanation for the WTO's shortcomings in its institutional focus might be its lack of sufficient resources. The WTO could be viewed as insufficiently institutionally robust as an organization, rather than overly so, as traditionally social entropy analysis would suggest of an organization within a social system.¹¹² Despite its evident mission creep noted above, the WTO is comparatively under-resourced as an international organization given its importance in the global economy. The WTO's annual budget in 2012 was just over 196 million Swiss Francs (USD 208 million) compared to almost USD 1 billion for the IMF and almost USD 2 billion for the World Bank. This deficiency is perhaps the most directly analogous feature of the WTO to the theory social entropy. Without sufficient funding the role of the WTO in delivering Information and maintaining Organization cannot be adequately performed and there will consequently be insufficient "energy" for the social system to resist disorder.

3. AN ALTERNATIVE MODEL OF SOCIAL ENTROPY AND THE WTO

¹¹⁰ Gregory Hudson, Pedro Bento de Faria and Tobias Peyerl, "The Legality of Exchange Rate Underevaluation Under WTO Law" Geneva Centre for Trade and Economic Integration, CTEI Working Paper, CTEI-2011-07, at 13 <http://graduateinstitute.ch/webdav/site/ctei/shared/CTEI/working_papers/CTEI-2011-07.pdf>

¹¹¹ Mark S Copelovitch and Jon C Pevellhouse, "Currency Wars By Any Other Means? Exchange Rates and GATT/WTO Dispute Initiation" <https://ncgg.princeton.edu/IPES/2010/papers/F220_paper3.pdf>

¹¹² Sergio Conti, 'The Network Perspective in Industrial Geography: Towards a Model' 75:3 *Geografiska Annaler* 115 at 116 (1993)

Entropy should not be viewed as necessarily destructive to an organization or society. Indeed commentators have argued that an ideal society should have a “systemic randomness.”¹¹³ Such a dis-ordering of society was anticipated, and not without a degree of hopeful promise, by sociologists even before the internet age as a consequence of the erosion of social ties, heightened personal mobility and advanced modes of communication leading to the effective elimination of space.¹¹⁴ In many ways this type of society is associated with globalization and the increasing inter-relatedness of people, countries and organizations. Thus, rather than castigating the WTO for its failures the WTO could be praised for its contribution to entropy in its elimination of the regulations that undermined economically efficient global trade flows. In a social entropy model protectionist trade policies, such as those associated with the period before the implementation of the GATT, could be viewed as high-energy inputs into the world trading system that ordered trade relation along the lines of a mercantilist, isolationist economic policy in a manner that was ultimately damaging. In this model entropy is positive because it represents a break down in trade barriers, leading to the comparative chaos of “free” trade. The underlying order in this model therefore becomes the comparative advantage of the state which supplies the traded commodity.

The evidence of this disordering effect of the WTO may be seen in the degree of openness of WTO Members to international trade as a consequence of the elimination of superfluous or ineffective legal or bureaucratic impediments. The OECD FDI Regulatory Restrictiveness Index which measures legal barriers to foreign direct investment (‘FDI’) reveals that there has been a gradual reduction in trade law restrictiveness worldwide over

¹¹³ Brendan O’Leary, ‘On the Nature of Nationalism: An Appraisal of Ernest Geller’s Writings On Nationalism’ 27:2 *British Journal of Political Science* 191 at 202 (1997)

¹¹⁴ Wilbur Zelinsky, ‘Selfward Bound? Personal Preference Patterns and the Changing Map of American Society’ 50:2 *Economic Geography* 144 at 145 (1975)

time.¹¹⁵ While the Index does not explicitly acknowledge the contribution of the WTO, which of course has the primary mandate of liberalizing trade not investment, it is not difficult to infer the correlation between the WTO's emphasis on transparency and non-discrimination and the increase in flow of foreign investment, especially in countries such as China and Russia, which joined the WTO in 2001 and 2012 respectively. Likewise, the International Chamber of Commerce's Open Markets Index considers the lack of domestic protectionist trade policies in establishing a metric for each country's capacity to encourage international trade.¹¹⁶ The World Justice Project's Rule of Law Index, which considers the extent to which each country in the world is free from corruption as well transparent and effective in the promulgation and enforcement of its laws in business as well as other spheres¹¹⁷, similarly owes some of the observed progress to the emphasis on rules-based governance associated with WTO Membership. The World Bank's Doing Business Report, which outlines the impact of domestic laws of countries around the world positively or negatively on commercial activities, including the extent to which the legal environment is un-necessarily complicated, has demonstrated a number of positive reforms in this area, especially in low income countries.¹¹⁸ The WTO is not credited directly for such advances in the Doing Business Report however the need for WTO Member states to maintain open, predictable regulatory environments that are conducive to foreign trade as well as investment embodies many of the key provisions in the GATT and the GATS among other agreements. Lastly, the Global Competitiveness Report evaluates the economic productivity of individual

¹¹⁵ International Investment Perspectives 2007: Freedom of Investment in a Changing World: OECD's FDI Regulatory Restrictiveness Index: Revision and Extension to More Economies and Sectors, OECD, 2007, Chapter 6 at 136

¹¹⁶ ICC Open Markets Index, 2012, International Chamber of Commerce, November 2012, <http://www.iccrf.org/sites/default/files/docs/2011/12/OpenMarketsIndex_FINAL102711.pdf>. Note that the Market Openness Index even considers WTO-consistent anti-dumping and safeguard measures as indicative of an anti-trade policy: at 12

¹¹⁷ World Justice Report, Rule of Law Index, 2011
<http://worldjusticeproject.org/sites/default/files/wjproli2011_0.pdf>

¹¹⁸ Doing Business Report 2012, World Bank, at 1,
<<http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB12-FullReport.pdf>>

countries based on various factors including the absence of over-regulation and red-tape¹¹⁹, characteristics that can be attributed to the WTO's approach to streamlining domestic regulations that impact upon international trade. The WTO has undoubtedly been instrumental in reducing the number and complexity of domestic laws that affect international trade and in so doing assisting Member countries in improving their rankings in the above indicia.

Although in the absence of the WTO's multilateral rules protectionist trade laws are detrimental to international trade flows and ultimately socially destructive in their raising of living costs and lowering of incomes worldwide, these laws could equally be seen as bulwarks against the comparative entropy of free trade. Under this model, a global system of liberalized trade in which comparative advantage resulting variously from skills, population or resource endowments dictates the patterns of production and exchange of traded commodities could be viewed as disordered because it is not predicated upon government-imposed barriers. In the absence of protectionism, trading patterns are not strictly speaking random, as social entropy would conventionally demand, yet they are natural in the sense that they are not dependent upon energy in the form of laws.¹²¹ If de-regulation, or more precisely liberalization, is lawlessness, the ensuing economic relations may not be truly disordered or arbitrary but rather rooted in market-oriented exchanges. In this particular social entropy model of the world trading system the WTO serves a critical function, that of what might be described metaphorically as the chaos machine, because it facilitates the regulatory "disorder" necessary for the natural state of the world trade system to assert itself. To the extent that this results in rising living standards and real income this actualization of social entropy theory should be celebrated.

¹¹⁹ The Global Competitiveness Report 2012-2013, World Economic Forum, 2012, at 4
<http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13.pdf>

¹²¹ Although comparative advantage arguably depends on other traditional forms of energy such as fossilized fuels.

4. CONCLUSION

This article has proposed world trade law as a model of social entropy in which the substantive legal and institutional features of the WTO are depicted as failing to ensure the expansion of international trade against the disorder of damaging trade protectionism. This article has supported this claim by postulating a movement towards entropy in international trade premised on various indicia of disorder in the world trading system: economic inequality instead of equality; legal uncertainty instead of legal certainty; bilateralism instead of multilateralism; unilateral retaliation instead of multilateral sanction; and unfocused institutional purpose instead of a clear trade-oriented mandate.

The social entropy model of the world trading system discussed here has not predicted specific future outcomes with respect to levels of global trade or economic growth. The original theory of social entropy did not attempt to offer predictions directly, in large part because it was removed from practical application.¹²³ Indeed one of the chief criticisms of social entropy as an abstract theory is its failure to accommodate actual sociological phenomena,¹²⁴ a weakness that this article has attempted to resolve in part through the application to an actual social system. Following the premise that the WTO can be characterized as an agent of entropy, a generalized prediction is therefore that the world trading system is heading towards a state of greater disorder in the trading relationship between states. This may be marked by an increase in protectionism as well as a growth in economic inequality and a decline of world trade. If the WTO is able to fulfil its central role in liberalizing trade, an alternative view of entropy may ensue, one in which trading relations

¹²³ A feature which led to criticism by sociologists: e.g. Avery Guest, 'Book Review: *Sociology and the New Systems Theory* by Kenneth Bailey' 24:1 Contemporary Sociology 138 at 139 (1995)

¹²⁴ E.g. Thomas Meyer, 'Book Review: *Social Entropy Theory* by Kenneth Bailey' 96:6 American Journal of Sociology 1545 at 1546 (1991), Avery Guest, 'Book Review: *Sociology and the New Systems Theory* by Kenneth Bailey' 24:1 Contemporary Sociology 138 at 139 (1995)

are “free” in as much as they are not based upon rigid trade barriers, and in which the only guard against total randomness (the only stable condition of any system) in trading relations is comparative advantage, supplemented by efforts to assist in the more equal distribution of wealth.

Social entropy has been defined as a problem that has defied the best efforts of organizational control, meaning ways by which governmental organizations are kept efficient and effective in highly complex environments.¹³¹ The rule of law may be conceptualized as a defence against social entropy in that it restrains the degradation of social order that is predicated upon the arbitrary exercise of power. Thus the WTO, as an instrument of the rule of law in world trade helps suppress the drift towards disorder in international economic relations. If the deficiencies in the energy-inputting function of the WTO outlined in this article are responsible for the degradation towards entropy, then improvements in the WTO’s delivery of its “energy” are essential to maintain order in the world trading system. This article has suggested that the WTO must assert its position as the global authority for the regulation of international trade. It must do so by adopting a trade-specific approach to this role with clearer rules, an understanding of the need to distribute wealth more evenly, and to offer more effective enforcement.

More generally, as a trans-disciplinary study this article has validated the theory of social entropy by proposing a verifiable model of a social system that has demonstrated signs of predicted decay as a consequence of its own internal insufficiencies. This article has accordingly established that social entropy theory offers a useful lens through which to assess the functionality of the “system” of world trade and the WTO in particular. Social entropy theory proposes at an admittedly high level of generality in this particular discussion, that effective legal and institutional architecture is critical to the prevention of degradation

¹³¹ Louise K Comfort, ‘Integrating Organizational Action in Emergency Management: Strategies for Change’ 45 Public Administration Review 155 at 157 (1985)

towards disorder in global trading relations, leading to declining growth and exacerbating inequality. Further studies may demonstrate that such guidance drawn from the field of sociology, and indeed the science of thermodynamics, may be fruitfully applied to evaluate other supra-national or international organizations, such as European Union or the United Nations.