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Published online: 06 Feb 2018.

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Economic Power Foundations of Cities in Global Governance

BENJAMIN LEFFEL ⓘ and MICHELE ACUTO ⓘ

This study provides evidence that city government participation in global governance networks is explicable by the larger power hierarchy of cities in the global economy. Extant research on city government participation in global governance networks, or "transnational municipal networks (TMNs)" such as United Cities Local Governments, has largely ignored the relevance of research showing city-level connectivity to corporate and other economic networks among world cities. In this latter tradition of research, the level of a city's connectivity to such economic networks is understood as commensurate with the hierarchical power it holds in the global economy. Using a sample of UK and Chinese cities, this study shows that patterns of participation in a range of TMNs are explained by varied measures of city-level connectivity to economic networks. Interpreted through structuration theory, findings suggest that city participation in global governance is shaped and stratified by city-level hierarchical power within the global economy.

Introduction

City governments are increasingly recognised as pivotal to numerous multilateral agendas set to shape the future of international affairs. A global recognition of the centrality of the "urban" in world affairs has in the past few years become tangible from a dedicated United Nations Sustainable Development Goal (SDG) on cities, to a spotlight role in climate action in the post-Paris Agreement roadmap on climate change, to disaster response, financing development and not least a dedicated UN "new urban agenda" issued in Quito, Ecuador at the end of 2016. The principal means by which city governments have themselves sought to participate in these global governance processes are through what has been called "transnational municipal networks" (TMNs): formalised associations of city governments working to solve collective urban, and very often broader, problems.[1] Meanwhile, it is now well recognised in literatures from political economy to geography, anthropology and even the built environment, that city economies constitute the principal circuitry that structures the world economy, as urban settlements serve as global "command and control" centres for international capital flows, linchpins of global logistics and gateways to national, regional

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1. Noah Toly, "Transnational Municipal Networks in Climate Politics: From Global Governance to Global Politics", *Globalizations*, vol. 3 (2008), pp. 341–356; Sophie Bouteligier, *Cities, Networks, and Global Environmental Governance: Spaces of Innovation, Places of Leadership* (New York: Routledge, 2013).

and global markets.[2] Yet, do these two global functions of cities act in isolation, or might there be a more explicit political-economy of city participation in global governance networks? Seeking to link political collaboration to economic networking—two areas often studied separately in both International Relations (IR) and urban studies—we aim with this study to offer some preliminary considerations as to this possible overlap.

Cities as agglomerations of globally-connected, networked and competing private sector entities[3] have largely been studied as a separate phenomenon from city governments as participants in global governance.[4] Yet bridging this gap may provide new insight on the economic foundations of why city governments seek to solve global problems. As globalisation allows cities to break away from the fate of their national economies, city economies increasingly form nebulous networked connections to compete nationally, regionally and globally.[5] Firms, particularly transnational corporations, are the principal actors within cities that accumulate and redirect international capital flows, all of which takes a distinctly networked form and ultimately produces economic power outcomes for a city. On a global scale, the city economies which these firms operate through can collectively be arranged by the relative economic power they possess within a larger global city hierarchy, in which a higher position is theorised to influence city growth, the specialised roles developed by cities and other political-economic outcomes occurring at the city-level.[6] The cities sitting atop this hierarchy constitute command and control centres as they maintain the greatest relative economic weight and network centrality, and are thought to contribute to a new geography of economic centrality and marginality.[7]

In the phenomenon of city participation in global governance, local governments have been the principal actors of interest and TMNs have been key organising structures of these city-based coalitions of interest.[8] TMNs are non-governmental organisations whose membership is comprised of city governments, and whose function is to facilitate the exchange of governance-related knowledge and resources among members to solve governance-related problems.[9] Whilst not

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2. Saskia Sassen, "On Concentration and Centrality in the Global City", in Paul L. Knox and Peter J. Taylor (eds.), *World Cities in a World System* (New York: Cambridge University Press, 1995), pp. 63–78.

3. Saskia Sassen, *Cities in a World Economy,* 3rd Ed. (Thousand Oaks, CA: Pine Forge Press, 2006); Peter J. Taylor and Ben Derudder, *World City Network: A Global Urban Analysis*, 2nd Ed. (Cambridge: Polity, 2015).

4. Michele Acuto, *Global Cities, Governance and Diplomacy: The Urban Link* (New York: Routledge, 2013); Toly, *op. cit*.

5. Barney Cohen, "Urban Growth in Developing Countries: A Review of Current Trends and a Caution Regarding Existing Forecasts", *World Development*, Vol. 32 (2003), pp. 23–51; Richard V. Knight, "The Emergent Global Society", in Richard V. Knight and Gary Gappert (eds.), *Cities in a Global Society* (London: Sage Publications, 1989), pp. 24–43.

6. Chris Chase-Dunn, "The System of World Cities, A.D. 800–1975", in Michael Timberlake (ed.), *Urbanization in the World-Economy* (Orlando, FL: Academic Press, 1985), pp. 269–292; John Friedmann, "The World City Hypothesis", *Development and Change*, Vol. 17, No. 1 (1986), pp. 69–8; David A. Smith, "Method and Theory In Comparative Urban Studies", *International Journal of Comparative Sociology,* Vol. 32, No. 1–2 (1991), pp. 39–58; David A. Smith and Michael Timberlake, "Cities in Global Matrices: Toward Mapping the World-system's City System", in Knox and Taylor (eds.), *World Cities in a World System* , *op. cit.*, pp. 79–97.

7. Peter J. Taylor, "Specification of the World City Network", *Geographical Analysis,* Vol. 33, No. 2 (2001), pp. 181–194; Sassen, *Cities in a World Economy, op. cit.*

8. Toly, *op. cit.*; Bouteligier, *op. cit.*

9. Jordi Borja and Manuel Castells, *Local and Global: The Management of Cities in the Information Age* (London: Earthscan, 1997).

exclusively "transnational", as the majority of city networking globally is still of a national nature (with groups like the US Conference of Mayors),[10] we focus explicitly on "transnational" municipal networks to put an even clearer emphasis on the linkages between the political and economic structuring of global affairs. Many emergent TMNs focus specifically on the governance area of environmental protection, given the advent of climate change.[11] Participation in these networks is consequential for cities, as cities with a higher degree of participation in them are shown to experience higher performance in the implementation of a range of local policies.[12] Globalisation also enables city governments to participate in a range of diplomatic matters alongside entities from higher levels, or layers, of government, in what has been referred to as paradiplomacy or multilayered diplomacy.[13] With growing numbers of city-to-city collaborations sprawling in recent decades, city networks are an increasingly common mechanism for global governance arenas including environmental protection, health and income inequality.[14] The corporate, private sector-centric networks that animate the global city hierarchy and the public sector-centric networks of TMNs involve largely different entities within cities. How then, might they be connected? Lee suggests that cities which have relatively higher power in the global economy are more likely to join TMNs.[15] This then bears the question: is the participation of cities in global governance via TMNs shaped and stratified by economic power?

Focusing on two particular countries offers a relevant empirical setting in which to investigate this question. It also testifies to a growing practical policy interest on the dynamics and possibilities of "city diplomacy" in governments the world over. In 2016, the authors were commissioned by the UK Government Office for Science (GO Science) to conduct research on the role of cities in global governance and economy via international networks, specifically observing cities in the UK and China. The comparison emerged not just as a function of national interest, but also as recognition of the well-established tradition of city diplomacy writing, and TMN discussion, in Chinese academic circles—thus drawing on an international context of both particular global relevance as much as well-established

10. David Gordon and Michele Acuto, "If Cities Are the Solution, What Are the Problems? The Promise and Perils of Urban Climate Leadership", in Craig Johnson, Noah Toly and Heike Schroeder (eds.), *The Urban Climate Challenge: Rethinking the Role of Cities in the Global Climate Regime* (New York: Routledge, 2015), pp. 63–81.

11. Michele Betsill and Harriet Bulkeley, "Transnational Networks and Global Environmental Governance: The Cities for Climate Protection Program", *International Studies Quarterly*, Vol. 48, (2004), pp. 471–493; Michele Betsill and Harriet Bulkeley, "Transnational Networks and Global Environmental Governance: The Cities for Climate Protection Program", *International Studies Quarterly*, Vol. 48 (2004), pp. 471–493; Taedong Lee, "Global Cities and Transnational Climate Change Networks", *Global Environmental Politics*, Vol. 13, No. 1 (2013), pp. 108–127.

12. Roberta Capello, "The City Network Paradigm: Measuring Urban Network Externalities", *Urban Studies*, Vol. 37, No. 11 (2000), pp. 1925–1945.

13. Brian Hocking, *Localizing Foreign Policy: Non-Central Governments and Multilayered Diplomacy* (New York: St. Martin's Press, Inc., 1993).

14. Michele Acuto, Mika Morissette, Dan Chan and Benjamin Leffel, "'City Diplomacy' and Twinning: Lessons from the UK, China and Globally", City Leadership Initiative, Department of Science, Technology, Engineering and Public Policy, University College London (UK Government Office for Science, January, 2016), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/545780/gs-16-13-future-of-cities-diplomacy-uk-china-twinning.pdf.

15. Lee, "Global Cities and Transnational Climate", *op. cit.*; Taedong Lee, *Global Cities and Climate Change: The Translocal Relations of Environmental Governance* (New York: Routledge, 2015).

practice. The results of that "GO Science" review showed that UK and Chinese cities are rapidly becoming well-represented among the larger population of European and East Asian cities, respectively, participating in such networks.[16] This broadly reflects how city-level international networking across the public and private sector has steadily increased among cities in the UK[17] and in China[18] since the 1980s. The same is true for British and Chinese cities with regard to TMN participation in the past decade[19] and their positioning in the global city hierarchy.[20] These similarities in increased city-level involvement on the world stage hold for both the UK and China despite obvious differences: a parliamentary versus one-party authoritarian system of government, a free market versus state capitalist economic system, a relatively small versus large population, and embeddedness in the centuries-old global connectivity of the western European region versus the relatively recent Chinese reemergence onto the world stage.

Studying British and Chinese cities, then, offers an opportunity to analyze a sample that is comparable in both their participation in TMNs and in economic networks, and is also diverse given the difference in national political systems underpinning this city diplomacy activity. In the following sections, we use the concepts of structural forces and multilevel governance to approach hypothesising the potential relationship between city government participation in TMNs and the position of city economies in the global city hierarchy.

Structural Forces and TMNs

In approaching a theoretical understanding of the relationship between TMN membership and economic forces, we must first acknowledge both the limitations surrounding city government entry to TMNs and the motivations of city government actors themselves. This is illustrated here through framing interviews conducted at the outset of this study with representatives of perhaps three of the most well-known TMNs on an international scale—the C40 Cities Climate Leadership Group (C40), ICLEI-Local Governments for Sustainability, and United Cities Local Governments (UCLG)—as well as a "deeper dive" in a Chinese case as represented by Wuhan with interviews with the Wuhan Development and Reform

16. Acuto, Morissette, Chan and Leffel, "'City Diplomacy' and Twinning", *op. cit.*

17. Eleri Evans, "A Framework for Development? The Growing Role of UK Local Government in International Development", *Habitat International*, Vol. 33, No. 2 (2009), pp. 141–148; Michael Shuman, *Towards a Global Village: International Community Initiatives* (London: Pluto Press, 1994).

18. Chen Zhimin, Jian Junbo and Chen Diyu, "The Provinces and China's Multi-Layered Diplomacy: The Cases of GMS and Africa", *The Hague Journal of Diplomacy*, Vol. 5 (2010), pp. 331–356; Peter Cheung, and James Tang "The External Relations of China's Provinces", in David M. Lampton (ed.), *The Making of Chinese Foreign and Security Policy in the Era of Reform, 1978–2000* (Palo Alto, CA: Stanford University Press, 2001), pp. 91–120; Yanli Chu, "Foreign-Related Activities of the Chinese Local Governments and Agents of Globalization: A Case Study of 31 Provinces in Mainland China", Ph.D. dissertation, University of Southern California, 2007; H. Yu, Y. Zhou and J. Cao, "A Research Report on the Vitality Index of Chinese Cities in International Communication", [*chengshi duiwai jiaowang huoli zhishu yanjiu baogao*] *Shanghai Institute for International Studies Task Force Report* Vol. 2 (2015); David Zweig, *Internationalizing China: Domestic Interests and Global Linkages* (Ithaca: Cornell University Press, 2002).

19. Acuto, Morissette, Chan and Leffel, "'City Diplomacy' and Twinning", *op. cit.*

20. Pengfei Ni, Xiaoyan Yue and Jin Huang, "Chinese Cities", in Peter J. Taylor, Pengfei Ni, Ben Derudder, Michael Hoyler, Jin Huang and Frank Witlox (eds.), *Global Urban Analysis: A Survey of Cities in Globalization* (Washington, DC: Earthscan, 2011), pp. 205–211; Peter J. Taylor, "UK Cities", in *ibid.*, pp. 245–250.

Commission. The three TMNs in question here span salient global governance subject areas from economic development to environmental protection, and offer insight as to the structural limitations of new member entry. C40 Cities have been widely acknowledged as a key driver in cities' contribution to global response to climate change. ICLEI has a well-established presence in the practice and literature around environmental sustainability. UCLG has been a key gateway for local governments to engage with the UN system, holding special consultative status as well as leading on a wide set of city-based transnational campaigns such as the one that led to the establishment of a "cities" Sustainable Development Goal. The Chinese city of Wuhan, Hubei Province, is a member of C40, and its membership is facilitated through the Wuhan Development and Reform Commission, which offers an initial look at the city government perspective of TMN participation from a Chinese perspective—an angle still widely under-researched despite the growth of Chinese city membership in TMNs.

Interviews indicate that only membership in C40 involves economic criteria, while entry to UCLG and ICLEI do not involve such criteria. Specifically, the main pool of C40 city membership is "mega-cities", the criteria for which is that a potential member city must currently, or be projected by 2025 to have, a minimum city (metropolitan area) population of 3 million (10 million), be among the top 25 global cities ranked by current gross domestic product output at purchasing-power parity, and set a target to reduce greenhouse gas emissions. Cities may apply to join or be invited to join by any of the three TMNs, the likelihood of getting accepted to or invited by C40 being lower than for ICLEI or UCLG, given the aforementioned restrictions. Member city attendance at official events are required for C40 members, not necessarily required for ICLEI and UCLG, and is a key deliverable of membership benefits in all three TMNs. ICLEI only requires members be committed to sustainability, and UCLG only "expects" members to be familiar with the UCLG constitution, which lays out principles of good governance. As of 2016, C40 has over 80 member cities, and UCLG and ICLEI both have over 1,000. While C40 member cities would by design be expected to rank highly in the global city hierarchy, they are in the minority by comparison to the larger population of UCLG and ICLEI member cities. For the vast majority of these cities, then, entry to TMN membership is not restricted by certain economic criteria *a priori* by the TMNs (UCLG and ICLEI) themselves.

These interviews did not confirm or deny if cities have previously been offered membership but declined. The Wuhan Development and Reform Commission indicated that the motivation to join C40 was twofold: to learn from other cities on how to implement low carbon and energy-saving infrastructure without sacrificing robust economic growth, and to share their own experience in low carbon planning with other cities. This is reflective of Lee's contention that city governments collaborate with one another both in order to gain desired knowledge from other experienced city governments or to share their own experience in order to gain reputational benefits.[21] City governments joining TMNs, then, is a combination of both structural forces and the agency of city government actors.

Gidden's structuration theory holds that in social systems, human actors interact with one another and with institutions to reproduce or remake what is already made, from social practices to wealth to political power. In so doing, actors are

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21. Lee, *Global Cities and Climate Change*, op. cit.

both enabled to act and constrained by structures, or sets of rules and resources, where rules involve norms and law under which actors live, and where resources involve wealth and other material power to which actors have varying access. A duality exists between structure and agency such that the motives of and knowledge possessed by actors can influence the extent to which structures enable or constrain them. For example, the expanse or limit of an actor's knowledge may enable or constrain their action. In the current capitalist world economy, a key structural principle is the differential access to resources and the varying economic power outcomes produced therein at the actor level. Both structural constraints and the actions of actors interact to create conditions and consequences that affect the options available to others. This can also manifest itself in the form of zero-sum power scenarios, where one person's enabling can be another's constraint, and vice versa.[22]

The global economy and local private sector participants in it operate in a similar way given the competitive nature of market participation, though it is largely not zero-sum. The level of access which a given city's firms have to global capital flows better enables them to compete, which is determined by a matter of both structural forces and agentic action. Goss and Lindquist use structuration theory to explain the talent acquisition aspect of this equation, arguing that within international labour migration, a combination of structure and agency explain the conditions by which a potential labour migrant and corresponding overseas employer are brought together. Larger structural forces of supply and demand in the labour market may enable or constrain the labour migrant in their job search, but the migrant also has the agency to utilise what knowledge and resources they have to explore the market, which may include using international social networking to their advantage.[23] Similarly, a combination of larger market forces and firm-level knowledge and resources can determine access to global capital flows that enable firms to better compete. Of interest to this study is how such economic power outcomes in a city's private sector influence city government actors.

The theoretical tradition surrounding the global city hierarchy suggests that position in the hierarchy influences a city's economic growth potential, the power it commands in markets and political-economic outcomes that involve city government actors.[24] One such outcome, we contend, is city government entry into TMNs, which may theoretically occur through the following process. Individual city government leaders choosing to apply to join a TMN or choosing to accept an invitation to join a TMN require the motivation, capacity and the opportunity to do so, conditions which are influenced by exogenous global economic forces. The global city hierarchy emerged from and is situated in the post-1970s era of accelerated and expanded global financial and information flows, in which the more integrated into these flows a city economy is, the more local private sector growth and urbanisation can be expected to occur.[25] The resultant local

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22. Anthony Giddens, *The Constitution of Society: Outline of the Theory of Structuration* (Berkeley, CA: University of California Press, 1984); Anthony Giddens, "Structuration Theory: Past, Present and Future," in Christopher Bryant and David Jary (eds.), *Giddens' Theory of Structuration: A Critical Appreciation* (New York: Routledge, 1991), pp. 201–221.

23. Jon Goss and Bruce Lindquist, "Conceptualizing International Labor Mmigration: A Structuration Perspective," *The International Migration Review,* Vol. 29, No. 2 (1995), pp. 317–351.

24. Friedmann, "World City Hypothesis", *op. cit.*; Taylor and Derudder, *op. cit.*

25. Friedmann, "World City Hypothesis", *op. cit.*; Philip McMichael. *Development and Social Change: A Global Perspective* (Thousand Oaks, CA: Pine Forge, 2000).

implantation of global economic processes allows both local private sector growth and new international commercial connections to be made.[26] City governments attempt to maximise this growth by building a range of international relationships needed to provide access to foreign export markets and trade shows, as well as foreign investment attraction opportunities.[27]

Concomitant with this globalisation-induced local economic growth is accelerated urbanisation,[28] which brings both greater population-related problems and increased government capacity to deal with them. That is, the larger tax base associated with a larger population size grants local governments greater departmental funds and human resources needed to seek solutions beyond the domestic scale.[29] It is the resultant knowledge- and resource-seeking behaviour in city government leaders on the international scale that leads to joining TMNs,[30] motivated by the prospect of obtaining governance knowledge to better solve these problems, as well as gaining the reputational benefits of sharing their own knowledge,[31] as shown in the case of Wuhan. Lastly, the international networking carried out by city government officials to maximise economic growth increases the likelihood of being exposed to knowledge of and/or gaining personal connections with international bodies such as TMNs, thus increasing the opportunity to join a TMN. The conditions of city government motivation, capacity and opportunity to join TMNs are thus influenced by global economic processes, and are understood to be more likely to occur as the level of a city's integration into the global economy increases. Given that position in the global city hierarchy can be understood as an approximation of this integration, we posit that the higher position a city's economy occupies in the global city hierarchy, the more likely the city's government is to join a TMN. Per structuration theory, city government actors are "enabled" via these structural forces to join TMNs as well as conversely "constrained" to the extent that such forces are not present, which also collectively constrains the diversity of TMN membership. With this conceptualisation in mind, the next section discusses potential variables for testing this relationship.

Multilevel Governance and City Networks

A direct approach to testing the relationship between UK and Chinese city government memberships in TMNs and the position of their economies in the global city

26. Sassen, "On concentration and centrality", *op. cit.*; Sassen, *Cities in a World Economy, op. cit.*

27. Lance Brouthers and Timothy Wilkinson, "Trade Promotion and SME Export Performance", *International Business Review*, Vol. 15, No. 3 (2006), pp. 233–252; Mark Chadwin "State Development Programs: Assessment and Recommendations", in S. Tamer Cavusgil and M. Czinkota (eds.), *International Perspectives on Trade Promotion and Assistance* (Westport, CT: Greenwood Press, Inc., 1990), pp. 39–52; Cohen, *op. cit.*; Hocking, *op. cit.*; Samuel McMillan, *The Involvement of State Governments in US Foreign Relations* (New York: Palgrave Macmillan, 2013); Timothy Wilkinson and Lance Brouthers, "An Evaluation of State Sponsored Promotion Programs", *Journal of Business Research*, Vol. 47, No. 3 (2000), pp. 229–236.

28. John Friedmann, "Where we Stand: A Decade of World City Research", in Knox and Taylor, *World Cities in a World System, op. cit.*, pp. 21–47; Friedmann, "World City Hypothesis", *op. cit.*

29. Rachel Krause, "Policy Innovation, Intergovernmental Relations and the Adoption of Climate Protection Initiatives by U.S. Cities", *Journal of Urban Affairs*, Vol. 33, No. 1 (2011), pp. 45–60; Lee, "Global Cities and Transnational Climate", *op. cit.*

30. Acuto, *Global Cities, op. cit.*; M. Carmona and R. Burgess (eds.), *Strategic Planning and Urban Projects: Responses to Globalization from 15 Cities* (Delft: Delft University Press, 2001); Peter Newman and Andy Thornley, *Planning World Cities: Globalization and Urban Politics* (Basingstoke: Palgrave Macmillan, 2005).

31. Lee, *Global Cities and Climate Change, op. cit.*

hierarchy would be to take city participation in TMNs as a dependent variable and measure the strength of association with a measure of position in the global city hierarchy as an independent variable. However, a stronger test of this association would include as an additional independent variable an alternative form of international city government networking that also is expected to be positively associated with position in the global city hierarchy. This would show if city government TMN membership is more driven by economic forces associated with the global city hierarchy than it is by other city government-led international networking activities associated with global economic forces. A suitable alternative form of networking would be international sister city relationships, which are city government-led dyadic relationships between city governments of different countries that involve economic, cultural, educational and other exchanges, but do not represent global governance to the extent that TMN membership does. Like TMN memberships, relatively higher numbers of international sister city relationships maintained by a given city government are also understood to be associated with greater integration into the global economy and therefore a higher position in the global city hierarchy.[32] The deeper structural differences between TMNs and sister city relationships offer empirically important details to consider when performing the proposed test, for which the concepts of scale and multilevel governance offer insight.

Scalar analysis in extant urban studies literature organises the world into a hierarchy of spatial scales—local, regional, national, etc.—which defines the capacity for certain actors to act. While TMNs facilitate networking among city governments, they also cooperate with national-scale civil society organisations as well as other TMNs to advance mutual goals, thus penetrating through several scales, from the local to the regional, national and supranational levels.[33] The activities of sister city relationships, on the other hand, largely do not penetrate into scales above the city-level.

More importantly, and beyond matters of scale, Taedong Lee[34] argues that the international activities of city governments can be analyzed in the context of Hooghe and Marks'[35] Type I and Type II multilevel governance: in Type I, local governments do not intersect or horizontally collaborate with one another in their activities, but rather only report upward to their respective higher governments at the state/provincial- and/or nation-level, and in Type II, there are a large number of jurisdictional levels designed around specific tasks, where local

32. Chu, "Foreign-Related Activities", *op. cit.*; Jacques De Villiers, "Success Factors and the City-to-city Partnerships Management Process – from Strategy to Alliance Capability", *Habitat International*, Vol. 33, No. 2 (2009), pp. 149–156; Pumendra Jain, *Japan's Subnational Governments in International Affairs* (New York: Routledge, 2005); Wilbur Zelinsky, "The Twinning of the World: Sister Cities in Geographic and Historical Perspective", *Annals of the Associations of American Geographies*, Vol. 8, No. 1 (1991), pp. 1–31.

33. Neil Brenner, "Globalization as Reterritorialisation: The Re-scaling of Urban Governance in the European Union", *Urban Studies*, Vol. 36, No. 3 (1999), pp. 431–51; Neil Smith, "Geography, Difference and the Politics of Scale", in Joe Doherty, Elspeth Graham and Mo Mallek (eds.), *Postmodernism and the Social Sciences* (London: Macmillan, 1992), pp. 57–79; Erik Swyngedouw, "Elite Power, Global Forces and the Political Economy of 'Glocal' Development", in Gordon Clark, Maryann Feldman and Meric Gertler (eds.), *The Oxford Handbook of Economic Geography* (Oxford: Oxford University Press, 2000), pp. 541–558.

34. Lee, *Global Cities and Climate Change, op. cit.*

35. Liesbet Hooghe and Gary Marks "Unraveling the Central State, but How? Types of Multi-Level Governance", *American Political Science Review,* Vol. 97, No. 2 (2003), pp. 223–43.

governments intersect horizontally and collaborate in their activities. Lee suggests that in Type II governance, city governments form networks to address such specific issues as climate change, operating outside the jurisdictional hierarchy of the territorial nation-state, which provides the conditions where environmental TMNs such as C40 come into being.[36] TMNs are thus classified as Type II multilevel governance, distinctive by local government actors directly intersecting via TMN membership, where there is horizontal collaboration within the same scale, and not being beholden to higher levels of sovereign government. Also through this framework, international sister city relationships may be understood as Type I multilevel governance, as they involve non-intersecting local governments and are subservient to higher tiers of sovereign government. Specifically, international sister city relationships are normally established via memorandum of understanding, and in addition to cultural and educational exchanges, they often involve commercial relationships and capacity building exchanges for urban governance areas such as economic development and environmental protection,[37] but remain dyadic and are normally subservient to hierarchal jurisdictions of government, not extending beyond the scale of city-level. For example, city A maintains separate sister city agreements with cities B and C, each of which involve direct bilateral interactions, however no interaction takes place between cities B and C. In this respect, international sister city relationships do not involve intersection between local governments beyond the dyadic form. This is particularly true in China, where city diplomacy is argued to be a mere extension of state-level foreign policy.[38] Some rare exceptions however, such as Shenzhen's sister city university network, blur these lines—in 2014 Shenzhen established a network *among* the universities of its existing international sister cities ("Shenzhen International Friendship City University League"). International sister city relationships are by these means conceptually distinguishable as Type I multilevel governance from TMNs as Type II multilevel governance. Further, while there exists a finite number of TMNs which city governments can join, international sister city relationships can exist in far greater numbers.

36. Lee, *Global Cities and Climate Change*, op. cit.

37. Marike Bontenbal, *Cities as Partners: The Challenge to Strengthen Urban Governance Through North-South City Partnerships* (Utrech, Netherlands: Eburon Academic Publishers, 2009); W.E. Hewitt, "International Municipal Cooperation: An Enabling Approach to Development for Small and Intermediate Urban Centres?" *Third World Planning Review*, Vol. 22, No. 3 (2000), pp. 335–360; W.E. Hewitt, "Improving Citizen Participation in Local Government in Latin America through International Cooperation: A Case Study", *Development in Practice*, Vol. 14, No. 5 (2004), pp. 619–632; Sangbum Shin, "East Asian Environmental Co-operation: Central Pessimism, Local Optimism", *Pacific Affairs*, Vol. 80, No. 1 (2007), pp. 9–26; Bernadia Tjandradewi, Peter Marcotullio and Tetsuo Kidokoro, "Evaluating City-to-city Cooperation: A Case Study of the Penang and Yokohama experience", *Habitat International*, Vol. 30, No. 3 (2006), pp. 357–376; Roger Van Der Pluijm, "City Diplomacy: The Expanding Role of Cities in International Relations", *Clingendael Diplomacy Papers*, Vol. 10 (2007), available: https://www.uclg.org/sites/default/files/20070400_cdsp_paper_pluijm.pdf (accessed 10 July 2017); Edith Van Ewijk, Isa Baud, Marike Bontenbal, Michaela Hordijk, Paul van Lindert, Gerry Nijnhuis and Guus van Westen, "Capacity Development or New Learning Spaces through Municipal International Cooperation: Policy Mobility at Work?" *Urban Studies*, Vol. 52, No. 4 (2015), pp. 756–774.

38. W. Xiong and J. Wang, "City Diplomacy: A Theoretical Debate and the Features in Practice", [*chengshi waijiao: lilun zhengbian yu shijian tedian*] *Public Diplomacy Quarterly* (January, 2013), pp. 14–19; W. Xiong and J. Wang, "City Diplomacy: A Theoretical Debate and the Features in Practice", [*chengshi waijiao: lilun zhengbian yu shijian tedian*] *Public Diplomacy Quarterly* (January, 2013), pp. 14–19; K. Zhao and W. Chen "City Diplomacy: The Role of Global Cities in Diplomacy", [*chengshi waijiao: tanxun quanqiu dushi de waijiao juese*] *Foreign Affairs Review*, Vol. 6 (2013), pp. 61–77.

For example, cities in China alone maintain 1,500 sister city relationships with 120 other countries.[39] Lastly, the above conceptual distinction of intersecting versus non-intersecting local governments has important implications for the posited relationship between TMNs and the global city hierarchy. Literature on the global city hierarchy notes that the inter-firm and corporate office networks among cities—that act as the circuitry of global capital flows and determine economic power outcomes in the global city hierarchy—are laterally intersecting, allowing several overlapping connections.[40] Being that TMNs involve intersecting local governments of this sort as opposed to the dyadic non-intersecting connections of sister city relationships, TMNs are more similar to the network structure that comprises the global city hierarchy than are sister city relationships. While both TMNs and sister city relationships are understood to be positively associated with local integration into the global economy, it may be conceptually expected that TMNs should maintain a closer association with the global city hierarchy than does sister city relationships. With these conceptual nuances in mind, we proceed to formulating a formal test of these ideas.

Testing TMN Participation and Global City Hierarchy

The question of the hypothetical relationship between city government participation in global governance networks and the global city hierarchy can now be refined as follows: are cities involved in global governance, represented here by UK and Chinese city memberships in TMNs, positively associated with the global city hierarchy? And is this city government membership in TMNs more strongly associated with the global city hierarchy than it is with UK and Chinese international sister city relationships? This can be tested for by identifying appropriate measures of the global city hierarchy and testing them as independent variables against TMN memberships and sister city relationships as dependent variables, respectively. Extant literature measures position in the global city hierarchy with city-level economic data and makes inferences therein on the relative power and roles of city economies around the world.[41]

One means of measuring position in the global city hierarchy is the number of transnational corporation headquarters within a given city,[42] and the Globalization and World Cities (GaWC) dataset "Global Command and Control Centers"[43] offers just such a measure for a collection of world cities in 2009, including cities in the UK and China. These measures are not to be confused with those which Neal suggested to simply be weighted counts of firms in

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39. Yu, Zhou and Cao, "A Research Report on the Vitality Index", *op. cit.*

40. Manuel Castells, "Toward a Sociology of the Network Society", *Contemporary Sociology*, Vol. 29, No. 5 (2000), pp. 693–699; Sassen, *Cities in a World Economy, op. cit.*, David A. Smith and Michael Timberlake, "World City Networks and Hierarchies, 1977–1997", *American Behavioral Scientist*, Vol. 44, No. 10 (2001), pp. 1656–1678; Taylor, "Specification of the World City Network", *op. cit.*

41. Manuel Castells, *The Rise of the Network Society Vol. 1 of The Information Age: Economy, Society and Culture* (Oxford: Blackwell, 1996); Castells, "Toward a Sociology of the Network Society", *op. cit.*; Friedmann, "World City Hypothesis", *op. cit.*; Sassen, *Cities in a World Economy, op. cit.*; Smith and Timberlake, "Cities in Global Matrices", *op. cit.*; Taylor, "Specification of the World City Network", *op. cit.*

42. Sassen, *Cities in a World Economy, op. cit.*

43. G. Csomós, "Global Command and Control Centers, 2006/2009/2012", *Globalization and World Cities Research Network Dataset 26* (2012), available: http://www.lboro.ac.uk/gawc/datasets/da26.html (accessed 1 July 2017).

cities.[44] Given that cities with a higher position in the global city hierarchy are more likely to join TMNs,[45] this study hypothesises that for UK and Chinese cities in the GaWC "Global Command and Control Centers" dataset, *TMN memberships will have a stronger positive association with the number of corporate headquarters than with sister city relationships (H1).*

A more nuanced form of measuring position in the global city hierarchy is through connectivity to and centrality within economic networks among cities, such as corporate office networks among advanced producer service firms.[46] This is a distinctly "relational" approach such that it reflects the relative network power each city has in relation to others within a finite network,[47] directly measuring the relative network strength of cities, as opposed to individual counts of corporate headquarters. Ni *et al.*[48] and Taylor[49] offer measures matching these criteria of the gross global network connectivity (GNC) via corporate office networks for a collection of Chinese and UK cities, respectively, for the year 2009. The nodes in these inter-city private sector networks have laterally intersecting, overlapping connections[50] and are thus more structurally similar to the intersecting city governments within TMNs than to the dyadic relationships among sister cities. Following the logic that cities with a relatively higher position in the global city hierarchy are more likely to join TMNs,[51] that GNC represents position in the global city hierarchy, and that TMNs are more structurally similar to corporate office networks than are sister city relationships, this study hypothesises that for Chinese and UK cities in Ni *et al.* and Taylor's datasets, respectively,[52] *TMN memberships will have a stronger positive association with GNC than with sister city relationships (H2).*

That the traditional centres of city-based global economic power, New York and London (NYLON), coexist with the newly emergent power of the Chinese city triad of Beijing, Shanghai and Hong Kong[53] warrants attention to how these core centres of power may relate to the city government networking of interest to this study. To that effect, Ni *et al.* and Taylor's datasets also offer "NYLON" and "triad" measures, which represent each UK and Chinese city's relative concentration of connections to NYLON and to the Chinese triad, respectively, as a proportion of

44. Zachary Neal, "Structural Determinism in the Interlocking World City Network", *Geographical Analysis*, Vol. 44 (2012), pp. 162–170.

45. Lee, *Global Cities and Climate Change, op. cit.*; Lee, "Global Cities and Transnational Climate," *op. cit.*

46. Arthur Alderson and Jason Beckfield, "Power and Position in the World City System", *American Journal of Sociology*, Vol. 109, No. 4 (2004), pp. 811–851; Peter J. Taylor, "Global Synthesis: National and Sub-Regional Contrasts", in Peter J. Taylor, Ni Pengfei, Ben Derudder, Michael Hoyler, Jin Huang and Frank Witlox, (eds.), *Global Urban Analysis: A Survey of Cities in Globalization* (London: Earthscan, 2010), pp. 331–336.

47. David A. Smith and Michael Timberlake, "Hierarchies of Dominance among World Cities: A Network Approach", in Saskia Sassen (ed.), *Global Networks, Linked Cities* (New York: Routledge, 2002), pp. 117–41.

48. Ni, Yue and Huang, *op. cit.*

49. Taylor, "UK Cities", *op. cit.*

50. Manuel Castells, "Toward a Sociology of the Network Society", *Contemporary Sociology*, Vol. 29, no. 5 (2000), pp. 693–699; Sassen, *Cities in a World Economy, op. cit.*, Smith and Timberlake, "World City Networks and Hierarchies, *op. cit.*; Taylor, "Specification of the World City Network", *op. cit.*

51. Lee, *Global Cities and Climate Change, op. cit.*; Lee, "Global Cities and Transnational Climate," *op. cit.*

52. Ni, Yue and Huang, *op. cit.*; Taylor, "UK Cities", *op. cit.*

53. Taylor, "Global Synthesis", *op. cit.*

GNC.[54] Leading world city economies tend to be highly connected to both NYLON and triad,[55] which may similarly be expected of cities with relatively higher positions in the global city hierarchy. In this case, the hypothesised association between TMN membership and GNC (H2) may also be expected to articulate itself in terms of connectivity to NYLON and triad. Accordingly, this study hypothesises that for Chinese and UK cities in Ni *et al.* and Taylor's datasets: *TMN memberships will have a stronger positive association with NYLON than with sister city relationships (H3)*, and *TMN memberships will have a stronger positive association with the Chinese triad than with sister city relationships (H4)*.

Data and Methods

Data on the year 2009 is selected because it is the most recent year for which two different measures of position in the global city hierarchy for a consistent sample of UK and Chinese cities can be obtained from extant literature. That is, only for 2009 is there both GNC measures[56] and command and control measures[57] for a sample of the same UK and Chinese cities. While the command and control measures also offer 2012 data in addition to 2009 data for UK and Chinese cities, using the 2012 data would obviate the additional inclusion of GNC measures, sacrificing diversity in the dataset. The resultant data used thus maximises the completeness and diversity of economic measures included for analysis as independent variables, and the explanatory value offered by the analysis. Further, notwithstanding global economic changes which have occurred since 2009, both sister city relationships and city government membership in TMNs—our dependent variables—have since increased in number,[58] and thus results obtained from a 2009 sample can be understood as more, not less, relevant to the present day.

Two different datasets are used to test H1 and H2 through H4, the descriptive statistics for which are shown in Table 1 below. The first dataset used to test H1 is the aforementioned GaWC dataset on "Global Command and Control Centers"[59] which offers the number of headquarters from the Forbes "Global 2,000" database of the world's largest 2,000 public corporations for 416 cities in 2009, for which the data on 20 UK cities and 33 Chinese cities specifically are extracted and used in this study. This independent variable is shown in Table 1 as "HQs", representing the number of corporate headquarters located in each city as count data, and as listed under each subheading—UK and Chinese cities combined, and UK and Chinese cities separately. A given sample city on average has between two and four HQs as shown by the means, far from the high end of the full range, reflecting the stratification of economic power among these cities. The second dataset, which is used to test H2 through H4, is from Ni *et al.* and

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54. Ni, Yue and Huang, *op. cit.*; Taylor, "UK Cities", *op. cit.*

55. Taylor, "Global Synthesis", *op. cit.*

56. Ni, Yue and Huang, *op. cit.*; Taylor, "UK Cities", *op. cit.*

57. Csomós, *op. cit.*

58. Tim Bunnell, "Locating Transnational Urban Connections beyond World City Networks", in John Hannigan and Greg Richards (eds.), *The SAGE Handbook of New Urban Studies* (London: SAGE Publications Inc., 2017), chapter 2; Jain, *op. cit.*; Pertti Joenniemi and Alexander Sergunin, "City-Twinning in IR Theory: Escaping the Confines of the Ordinary", *Journal of Borderlands Studies*, Vol. 32, No. 4 (2017), pp. 443–458.

59. Csomós, *op. cit.*

Table 1. Variable description and data source.

| | Independent variables | | | Dependent variables | | | | Data source |
| | | | | TMN memberships | | Sister cities | | |
	Mean (std. dev)	Range	Data source	Mean (std. dev)	Range	Mean (std. dev)	Range	
HQs			Csomós					iclei.org,
UK cities	4.80 (15.5)	1–71		.20 (.52)	0–2	6.50 (6.31)	0–26	uclg.org,
Chinese cities	2.81 (5.72)	1–31		.30 (.58)	0–2	15.6 (16.5)	0–72	C40.org,
Combined	3.56 (10.4)	1–71		.26 (.55)	0–2	12.1 (14.2)	0–72	UK and Chinese
GNC								municipal government
UK cities	.17 (.20)	.04–.96	Taylor	.29 (3.15)	0–2	7.70 (3.15)	2–14	websites
Chinese cities	.10 (.14)	.004–.96	Ni *et al.*	.71 (.71)	0–2	24.1 (18.9)	0–72	
Combined	.10 (.18)	.004–.96		.52 (.68)	0–2	16.7 (16.3)	0–72	
NYLON								
UK cities	−.20 (.17)	−.46–.07	Taylor					
Chinese cities	.12 (.43)	−.62–.87	Ni *et al.*					
Combined	−.01 (.38)	−.62–.87						
Triad								
UK cities	−.21 (.38)	−.65–.95	Taylor					
Chinese cities	.49 (.47)	−.28–1.28	Ni *et al.*					
Combined	.14 (.55)	−.65–1.28						

from Taylor,[60] which cover data on the intercity office links of 175 advanced producer service firms across 525 cities in 2008. Taylor provides three separate measures for a list of 17 UK cities, and Ni *et al.* provides the same measures for 21 Chinese cities. These three measures are (a) global network connectivity, shown as "GNC" in Table 1, which is calculated by aggregating the intercity office links of advanced producer service firms, (b) the relative concentration of office connections to New York City and London comprised within each city's GNC, shown as "NYLON" below, and (c) the relative concentration of office connections to Beijing, Shanghai and Hong Kong within each city's GNC, shown as "Triad" below. These three independent variables are represented by continuous data. The raw measure of GNC ranges in value from 4,000 to over 96,000, and to improve inference as well as fit values within the tables, all GNC values are equally divided by 100,000, which does not sacrifice explanatory value in the statistical analysis. NYLON and triad measures were not changed from their raw form, and they represent proportional values in which the highest possible value for either is 1 and the lowest is -1, where a value of over or under zero represents the "degree of over-linkage [or] under-linkage"[61], respectively, to those power centres. For example, the mean NYLON value for Chinese cities is 0.12, suggesting that Chinese sample cities tend to be only moderately overlinked to New York and London, or in general terms that they tend to have a moderate level of connectivity to these cities. As with HQs, the averages for GNC, NYLON and triad are much closer to the lower than the higher end of their respective ranges, again reflecting the stratification of power and centrality in these city economies. Of note, the values for GNC—as well as the NYLON and triad measures derived from GNC—are not completely independent of one another given that it is a network specification. However, their co-dependence is attenuated by the large sample size of 525 cities from which they were drawn and does not threaten inference in the analysis. As with the other datasets, the descriptive statistics for each of the dependent variables, TMN memberships and sister city relationships, are broken down in Table 1 by UK and Chinese cities combined, and UK and Chinese cities separately.

The "TMN Memberships" column in Table 1 accounts for the UK and Chinese member cities of C40, ICLEI and UCLG within each dataset, and the "Sister Cities" column accounts for the total international sister city relationships for each of the UK and Chinese cities within each dataset, all of which are represented as count data. While membership across three different TMNs are accounted for, the range for TMN memberships show that at most, cities in the datasets have two overlapping memberships at most, and that no one city is a member of all three. The means shown for TMN memberships reflect that most cities in the datasets have membership of either one TMN or none, which allows for inference on cities that have some membership versus none, or per our structuration approach, those enabled versus constrained. These TMNs were selected on the basis that they are "global" and not regionally restricted, such that both Chinese and UK cities are eligible to join them. In order to ensure that all sister city relationships accounted for in the datasets represented both position in the global city hierarchy and Type I multilevel governance, online records of the interactions of all sister city

60. Ni, Yue and Huang, *op. cit.*; Taylor, "UK Cities", *op. cit.*

61. Peter J. Taylor, "Introduction: Key Country and Sub-regional Connectivity Profiles", in Taylor, Ni, Derudder, Hoyler, Huang and Witlox, *Global Urban Analysis, op. cit.*, p. 199.

dyads covering all years of each relationships' existence were checked for (a) the presence of annual personnel exchanges involving private sector representatives carrying out commercial interactions such as import/export sales and/or direct investments; and (b) the absence of direct collaborations with other sister city dyads, in which approval and oversight of each city's international sister city activity took place under the auspices of a higher tier of government. All cities included in the sample were confirmed to meet these criteria.

TMN and sister city values are not shown in Table 1 for the UK and Chinese cities under NYLON and triad because Ni *et al.* and Taylor derived the NYLON and triad values from the GNC values of the same sample of UK and Chinese cities. C40 is comprised of over 80 member cities from 45 countries, 1 of which is a UK city, and 7 of which are Chinese cities. ICLEI is comprised of over 1,000 member cities, 5 of which are UK cities, and 3 of which are Chinese cities. UCLG is comprised of over 1,000 member cities, 2 of which are UK cities, and 25 of which are Chinese cities.

The data on TMN membership and on sister city relationship used as dependent variables to test the hypotheses are count data, and there is overdispersion present in the distribution of both variables. To account for overdispersion, a negative binomial generalised linear model (GLM) is used. The negative binomial model assumes Y_i follows a negative binomial distribution with mean μ_i and dispersion parameter ϕ. The model to test for association between the mean number of and the covariates of interest can be written as given in model (1) below, where μ_i is the mean number of TMN memberships or sister city relationships and the x_{ij} are the covariate values for city i. In the case of dispersion parameter $\phi = 1$, this model reduces to the standard Poisson regression model. Through the dispersion parameter ϕ, the negative binomial model can account for greater variability in the response compared to the standard Poisson model, which yields more accurate inferences.

To test H1, corporate headquarters (HQs) and sister city relationships are regressed as independent variables against the dependent variable of TMN memberships. This is done separately for both the UK and Chinese cities combined, the UK cities alone, and the Chinese cities alone for reference purposes. To find support for H1, TMN memberships must maintain a stronger positive and significant association with HQs than it does with sister cities.

$$\log(\mu_i) = \beta_0 + \sum_{j=1}^{p} \beta_j x_{ij}$$

To test H2, TMN memberships as a dependent variable is regressed on GNC and the number of sister cities, and as with H1, this is done separately for both the UK and Chinese cities combined, the UK cities alone, and the Chinese cities alone. To find support for H2, TMN memberships must maintain a stronger positive and significant association with GNC than it does with sister cities. To test H3, TMN memberships is regressed as a dependent variable on NYLON and the number of sister cities, and this is done separately for both the UK and Chinese cities combined, the UK cities alone, and the Chinese cities alone. To find support for H3, TMN memberships must maintain a stronger positive and significant association with NYLON than it does with sister cities.

To test H4, the TMN memberships as a dependent variable is regressed on triad and the number of sister cities, and this is done separately for both the UK and Chinese cities combined, the UK cities alone and the Chinese cities alone. In order to find support for H4, TMN memberships must similarly be found to have a stronger positive and significant association with triad than it does with sister cities. Accompanying each of the above four tests will also be four separate tests in which sister city relationships as the dependent variable is regressed against TMNs and, respectively, HQs, GNC, NYLON and triad as independent variables. This will allow for better inference on the relationship between sister city relationships and TMN membership.

Results and Discussion

In Tables 2–5, the left-side portion shows results for TMNs as the dependent variable, and the right-side portion shows sister city relationships as the dependent variable. We will first discuss the results as they pertain to TMNs as the dependent variable. Table 2 shows that TMN memberships maintain a stronger positive and significant association with corporate headquarters than it does with sister cities, lending support for H1. Table 3 shows that TMN memberships maintain a stronger positive and significant association with GNC than it does with sister cities, lending support for H2. Table 4 shows that TMN memberships maintain a stronger positive and significant association with NYLON than it does with sister cities, lending support for H3. Lastly, Table 5 shows that TMN memberships maintain a stronger positive and significant association with triad than it does with sister cities, lending support for H4. While TMN memberships show a positive and significant association with both corporate headquarters and GNC, the strength of association with GNC is markedly greater. This is likely due to the fact that GNC measures are a direct approximation of network connections in the private sector, and thus as "relational" measures they offer the greater explanatory value for networked phenomena that Smith and Timberlake note.[62] Both cases provide evidence of a direct relationship between city government memberships in TMNs and the global city hierarchy. This relationship is further supported by the association which TMN memberships have with NYLON and with triad. That is, leading world city economies are highly connected to the NYLON and triad power centres,[63] extended here to position in the global city hierarchy, which are also shown to influence city government memberships in TMNs. Regarding sister city relationships as the dependent variable, shown on the right-side portion of the tables, all cases show that sister city relationships maintain a stronger positive association with TMN memberships than with, respectively, HQs, GNC, NYLON and triad. This is specifically the case in Chinese cities, and suggests that higher numbers of sister city relationships result from conditions that are present when a Chinese city government is a TMN member, but not conditions associated with position in the global city hierarchy.

The number of corporate headquarters and measures of GNC, NYLON and triad represent the position of sample cities in the global city hierarchy,[64] where city-level

62. Smith and Timberlake, "Hierarchies of Dominance among World Cities", *op. cit.*

63. Taylor, "Global Synthesis", *op. cit.*

64. Csomós, *op. cit.*; Ni, Yue and Huang, *op. cit.*; Taylor, "UK Cities", *op. cit.*; Taylor, "Global Synthesis", *op. cit.*

Table 2. Corporate headquarters, transnational municipal networks (TMNs) and sister cities.

	TMNs				Sister cities		
	UK cities	Chinese cities	All cities		UK cities	Chinese cities	All cities
HQs	.03 (.02)	.03 (.02)	.03 (.01)**	HQs	.01 (.02)	−.01 (.03)	−.02 (.01)
Sister cities	−.29 (.36)	.01 (.01)	.02 (.01)*	TMNs	.32 (.71)	1.02 (.34)**	1.09 (29)**
Constant	1.55 (3.18)	−1.01 (.73)	−1.85 (.52)*		1.78 (.23)*	2.28 (.16)*	2.12 (.14)*
AIC	22.3	36.5	54.3		124.6	243.1	365.4
Null dev.	5.21	10.9	16.3		23.5	56.5	82.1
Resid. dev.	1.75	3.64	5.83		22.7	38.4	60.9
Parameters	3	3	3		3	3	3
df	2	2	2		2	2	2

Numbers in parentheses are standard errors.
Levels of significance are denoted as follows: *$p < .05$, **$p < .01$, ***$p < .001$.

Table 3. Global network connectivity, transnational municipal networks (TMNs) and sister cities.

	TMNs				Sister cities		
	UK cities	Chinese cities	All cities		UK cities	Chinese cities	All cities
GNC	2.27 (.51)***	14.1 (6.17)*	17.1 (4.06)***	GNC	7.31 (6.65)	2.91 (2.04)	−3.03 (6.94)
Sister cities	−.01 (.03)	.01 (.01)	.01 (.01)	TMNs	−.01 (.25)	.28 (.07)***	.55 (.22)*
Constant	−.09 (.25)	.22 (.24)	.01 (.03)		1.91 (.11)	2.89 (.07)**	2.52 (.16)**
AIC	19.9	44.9	64.6		88.4	342.9	289.3
Null dev.	5.52	10.2	17.4		21.1	270.9	49.7
Resid. dev.	2.01	7.14	9.8		17.5	239.5	41.5
Parameters	3	3	3		3	3	3
df	2	2	2		2	2	2

Numbers in parentheses are standard errors.
Levels of significance are denoted as follows: *$p < .05$, **$p < .01$, ***$p < .001$.

Table 4. NYLON, transnational municipal networks (TMNs) and sister cities.

	TMNs				Sister cities		
	UK cities	Chinese cities	All cities		UK cities	Chinese cities	All cities
NYLON	1.51 (.61)*	1.13 (.25)***	1.50 (.60)*	NYLON	.22 (.58)	−.81 (.51)	−.26 (.45)
Sister cities	.01 (.01)	.01 (.01)	.01 (.01)	TMNs	.12 (.24)	.71 (.31)*	.66 (.26)*
Constant	−.94 (.41)*	.35 (.17)	−.83 (.31)		2.02 (.16)*	2.73 (.24)**	2.42 (.18)**
AIC	60.3	34.7	51.1		86.7	177.7	281.3
Null dev.	15.2	10.2	15.2		16.7	28.3	50.2
Resid. dev.	6.95	4.39	6.95		16.2	24.3	40.4
Parameters	3	3	3		3	3	3
df	2	2	2		2	2	2

Numbers in parentheses are standard errors.
Levels of significance are denoted as follows: *$p < .05$, **$p < .01$, ***$p < .001$.

Table 5. Triad, transnational municipal networks (TMNs) and sister cities.

	TMNs				Sister cities		
	UK cities	Chinese cities	All cities		UK cities	Chinese cities	All cities
Triad	1.03 (.29)**	.71 (.31)*	1.41 (.31)**	Triad	.21 (.33)	−.58 (.34)	.48 (.26)
Sister cities	.01 (.03)	.01 (.01)	.01 (.01)	TMNs	.10 (.21)	.34 (.26)	.08 (.24)*
Constant	.36 (.32)	.07 (.29)	−1.51 (.51)*		2.04 (.21)**	3.02 (.21)**	2.59 (.14)**
AIC	24.1	33.1	53.3		91.1	138.5	251.5
Null Dev.	5.52	6.11	30.1		20.4	19.8	40.1
Resid. Dev.	2.58	4.33	20.1		17.7	16.9	34.5
Parameters	3	31	3		3	3	3
df	2	2	2		2	2	2

Numbers in parentheses are standard errors.
Levels of significance are denoted as follows: *$p < .05$, **$p < .01$, ***$p < .001$.

power in the global economy is thought to be positively associated with both TMN membership[65] and number of international sister city relationships.[66] The results suggest that the higher the position UK and Chinese city economies have in the global city hierarchy, the more likely they are to either be invited to become or to apply and be accepted for membership in TMNs. Thus, following the logic that a higher position in the global city hierarchy influences political-economic outcomes occurring at the city-level,[67] these results suggest that memberships of TMNs can be considered one such political-economic outcome, evincing a political-economy of city government participation in global governance. These same economic power foundations may also be explanatory of the global governance network participation of other European and East Asian cities, given that UK and Chinese cities are increasingly representative of European and East Asian city participants in such networks.[68] The results also lend support to the structuration theory interpretation of the relationship between TMN membership and the global city hierarchy. To recapitulate, city governments join TMNs when the conditions of motivation, capacity and the opportunity to join are present, and these conditions are fulfilled as a result of structural (economic) forces that both enable or constrain city government actors with regard to joining TMNs.

As global capital flows become more integrated into a city's private sector, city government actors build international relationships to assist economic growth associated with this integration. This growth results in accelerated urbanisation, bringing greater population-related problems to the city, in turn initiating city government knowledge- and resource-seeking behaviour to remediate those problems, which fulfils the condition of city government motivation to join TMNs. The population growth inherent to urbanisation adds a larger tax base, allowing more local government human and financial resources with which to participate in TMN activities, fulfilling the condition of city government capacity to join TMNs. International connections created by city government to maximise local economic growth also increases the likelihood of exposure to knowledge of or personal connections made with international bodies such as TMNs, thus fulfilling the condition of opportunity to join TMNs.

By way of this process and the conditions they fulfil, city government actors are thusly enabled by the structural forces of global economic integration to join TMNs, or conversely constrained to the extent that these forces of integration are not present, and thus do not enable the posited process. This can be interpreted as the specific type of enablement/constraint relation in structuration theory where the enabling of some actors acts as or contributes to the constraint of others,[69] manifested in this case by economic power outcomes strongly favouring highly competitive cities, and marginalising others.[70] Access to the global capital flows that allow for elevating position in the global city hierarchy is exclusive and competitive in nature, hence the stratification seen in the hierarchy. This exclusivity and the

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65. Lee, *Global Cities and Climate Change*, *op. cit.*; Lee, "Global Cities and Transnational Climate," *op. cit.*

66. Chu, *op. cit.*; De Villiers, *op. cit.*; Zelinsky, *op. cit.*

67. Chase-Dunn, *op. cit.*, Friedmann, "World City Hypothesis", *op. cit.*; Smith, "Method and Theory", *op. cit.*; Smith and Timberlake, "Cities in global matrices", *op. cit.*; Taylor, "Specification of the World City Network", *op. cit.*

68. Acuto, Morissette, Chan and Leffel, "'City Diplomacy' and Twinning", *op. cit.*

69. Giddens, *The Constitution of Society*, *op. cit.*; Giddens, "Structuration theory", *op. cit.*

70. Sassen, *Cities in a World Economy*, *op. cit.*; Taylor, "Specification of the World City Network", *op. cit.*

competitive outcomes therein act as a structural constraint on city governments, in that lower position in the hierarchy translates to the relative absence of the above driving structural forces, and ultimately lower likelihood of joining a TMN. This further constrains the collective body of TMN member cities to those who have relatively higher positions in the global city hierarchy, meaning that the landscape of cities participating in global governance may directly reflect this economic landscape of marginality. Lastly, multiple intersecting connections between cities—beyond merely the dyadic form—defines the form of inter-city relations among the city governments within TMNs as well as among the city-based firms that animate the global city hierarchy. The concept of Type II multilevel governance was useful in revealing this structural similarity and should be utilised in future research on TMNs and other types of city networks.

Conclusion

Urban problems today are also global collective problems,[71] for which solutions are offered on the global platform of the TMN. Hence, as the global economic forces brought to bear by a city's private sector generate new problems which city government leaders must respond to, they increasingly turn to TMNs. Yet city participation in TMNs is not universal and appears stratified along economic lines. Extant literature highlights how the relative global economic power of cities is consequential for city government participation in global governance through TMNs,[72] and this study contributes new evidence to that end, but there is no doubt much need for more systematic inquiries into its effects and viability for cities the world over. In our limited sample, those UK and Chinese cities which rank higher in the global city hierarchy bear the problems of accelerated urbanisation while having greater capacity to manage them, and are able to utilise the international connections drawn by their massive private sectors to seek and share knowledge on the international scale. Thus, a higher position in the hierarchy of cities in the global economy increases the likelihood that these cities either be invited to become or to apply and be accepted for membership in TMNs.

Being that the UK and Chinese TMN member cities rank high on the global city hierarchy, they represent the echelon of cities that possess a disproportionate share of power and centrality in the global economy, which collectively contribute to a new global economic landscape of centrality and marginality.[73] If the collection of UK and Chinese cities participating in global governance via TMNs observed in this study are distinguished by this economic power, might the larger global landscape of economic centrality define TMN membership *beyond* the UK and China? If so, future studies should investigate this relationship, focusing on existing and new TMNs and other networked structures through which city governments participate in global governance. As such, we believe we have only begun to scratch the surface of a complex political-economic relationship that, thanks to the pervasiveness of cities in world affairs in an increasingly urbanised age,

71. Richard V. Knight, "The Emergent Global Society", *op. cit.*

72. Lee, *Global Cities and Climate Change, op. cit.*; Michele Acuto and Steve Rayner, "City Networks: Breaking Gridlocks or Forging (new) Lock-ins?" *International Affairs*, Vol. 92, No. 5 (2016), pp. 1147–1166.

73. Sassen, *Cities in a World Economy, op. cit.*; Taylor, "Specification of the World City Network", *op. cit.*

might in fact hold critical evidence as to the future and core dynamics currently affecting international affairs.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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