Who Says Networks, Says Oligarchy? Oligarchies as "Rich Club" Networks

Christopher Ansell
University of California
Berkeley, CA, USA

Renata Bichir
University of São Paulo
São Paulo, Brazil

Shi Zhou
University College London
London (UCL), UK

Abstract
Departing from Roberto Michels's classic analysis of oligarchy, we provide a structural analysis of the concept based on social network analysis. We define oligarchy as a social network that exhibits three structural properties: tight interconnections among a small group of prominent actors who form an "inner circle"; the organization of other actors in the network through the intermediation of this inner circle; and weak direct connections among the actors outside the inner circle. We treat oligarchy as a global property of social networks and offer an approach for measuring the oligarchical tendencies of any social network. Our main contribution is to operationalize this idea using a "rich club" approach. We demonstrate the efficacy of this approach by analyzing and comparing several urban networks: Sao Paulo urban infrastructure networks and Los Angeles and Chicago transportation policy networks.

Keywords: *oligarchy, rich clubs, policy networks, urban networks*

Authors
Christopher Ansell*, Department of Political Science, University of California, Berkeley, California, USA.*
Renata Bichir, Center for Metropolitan Studies, Center of Arts, Sciences and Humanities, University of S*ão Paulo, São Paulo, Brazil.*
Shi Zhou*, Department of Computer Science, University of College London (UCL), London, UK.*

Correspondence concerning this work should be addressed to Christopher Ansell by email: cansell@berkeley.edu

1. Introduction

The concept of oligarchy has a long history in the social sciences and in the popular imagination, from Aristotle's description of oligarchy as rule by the few to Roberto Michel's "Iron Law of Oligarchy," to the FROORTXLDO GHVFULSWLRQ RI g... as "oligarchs." The term has various connotations in the social sciences, from the "bureaucratic conservatism" RI VRFLDO PRYHPHQWV 9RVV ... control of the economy by "industrial tycoons" (Guriev DQG 5DFKLQVN\ WR WKH "PDMRU SURGXFHUV´ $FHPRJO... references, however, share the idea that an oligarchy a regime controlled by cooperation or collusion among a small group of powerful elites.

Given the long history and ubiquitous use of the idea of oligarchy and the potential importance of oligarchical control over social movements, economies and political systems, it is surprising that there is so little theoretical and empirical attention paid to the concept of oligarchy. Many authors make reference, of course, to Roberto Michels's work, *Political Parties*, which provides the classic theoretical treatment of the concept %XW VLQFH WKH SXEOLFDWLRQ R... there has been limited theoretical analysis of the concept of oligarchy. Taking Michels's claim that oligarchies were inevitable seriously, subsequent scholarship has mostly sought to identify the conditions under which organizations and social movements do not become ROLJDUFKLFDO /LSVHW 7URZ 6KHUPDQ ,Q WKLV SDSHU Michels's classic treatment by analyzing the structural bases of oligarchy, which we operationalize using social network analysis. We treat oligarchy as a global property of social networks and offer an approach for measuring the oligarchical tendencies of any social network.

:H EHJLQ E\ EULHÀ\ UHYLHZ... classic analysis of oligarchy, pointing to how it provides WKH EDVLV IRU RXU RZQ VWUXFW... Weber's, Michels analyzed the development of oligarchy LQ FRPSOH[EXUHDXFUDWLF RW... insight was a synthesis of the "elite theory" of fellow Italians Gaetano Mosca and Vilfredo Pareto with Weber's

H[SHFWDWLRQ WKDW PRGHUQ EXUH
³LURQ FDJH ´ +H DUJXHG WKDW RUJI
DQG VWUDWL¿FDWLRQ SURGXFHG D
HOLWH ³:KR VD\V RUJDQL]DWLRQ V
formally sovereign, the "masses" were unable to organize themselves and as a result become dependent on the elite group to direct them. While the elite group is composed DQG be a stable "inner circle" that monopolizes control RYHU RUJDQL]DWLRQDO RI¿FHV WK a narrow and unstable relationship with the organization. Consequently, the elite's advantages allow them to transform their "inner circle" into a "closed caste." This closure is essential if elites are to prevent a challenge to WKHLU SRVLWLRQ E\ WKH UDQN DQG has three aspects: the elite are well-connected among themselves, forming an "inner circle"; the masses are organized through the intermediation of this inner circle; and the masses are poorly interconnected among themselves.

Literature in the Michelsian tradition has focused on the organizational aspects of oligarchy. By contrast, we focus on the relational character of oligarchy, as it might develop within a social network. A social network perspective has two important advantages for the study of ROLJDUFK\ SRUW DQ LW ZRUNHV QXV IU RUJDQL]DWLRQ DQG DOORZV XV WR might structure the organization of elites spanning organizational or institutional boundaries (see Marques DQG RQ WKH SHU ³6WDWH´ IDEHULFRQG D VRFLDO QHWZ may be used to capture the informal relational basis of oligarchy—the proverbial "old boys network."

An earlier generation of scholars made much the same argument and closely dissected the structure of HOLWH UHODWLRQVKLSV DPRQJ ³UXOLQJ HO 'XPKRII %XW WKLV VFKRO down in debates between "elite theorists" and "pluralists" SROLWV 5REHUWR DOLFKHOV $OWKRXJK WK new insights, it tended to be structured in dichotomous WHUPV DQ\ DOO VLWV XSHRRZ WKH WR HODU QWK V ZRUN LQ WKLV WUDGLWL RW RD RQH SRLQW ¿FW HWVSHFRQ WUHDO ZRUN the boards of corporations. As this corporate interlock literature developed, it increasingly focused on how links

---

6HH /HDFK IRU D UHYLHZ DQG FULWLTXH +H GH¿QHV ROLJDUFK\ DV WKH ³F LQ WKH KDQGV RI D PLQRULW\ ´

2 This concept refers to the relational patterns formed by both institutional and personal relationships that structure state organizations. $FFRUGLQJ WR 0DUTXHV ³7KH VWDWH IDEULF LV FUHDWHG DQG FKDQJHG E\ QHWZ larger environment of policy communities. The contacts are both personal and institutional and are based in old and new ties, constantly re-created. These midlevel structures control several resources and affect preferences, restrict choices and strategies, and change political resul

LQVQD RUJ _ ,VVXH

EHWZHHQ FRUSRUDWH ERDUGV literatures that some nodes are often much more central
DQG UHVRXUFHV EHWZHHQ WKH than others, and that these central nodes may play an
studies usefully widened the discussion of the role in important brokerage role, often by spanning "structural
corporate interlocks, but also gradually shifted attention holes" in the network. We also know that subgroups form
away from the regime-like characteristics of interlocking within networks, often among well-connected actors, and
directorates. WKDW QHWZRUNV RIWHQ H[KLELW

We have no interest in resurrecting the old elite Work on "small world" networks has also found that
pluralist debate. Our relational approach to oligarchy small group of "hubs" can link a sparsely connected
suggests that the structure of social networks is likely QHWZRUN WRJHWKHU :DWWV
WR DIIHFW WKH ÀRZ RI LQIRUPDPDWKHVRHQ ¿QGLHQ GLVWUJEXWLRQ RI SR
UHVRXUFHV SDWWHUQV RI GH subgroups to coordinate and organize the intermediation
But to be clear, a structural analysis of networks alone of the network as a whole. It is more useful, however,
GRHV QRW SURYLGH VXI¿FLHQW to understand the degree to which a social network is a
UXOLQJ HOLWH PRQRSROL]HV SRZHOO HDQGLWYLGXHLQFH UPHGDWRHQ \W
demonstrate that the relational basis for such control whether or not a network has a ruling elite.
LQÀXHQFH H[LVWV ,Q DGGLWLRQ In the following section, we develop a strategy for
we depart from the more dichotomous inclinations of the measuring the oligarchical tendencies of a network using
elite-pluralist debate, focusing instead on how to measure "distribution of degree" approach. In later sections of
oligarchical tendencies in networks. the paper, we demonstrate the value of this approach by

Why is a relational concept of oligarchy useful? analyzing several social networks.
One way to approach this question is through the idea of
brokerage. Brokerage is a form of intermediation where a **2. Three Network Metrics**
focal actor, the broker, mediates the relationship between
VRPH RWKHU VHW RI DFWRUV 6R+RZ QGKRZXRQOG ZH GQLHQWLVI\ WKD
ZHOO HVWDEOLVKHG WUDGLWLRQ network to be oligarchical? The tool kit of social network
6LPPHO *RXOG DQG)HUQDQG analysis offers several possibilities. In this paper, we
2EVWIHOG 6WRYHO DQG 6Z introduce a method based on work in physics and
tradition has been to understand the position and power of computer science that focuses on how ties are distributed
individual brokers, and the advantages that accrue to them across the network. We use the concept of "rich clubs"
RU WKRVH WKH\ FRQQHFW +RZHYHU LW DQG PD\ FDQ EH JUJV LW LVKRXOV VRQ
interesting or valuable to understand the collective pattern RQGUDJyQ DQG =KRX DV RXU E
of mediation in a network. The concept of oligarchy, we oligarchical tendencies of a network, and supplement
suggest points to the collective mediation of a network LW ZLWK DQ DQDO\VLV RI WKH ³I
by a small but cohesive subgroup. To explain, we can QHWZRUN SURSRUWLRQ 1HZPDQ DQG WKH
recall the three aspects of oligarchy that we drew from RI WLHV %DUDEDVL DQG $OEHUW
0LFKHOV WKH HOLWH DUH WLH these measures identify the tendency of social networks
themselves, forming an "inner circle"; the "masses" WR H[KLELW WKH NH\ IHDWXUH RI
are organized through the intermediation of this inner GHQWL¿HG WKH H[LVWHQFH RI D
circle; and the masses are poorly interconnected among monopolizes the intermediation of the rest of the network.
themselves. An oligarchy describes a network where a
cohesive subgroup monopolizes the intermediation **2.1 Power-Law Degree Distribution**
relationships in the network as a whole. As in the work on
individual brokerage, Michels suggests that advantages 0DQ\ UHDO QHWZRUNV – HVSHFLDOO
accrue to the inner circle. But the concept of oligarchy is may display a skewed degree distribution known as the
about the collective, rather than individual intermediation "power law," or P(k) ~ $k^{-\gamma}$, where degree k LV GH¿QHG
of the network. as the number of links a node has (Barabási and Albert,

3XUH ROLJDUFKLHV PD\ UDUHO\ H[LVW QJ JDYHQ WKHHOOVV $ SR
many kinds of social networks may have oligarchical called 'scale-free' because it is not the average degree,
tendencies. It is well established in the social network EXW WKH H[SRQHQW RI WKH SRZH

characterizes the network's connectivity.

    In a power-law network, most nodes have only a of WKH DFWXDO QXPEHU RI OLQNV
few links, and the network is guaranteed to have a small number of links among a group of rich nodes (Zhou and
VHW RI QRGHV ZLWK YHU\ KLJK GRQ RQGHUDJRRQG This a quantitative measure of GH
KLJKHU WKDQ WKH DYHUDJH GH the density of connectivity among a given group of rich
process. Thus, for power-law networks, it is particularly QRGHV :KHQ ' WKH ULFK QRGHV D
LPSRUWDQW WR H[DPLQH WKH IROO PLRQ WKDW D KLJKHGHJUHH QRGHV ULQ
organizing the network's global structure. link among themselves (although each of them may have
      D ODUJH QXPEHU RI OLQNV ZLWK QR

2.2 Network Mixing Patterns

For simplicity, a network is said to contain a rich
club if the richest nodes (e.g. the top 5% best-connected

1HZPDQ LGHQWL¿HG GLIIHUHQW QRGHV PD\QH SDWK WKUYDOXH ULFK
networks. A network is assortative if nodes of similar ! 1R D SULRU GH¿QLWLRQ H[L
degrees tend to be connected to one another and QRGHV DUH LQ WKH ULFK FOXE 7K
disassortative if nodes tend to be connected to nodes usually calculated for all groups of rich nodes so that this
RI GLIIHUHQW GHJUHHV 7R PHD VWUXFWXUDO SURSHUW\ FDQ EH H[
SDWWHUQV 1HZPDQ SURSRVHG network hierarchy. The rich club coefficient is
ZKLFK UDQJHV IURP WR :K found to be critically relevant to the redundancy and
DVVRUWDWLYH PL[LQJ LQ WKH QHWZRUVQHLVH RI YHU\HOOZRUN RI QRGHV
WZR QRGHV ZLWK WKH VDPH GHJ DQG HW RIKLWV UURXW LQJKHUH¿EHQF\ L
perfect disassortative network, i.e., every link connects EHWZHHQ QRGHV =RX
WZR QRGHV ZLWK GLIIHUHQW GHJU HKRZ HOO DQG U0RQG WRRRQH LV D V
QHXWUDO PL[LQJ QHWZRUN QHWZRUN¶V ULFK FOXE FRHI¿FLHQV
ZLWK WKH QHWZRUN¶V GHJUHH G
SDWWHUQ)RU H[DPSOH QHWZRUNV

Rich Club Coefficient

degree distribution can have a vastly different rich-club
The "rich club" concept proposed by Zhou and Mondragon FRHI¿FLHQW DQG KLJK GHJUHH QR
DQG FRPSOHPHQW network are not necessarily more interconnected than
QHWZRUN PL[LQJ SDWWHUQV those in a disassortative network.
IROORZLQJ DPELJXLWLHV)RU H[DPSOH LI D QHWZRUN GLVSOD\V
DVVRUWDWLYH PL[LQJ ZKHUH K

2.4 Debate on the Rich-Club Phenomenon

with other high-degree nodes, does this mean the high-
GHJUHH QRGHV DUH WLJKWO\ There has been a debate on the rich-club phenomenon with
each other? Or, if a network is disassortative and high respect to how to determine whether the rich nodes in a
GHJUHH QRGHV RQ DYHUDJH network show a tendency to form a tightly interconnected
nodes, does this mean the high-degree nodes do not link FOXE &ROL]]D HW DO SURSRV
with themselves at all? FOXE FRHI¿FLHQW RI D UHDO QHWZ
    ³5LFK´ QRGHV DUH GH¿QHG DYQ D GUDRXSW KH QRQHGHUJH RI D P
ZLWK WKH KLJKHVW GHJUHHV version of the weal network. The logic here is analogous
as the top n best-connected nodes or as the nodes with to the difficulty of determining
degrees larger than or equal to a given degree. For a or "short" without comparing their height to the average
given group of rich nodes, any member of the group has height of the group of people that the person belongs to.
a degree higher than or equal to any node outside the QRH ³VXSULVLQJ´ UHVXOW LV WKD
group. More nodes with lower degrees are included when ZKLFK LV FRQVLGHUHG WR H[HPSO
the size of the group increases. phenomenon, would have a slightly lower rich-club

---

this method cannot be used to compare between different real networks – because a "short" person on a basketball team may be taller than a "tall" person in a primary school class.

detecting cohesive subgroups (Wasserman and Faust such as clique analysis and methods of "community detection," such as the Girvan-Newman method (Newman may be identifying the "inner circles" of oligarchies.

phenomenon to a monotonic increase of the rich-club coefficient as a function of degree. Others suggest that the monotonic increase may be "a natural consequence of a stochastic process" and comment that "… an oligarchy will always appear to be present, even if the network is random." However, it is worth noting that a club coefficient is not a property of networks (McAuley et al. rich club coefficient can even in some networks (Zhou and Mondragon and Zhou club coefficient is an absolute level of interconnectivity among a group of rich nodes. It is calculated without any assumption and judgment about the rich-club phenomenon. In other words, it is measuring a person's height without judging whether a person is tall or not. In this paper as a network metric and avoid referring to the rich-club phenomenon.

The rich-club approach has a different focus degree, pushes the analytical focus beyond identifying well-connected leaders or important subgroups. "Rich" nodes form a cohesive group among themselves, but they also maintain ties to more "impoverished" nodes—e.g. their clients. It is these ties with non-rich nodes that makes a "rich club" different Mondragon et al. "Alch." So on the rich characterize the oligarchical tendency of networks as opposed to identifying the oligarchs themselves.

argue that the "structural biases approach" uses "properties" of the network to evaluate whether rich nodes merely affiliate among themselves, they also affiliate with non-rich nodes "assortative," rich nodes affil rich nodes while non-rich nodes other non-rich nodes (in a class or network, nodes of similar degree associate with "dissassortative," by contrast, nodes of dissimilar degree associate together. While the "rich club" measure captures the way a core group monopolizes ties, the disassortative measure guarantees that this core is not segmented off

3. Oligarchy as a Global Property of Networks

Assortative mixing is commonly networks but is not associated with "oligarchical" networks. An oligarchy is a rich club with disassortative mixing the "rich" nodes are interconnected, but they are also connected to the "poor" nodes who are not strongly interconnected among themselves.

from the rest of the network.
In addition to knowing that there is a group of rich nodes that are tied together, but also linked to a wider network of clients, the concept of oligarchy also presumes that the "rich club" at the core of the network is small relative to the network as a whole. One way to

The idea that the power of well-connected people is derived from their connections to other well-connected people is well established in social network analysis, and typically measured using eigenvector centrality (Bonacich or to vary the relative importance of indirect ties, "power" centrality (Bonacich con later measure, however, is that it requires an arbitrary decision on the part of the analyst about whether people gain more power by being tied to other "rich" nodes or by being tied to more "impoverished" nodes. Following this tradition of measuring centrality and power in networks, some authors have recently developed new measures for identifying "leadership insularity" (Abersman

evaluate whether the "rich club the degree distribution of the network. If the rich-club is small we should expect th resemble a power law.
To summarize, an oligarchical network can be characterized as having a "rich club" (a group of well-connected nodes who without but the overall network exhib are disassortative (where each rich node is strongly connected to the poor nodes connected nodes distribution (few well-connected nodes and many poorly-connected nodes. Taken toget capture the degree to which a small group dominates the collective intermediation of the network as a whole. In

Michels' terms, the rich club is a cohesive "inner circle" P H D V X U H   R I   R O L J D U F K \   , Q   W K H   Q H [
that organizes the weakly organized "masses."   V H Y H U D O   V R F L D O   Q H W Z R U N V   X V L Q J

One alternative way to identify an oligarchical X U E D Q   L Q I U D V W U X F W X U H   S R O L F \   Q H
network regime is to develop a core-periphery analysis. R Y H U   V L [P D \ R U D O   D G P L Q L V W U D W L
Much like the concept of an oligarchy, a core-periphery S R O L F \   Q H W Z R U N V   L Q   W Z R   8 6   F L V
structure is a "core" of people who are tied together and Angeles. These networks allow us to compare urban
a "periphery" of less well connected actors (Laumann S R O L F \   U H J L P H V   D F U R V V   W L P H   L Q   V
and Pappi 1976; Breiger 1979). and across city or for the same kind of policy domain
networks as follows: "a cohesive set of actors, a parti A F U R V V   R Q H   S R O L F \   G R P D L Q   R U   D   V L
a "leading crowd" is surrounded by a to other et al. individual and urban structure
who have interchange both to and from them."

Consistent with this D e s c r i p t i o n   o f   t h e   N e t w o r k s   a t t i   a n d   (Y H U H W
developed a partitioning algorithm for analyzing
core-periphery structure that assigns those who are 4.1 São Paulo Urban Infrastructure Networks
closely connected to each other   block   to the "core"
and those who are not conn S ã o   P a u l o   i s   a   c i t y   o f   r o u g h l y   e l e v e n
to a "periphery." They then dicen Brazil, and has some 11 million
evaluate how closely the derived assignment corresponds municipal inhabitants and 20 million in the metropolitan
with an idealized core periphery s B r u n d u t i u r k h a   p o n g   t t h e   u r
there are several limitations of using a core-periphery urban-infrastructure policy is at the core of municipal
D Q D O \ V L V   D V   P H D V X U H   R I   R O L J politics and policies, and receives a large share of the
                                                                     P X Q L F L S D O   E X G J H W   ±   R Q   D Y H U D
The core-periphery algorithm partitions a   % L F K L U   7 K X V   L W   L V
network into a core that is tightly interconnected. important policy domain.

b l o c k   b u t   t h i s   m e a s u r e Policy network data was collected by Eduardo
capture the degree to which this core is a "rich Marques and Renata Bichir in order to investigate the
c l u b "   a s   m e a s u r e d   b y   t h S R O L W L F D O   O R J L F   R I   W K H   S H F U H W
2. The core-periphery measure says that the core 6 H F U H W D U L D   G H   9 L D V   3 ~ E O L F D V "
is tightly interconnected and the periphery is municipal agency responsible for urban infrastructure
weakly interconnected; it says less about the link U R O L F \   0 D U T X H V   E D V H G   R Q   D Q   H [D P
between core and periphery or conc o r   o n   a n   a c t   i n   w i t h   i t s   s p e c i f i c   s h e l
an imperfect block   research analyzed spatial relations and political
directly measures how rich nodes are tied to G \ Q D P L F V   R I   X U E D Q   L Q I U D V W U X F W X
non-rich nodes (assortative and disassortative S D X O R   I U R P   8   W R
mixing
3. The "core" of a core-periphery structure might
be very large, while we are assuming that the
"rich club" is a small group (as measured by the
S R Z H U   O D Z   G L V W U L E X W L R Q

Thus, while core-periphery measures may also provide an
D S S U R [L P D W H   P H D V X U H   R I   R O L J D U F K L F D O   V W U X F W X U H   W K H   U L F K
club approach offers a more direct and discriminating

7R UHFUHDWH WKH SROLF\ QHW
UHVHDUFKHUV FRQGXFWHG LQ GHSWK LQWHUYLHZV ZLWK FDUHHU
RI¿FLDOV WHFKQLFLDQV DQG PHPEHUV RI WKH FRPPXQLW\ RI GDW
HQJLQHHUV DVVRFLDWHG ZLWK SROLF\ KHOSHV WR LQYHVWLJDWH ZKHWKHU WKHVH
± EDVHG RQ RI¿FLDO GDWD RI 7UDQQVSRUWDWLRQ RI¿FH PDLQWDLQHG
LQVWLWXWLRQDO SRVLWLRQV RQ WKH FROODERUDWLRQ RQ WUDQVSRUWDWLRQ SROLF\H ±

conditions for collaboration on transportation policy
to characterize the policy and political dynamics in the
city over time, as well as to investigate the continuity
of the networks.The interviews used a name generator
issues among groups operating on an urban and regional
The network data analyzed in this paper is the data set
produced by the Marques team using this data collection
process.

PHWURSROLWDQ UHJLRQV ² /RV $QJH
DQG &KLFDJR PLOOLRQ SHRSOH
ZDV WR LQYHVWLJDWH ZKHWKHU WK
7DUODQ VQFXPEHWLRQ RI¿WKHPDLSQW
VFDOH ,67($ DOVR VRXJKW WR HQF
Q QHZ JURXSV W\SLFDOO\ H[FXGHV
regimes. In addition to their size, L.A. and Chicago were
selected because they represent contrasting urban political
dynamics. L.A. is traditionally regarded as having a very
fragmented urban and regional politics, while Chicago's
active business and civic community and centralized

This policy network was constructed with the aim
of analyzing the power dynamics inside this bureaucracy
under different mayors with different political inclinations.
The study focused on the differences between right-wing
and left wing parties, since this is a policy area traditionally

SROLWLFDO UHJLPH PDNH LW DQ H[
Q ZLWK JURXSV DFWLYH LQ
DVVRFLDWHG ZLWK WKH ULJKW and lower level policy making. 6m R 3DXOR
UHODWLRQV DPRQJ GLIIHUHQW JURXSV PLRV VWKXF WX EUHG LQ LQWHUV YWKZ
broader political environment (political parties, othe in Los Angeles region and his 205 with 150 groups or
SXEOLF DJHQFLHV DQG SULYD active in the Chicago region. During these interviews,
public works were investigated. The analysis found that groups were shown a list of organizations involved in
this policy community is characterized by the importance transportation issues and asked to "check every name on
of personal ties among state actors and between state the list that your organization has worked with as part
DQG SULYDWH VHFWRU DFWRU of its transportation work." A follow-up question then
LQIUDVWUXFWXUH SROLF\ QHWZ asked respondents to indicate which of these groups they
GHQVH DQG FRPSOH[RYHU WL had worked with "closely." The questions were intended
LQWHUFRQQHFWHG SHRSOH SUH to capture the difference between "weak" and "strong"
SHRSOH LQ WKH DGPLQLVWUD network ties.
0DUTXHV IRXQG D KHJHPR
policy across this period, which was stable even during The study found that ISTEA h
WKH WZR OHIW ZLQJ DGPLQLV creation of new groups and that these groups brought
despite their attempts to change the power dynamics new perspectives to the urban and regional transportation
this policy domain by introducing new players into the policy process. It was also found that these groups were
policy network. These new actors, however, failed to engaged in active networking within their regions. The
displace or break the hold of the hegemonic group. interviews, however, also indicated that the groups

felt that they were still not fully included in a planning process now dominated by the Metropolitan Planning

the analysis that follows, we attempt to normalize our measures where possible.

2 U J D Q L] D W L R Q V   0 3 2 V   D O V R   F U H D W H G   E \   , 6 7 ($ 2 I   W K H   W Z R

cities, Chicago groups were more successful in getting

7 K H   5 L F K   & O X E   & R H I ¿ F L H Q W

their MPO to be responsive to their input.

When we look at the distribution of the rich-club

5. Comparison of the Networks

F R H I ¿ F L H Q W   D V   D   I X Q F W L R Q   R I   G H

we can see that all the policy networks show a rich-club

$ V   L Q G L F D W H G   L Q   7 D E O H   W K D W   S R O L F \   Q H W Z R U N V   V W D U   K R X   D Q

V L J Q L ¿ F D Q W O \   D F U R V V   W K H   W K H   J H Q H U D O   W L H   F R U U L F K   K H Q R V G R V   3 D U X H O R V K R Z

Q H W Z R U N V   D U H   P X F K   O D U J H U   W P X F D Q   V O K O H U   J 8 H V   Q K D V Z R W N M   E X H X U D J

D O V R   P X F K   V S D U V H U   H J   O H V   V K R Z   W K D W   W K H   S H R S O H   Z L W K   W K H   K L J K H V W   G H J U H H   D U H   D O V R

declines as networks become larger, this is not surprising interconnected with each other--the higher the degree, the

As the comparison of the "strong" and "weak" tie networks U H D W H U   W K H   U L F K   F O X E   F R H I ¿ F L H Q

L Q   & K L F D J R   D Q G   / $ V X J J H V W V   G H Q V L W \   L V   D O V R   D   U H À H F W L R Q

of the kinds of social relations elicited by interviews and

surveys. If you ask people to specify only the people they

Z R U N   Z L W K   F O R V H O \   ³ V W U R Q J   W L H V ´   W K H Q   \ R X   Z L O O   J H Q H U D W H

a sparser network than if you ask them whom they have

Z R U N H G   Z L W K   ³ Z H D N   W L H V ´   7 K H   G L I I H U H Q F H   E H W Z H H Q   W K H

Q H W Z R U N V   L Q G L F D W H   W K D W   L W   L V   L P S R U W D Q W   W R   H [H U F L V H   F D X V

when making comparisons, since many network measures

are sensitive to the size and density of the network. In

Table 1   ' H J U H H   & O X V W H U L Q J   D Q G   0 L [L Q J   3 U R S H U W L H V

Dataset	Density	Number of Nodes	Number of Ties	Average Degree	Maximal Degree	Shortest Path Length Between Nodes	Clustering & R H I ¿ F L H Q W	Assortative & R H I ¿ F L H Q W
São Paulo								
Reynaldo	0.030			5.3	42			-0.23
Covas	0.028					3.23		
Janio	0.024					3.32		
Erundina			584					
Maluf	0.028					3.24		
Pitta	0.028	204				3.25	0.305	
Chicago								
Chicago – Weak	0.403	35	240					
& K L F D J R ± 6 W U R Q J		33		3.82				
Los Angeles								
LA – Weak								
/ $ ± 6 W U R Q J		38		5.42				

0 , 6 6 , 1 *   ) 2 2 7 1 2 7 (

Figure 1   5LFK &OXE &RHI¿FLHQW DV D)XQFWLRQ RI 'HJUHH

Figure 3   'HJUHH GLVWULEXWLRQ 6mR 3DROR QHWZRUN

5.2 Mixing Properties

7DEOH DOVR VKRZV WKH ¿Q
FRHI¿FLHQW DQG VHYHUDO ZLWK
WKH H[FHSWLRQ RI WKH /RV $QJHOHV VWURQJ WLH
WKH QHWZRUNV DUH GLVDVVRUWDWLYH LQ XUEDW
nodes with dissimilar degree tend to be connected to each
other, i.e. well-connected nodes tend to be connected
to poorly-connected nodes and vice-versa (Zhou and
0RQGUDJyQ &ROL]]D HW DO   D
Paulo, it is interesting to note that the Reynaldo regime
WKH PRVW GLVDVVRUWDWLYH FRQQHFWHG
ZLWK 0DUTXHV¶V ¿QGLQJ WKDW
established during this administration. The disassortative
FRHI¿FLHQWV KRZHYHU DUH
GLIIHUHQW DGPLQLVWUDWLRQV
LGHRORJLFDO LQFOLQDWLRQ 7KH
argument that the hegemonic group, once established, is
TXLWH VWDEOH 0DUTXHV

5.3 Degree Distribution

:H FDQ DOVR FRQWUDVW WKH 6mR 3DXOR
WKH 86 QHWZRUNV E\ ORRNLQJ
these networks. The degree distribution is indicative
of a network's global connectivity, although different
SURSHUWLHV PL[LQJ SDWWHUQ PRUH
sharing the same degree distribution (Zhou and
0RQGUDJyQ   2QH LPSRUWDQW
distribution is a "power law" distribution, in which many
nodes have only a few links and a small number of nodes
have a very large number of links (Zhou and Mondragón

When we look at Figures 3, we see the degree
GLVWULEXWLRQV DSSUR[LPDWH D SRZHU
few nodes with a large number of connections, but most
nodes have few connections. Compared with the Chicago
DQG /$ QHWZRUNV)LJXUH
more closely resemble a power law distribution.

6. Analysis

Four bases of comparison are presented by our three
XUEDQ SROLF\ QHWZRUNV 7KH
WR H[DPLQH UHJLPH OHYHO SUR
different municipal administrations. The Chicago and
Los Angeles data allow us to compare policy network
regimes in two different American cities, while holding

policy sector constant. The Chicago and Los Angeles
data also allows us to compare weak and strong tie
QHWZRUNV ZLWKLQ HDFK FLW\ DQG WR VRPH GHJUHH WR GUDZ
With generalizations about the character of weak and strong
WLHV LQ EURRWLRQJ FLWLHV LQ WZR GLIIHUHQW
WDWLJLYHLD XUEDW KLSR PLHFLQQH WZ WKH
networks.

All three policy networks show some tendencies
towards oligarchical organization. All of them demonstrate
a "rich-club" organization, where the best-connected
individuals or organizations are connected to other well-
FRQQHFWHG LQGLYLGXDOV :LWK WKH H[FHSWLRQ RI WKH
Los Angeles strong tie network, however, all the networks
are disassortative, meaning that the well-connected are
also connected to the less well-connected. This is to be
H[SHFWHG LQ WKRVH FDQ DQ RU RLOLQJ OFK LV FRQQHWWKH
collectively intermediate the social network as a whole.
While all these networks may have oligarchical tendencies,
WKH 6mR 3DXOR QHWZRUNV DUH PRUH
HLWKHU RI WKH $PHULFDQ QHWZRUN
are more disassortative than the American networks,
particularly the strong tie networks. This means that
6mR 3DXOR HOLWHV ZLWK WKURQW
network, while elites in the American networks are less
EURDG EDVHG 7R VRPH GHJUHH WK
the concept of oligarchy we have embraced. Is a regime
PRUH OLNHO\ EO LJQRU GLE DOO QLHVVZRUH
organize the broader network or ignore it? In the
ODWWHU W\SHQ RU DGGLWHLR WKH IRUP
consider whether the latter case also represents a form
of oligarchy. The fact that the strong tie networks in the
American cities are less disassortative than the weak tie
networks suggest that when it comes to the closest ties,
the American networks are more clubbish.

7KHUH LV DQRWKHU PRUH LPSRUWDQW UHDVRQ KRZHYHU
question the oligarchical qualities of the American
networks. The well-structured power law distribution
RI WKH 6mR 3DXOR QHWZRUNV LQGL
"inner circle" that monopolizes most of the network. By
contrast, in the American cities, this "inner circle" is not
well differentiated. In the weak tie networks, in particular,
a rather large group of institutions are well-connected,
suggesting more of a pluralist than an oligarchical regime.
In other words, there are well-connected organizations, but
no small group of elites that monopolizes ties. The strong
tie networks appear closer to power law distributions,
suggesting a more distinct elite. But even these networks
do not differentiate between a small well-connected elite

 (DFK RI WKH 6mR 3DXOR QHWZRUNV FRQWDLQV PXOWLSOH FRPSRQHQWV ,Q WKH
WKH ODUJHVW FRPSRQHQW LQ D QHWZRUN 7KH JLDQW FRPSRQHQW FRQWDLQV PR
entire networks.

and a less well-connected periphery.

2 X U   D Q D O \ V L V   F R Q F O X G H V
networks come much closer to being oligarchies than
the American networks. While the American networks
have some oligarchical tendencies, they ultimately
appear more pluralistic. Well-connected organizations
in the American networks are clubbish, but the analysis
does not suggest that this elite is very well differentiated
: L W K R X W   V W X G \ L Q J   R W K H U   % U D
W R   F R Q ¿ G H Q W O \   F R Q F O X G H   W
national differences in urban policy networks. But the
contrast suggests that this is a distinct possibility. One
thing that is clear from the data, however, is that the
Brazilian oligarchy appears to be stable across municipal
administrations, a point that reinforces the argument
P D G H   E \   0 D U T X H V   D E R X W
political parties were in charge during these different
D G P L Q L V W U D W L R Q V   V R   L W   L V   6
is a sharp disjuncture in the distribution of the rich-club
F R H I ¿ F L H Q W   D W   K L J K H U   G H J U H H
D G P L Q L V W U D W L R Q   & R Y D V   W K D W
to destabilize the oligarchy. But the distribution returns to
W K H   S U L R U   S D W W H U Q   X Q G H U   W
(U X Q G L Q D

The contrast between Chicago and Los Angeles
was less striking than we anticipated, though in the
H [S H F W H G   G L U H F W L R Q $ V   P H Q
to be a civically fragmented city, while Chicago has a
reputation for more civic cohesion. The distribution of
W K H   U L F K   F O X E   F R H I ¿ F L H Q W
V L P L O D U   L Q   E R W K   F L W L H V   W K
linked to one another. The Los Angeles networks are less
disassociative than the Chicago networks, suggesting
that that the well-connected organizations in Los Angeles
are less well-connected to the wider network. This could
be one indicator of greater fragmentation in the Los
Angeles networks. For the strong tie networks, Chicago
also appears somewhat closer to a power law distribution
(many organizations with few ties; a few organizations
Z L W K   P D Q \   W L H V   W K D Q   W K H   / R
Angeles, many organizations have a medium range of
ties. Our conclusion is that there is a less distinctive elite
in Los Angeles. For the weak tie networks, however, this
contrast is less clear.

7. Conclusion

The concept of oligarchy has an illustrious history in
the social sciences, but is only weakly developed as
an analytical concept. Though it is not uncommon to
hear the word used to describe political and economic
regimes in organizations, social movements, and nations,

the precise meaning of the concept is often suggestive
rather than precise. In this paper, we provide a structural
analysis of the concept based on social network analysis.
Building on the classic treatment of oligarchy by
Michels, we begin with a conception of oligarchy as a
social structure organized and dominated by a small
inner circle of prominent actors tightly interconnected
among themselves. These "oligarchs" are linked to less
G R P L Q D Q W   D F W R U V   L Q   W K H   Q H W Z R U N   who are only weakly
L Q W H U F R Q Q H F W H G   D P R Q J   W K H P V H O Y H V   The power of an
oligarchy lies in the cohesion of the oligarchs, their ability
to organize less prominent actors, and the weakness of
these less prominent actors to organize themselves.
Our main contribution is to operationalize this idea using
a "rich club" approach. The social network concept of a
"rich-club" captures the idea that well-connected actors
K L J K   G H J U H H   D U H   D O V R   F R Q Q H F
W K H L U   P L Q L Q J   L Q V S L U H V   W K H V H   D E L D   L U L V
whether well-connected actors are only connected to
H D F K   R W K H U   L Q   W K H L U   V ¿ R U W D O O \   L Y H W \   Z R L Q J W
G L V S D U R E O H   O D W H L Y H F W L Y L Q   D O O
Q H W Z R U N   ¿ W V   D   S R Z H U   O D Z   G L V W U
W K H   J Q H [P D O Q W   Z E O Q R   U D G   R L Q L R Q V   G D W H
whether the inner-circle is a small or large group relative
to the size of the network.
: H   G H P R Q V W U D W H   W K H   H I ¿ F D F \
analyzing and comparing several urban networks. Our
D Q D O \ V L V   R I   6 m R   3 D X O R   & K L F D J R
that policy networks have oligarchical tendencies, in the
Sense that well-connected actors in all three cities tend
W R   Z H O O   F R Q Q H F W H G   W R   E H   K H V W U R Q O
Paulo networks, the weak tie networks in Chicago and
Los Angeles, and the Chicago strong tie network are
also disassortative, meaning that the well-connected
actors are connected to less well-connected actors.
R Z H Y H U   R Q O \   W K H   6 m R   3 D X O R   Q H
clear power law distribution, indicating a small coterie
R I   Z H O O   F R Q Q H F W H G   D F W R U V   : H   F R
networks come closest to being oligarchical regimes,
while the Chicago and Los Angeles networks are more
pluralist. Remarkably, the oligarchical structure of the
6 m R   3 D X O R   Q H W Z R U N V   L V   V W D E O H
administrations, suggesting that oligarchy, once formed,
may be a robust form of political organization.

References

$ U E H V P D Q   6   D Q G   & K U L V W D N L V   1
, Q V X O D U L W \   D   1 H Z   0 H D V X U H
E H W Z H H Q   & H Q W U D   Connections   1 H W

Acemoglu, D. ... Oligarchic ... versus S. Democratic ... and Cole ... Societi ... Journal of the European Economic Union Democracy: The Internal Politics of the Association International Typographical Union. New York: The Free Press.

Amaral, L. A. N. ... Guimera, R. ... networks: Lies, damn lies and ... Nature ... statistics. ... and Schutz ... Physics ... Core and Periphery Stru...

Barbasi, A. L. and Reka, A. ... The Emergence of Scaling in Random Networks. Science ... Marques, E. and Bichir, R. ... Inv...

Bichir, R. ... Investimentos ... no ... governo federal e suas ... permeabilidade ... porte no município de São Paulo. Paulo Paço Imbuia Debates, Ano XVII, In Marques, E. and Torres, H. (eds.) São Paulo: segregação, pobreza e desigualdade sociais. Marques, E. Estado e redes sociais: Paulo Editora Senac. permeabilidade e coesão nas políticas urbanas no Rio de Janeiro. Rio de Janeiro, Rev...

Borgatti, S. and Everett, M. ... Marques, E. Redes Sociais, instituições e atores Periphery ... Social Networks. políticos no governo da cidade de São Paulo

Borgatti, S. P. Everett, M. G. and São Paulo: Annablume Freeman, L. C. ... Ucinet for Windows: Software for Social Network Marques, E. ... ³Social Networks, the Analysis. Harvard, MA. Analytic Technologies. Kinship System and Conjugal Family. Journal of

Breiger, R. L. ... Toward an ... Op... Revista Brasileira de Ciências Sociais Vol. Community. Eliquity ... Quality&Quantity ... tures ... Special Edition ... Al... http://www.centrodametropole.org...

Burt, R. Brokerage and closure: An introduction html#nome to social capital. Oxford University. Marques, E. ... Public policies, Cole, R. ... Weiss, M. ... Identifying networks in Brazilian urban policies Latin influential... Methods ... and American Research Review... linking social network data. Connections. McAuley, J. J. da Fortunato. Costa...

Colizza, V. Flammini, A. Serrano, M. A. and Athe, V. Reshgnaluni, Phenom... A. ... Detecting Rich Club... Ordering in networks... Applied Physics archite... Complex Networks. Nature Physics. Letters.

Dahl, R. Who Governs: Democracy and Mills, C. W. The Power Elite. Oxford. Oxford Power in an American City. New Haven. Yale University Press. University. Mizruchi, M. S. ... What do Interlocking

Domhoff, G. W. ... Who Rules America... Analysis, Critique, and Assessment of Research Cliffs, NJ. Prentice Hall. on Interlocking Directorates. Annual Review of

Everett, M. G. and Borgatti, S. P. Sociology. Peripheries of Cohesive Subsets. Social Networks. Newman, M. E. ... Detecting com...

Everett, M. G. and Borgatti, S. in networks. The European Physical Journal Clique Overlap. Connections. B-Condensed Matter and Complex Systems,

Gould, R. V. Fernandez, R. M. ... Structures of mediation: A formal app... Newman, M. to E. brokerage Detecting in transaction networks. Sociological methodology. community structure in networks. Physical Review Letters.

Mondragón, R. and S. Zhou. Guriev, S. and Rachinsky, A. with The hierarchy hierarchical roots of rich European coef... Oligarchs in Russian Capitalism. Journal of Physical Journal B: Condensed Matter and Economic Perspectives. Complex Systems

Hunter, F. Community Power Structure: A Obstfeld, D. ... Social networks, Study of Decision Makers. orientation, and involvement in innovation.

Leach, D. K. ... The Iron Law of Administrative Science quarterly. Conceptualizing Oligarchy Across Organizational Forms. Sociological Theory. Opsahl, T., V. Colizza, P. Panzarassa and J. J. Ramasco.

3URPLQHQFH DQG &RQWURO 7KH :HLJKWHG
Rich-Club Effect.Physical Review Letters

3ROVE\ 1 : +RZ WR 6WXG\ &RPPXQLW\ 3RZHU
The Pluralist Alternative.The Journal of Politics,

6LPPHO *The Sociology of Georg Simmel.6LPRQ
DQG 6FKXVWHU

6WRYHO . 6KDZ / Annual ReviewVRNHUDJH
of Sociology,

9RVV . DQG 6KHUPDQ 5 %UHDNLQJ WKH ,URQ
/DZ RI 2OLJDUFK\ 8QLRQ 5HYLWDOL]DWLRQ LQ WKH
American Labor Movement.The American
Journal of Sociology

:DVVHUPDQ 6 DQG)DXVW .Social Network
Analysis: Methods and Application &DPEULGJH
&DPEULGJH 8QLYHUVLW\ 3UHVV

:DWWV 'XQFDQSmall Worlds: The Dynamics of
Networks Between Order and Randomness.
3ULQFHWRQ 3ULQFHWRQ 8QLYHUVLW\ 3UHVV

:HLU 0 5RQJHUXGH - DQG $QVHOO &
&ROODERUDWLRQ LV QRW HQRXJK 9LUWXRXV &\FOHV RI
Reform in Transportation Policy.Urban Affairs
Review

=KRX 6 DQG 0RQGUDJyQ 5 7KH 5LFK &OXE
Phenomenon in the Internet Topology.IEEE
Communications Letters

=KRX 6 DQG 0RQGUDJyQ 5 E 5HGXQGDQF\ DQG
UREXVWQHVV RI WKH $6 OHYHO ,QWHUQHW WRSRORJ\ DQG
its models.IEE Electronic Letters

=KRX 6 DQG 0RQGUDJyQ 5 6WUXFWXUDO FRQVWUDLQWV
LQ FRPSOH[QHWZRUNVNew Journal of Physics

=KRX 6 :K\ WKH ,QWHUQHW LV VR µVPDOO¶"