**A Network Analysis of Political Patronage and Promotion**

**in the Chinese Bureaucracy**

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Abstract

I apply cutting-edge network analysis and machine learning techniques to study the impact of patronage network on political promotion in autocratic regimes, using a newly available large biographical database that contains extensive demographic and career information of over 4,000 key city, provincial and national leaders in China since late 1990s. I find that career outcome of political leaders in China is largely determined by patronage networks formed very early in career, mostly even before one gets promoted to municipality head. Specifically, using patronage network information only up until 2005, I am able to predict ten years later in 2015, theses leaders’ career outcome with high accuracies both in-sample and out-of-sample.

Technically, I use home origins, overlapping work/school experience, and sub-national personnel appointment information to map out the existence, direction, and strength of patron-client links. I treat officials as nodes and patron-client links as edges to build a SNAP graph of 4,057 nodes and 655,769 directed, weighted edges. Next, I apply Node2Vec, Random Walks, Node Influence, Spectral Clustering and Network Centrality methods to extract and transform local and global node features into numerical vector representations. I then train and compare OLS, Logit, Random Forests, SVMs, and neural nets models in predicting political promotions ten years later. I check against null models and cross validate to ensure model robustness and avoid overfitting.

To the best of our knowledge, I present the first application of network analysis methods to examine large-scale patronage relationships among middle level politicians in an autocratic regime. My novel finding speaks directly to the long-run scholarly debate about determinants of promotion in autocracy and goes beyond qualitatively arguing that patronage networks matter to quantitatively demonstrate how and when they matter and matter most. My innovative application may also inform future use of network analysis in examining political data in a variety of contexts for descriptive, causal, and predictive inferences.