

SMALL FINANCIAL WORLD

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INTRODUCTION

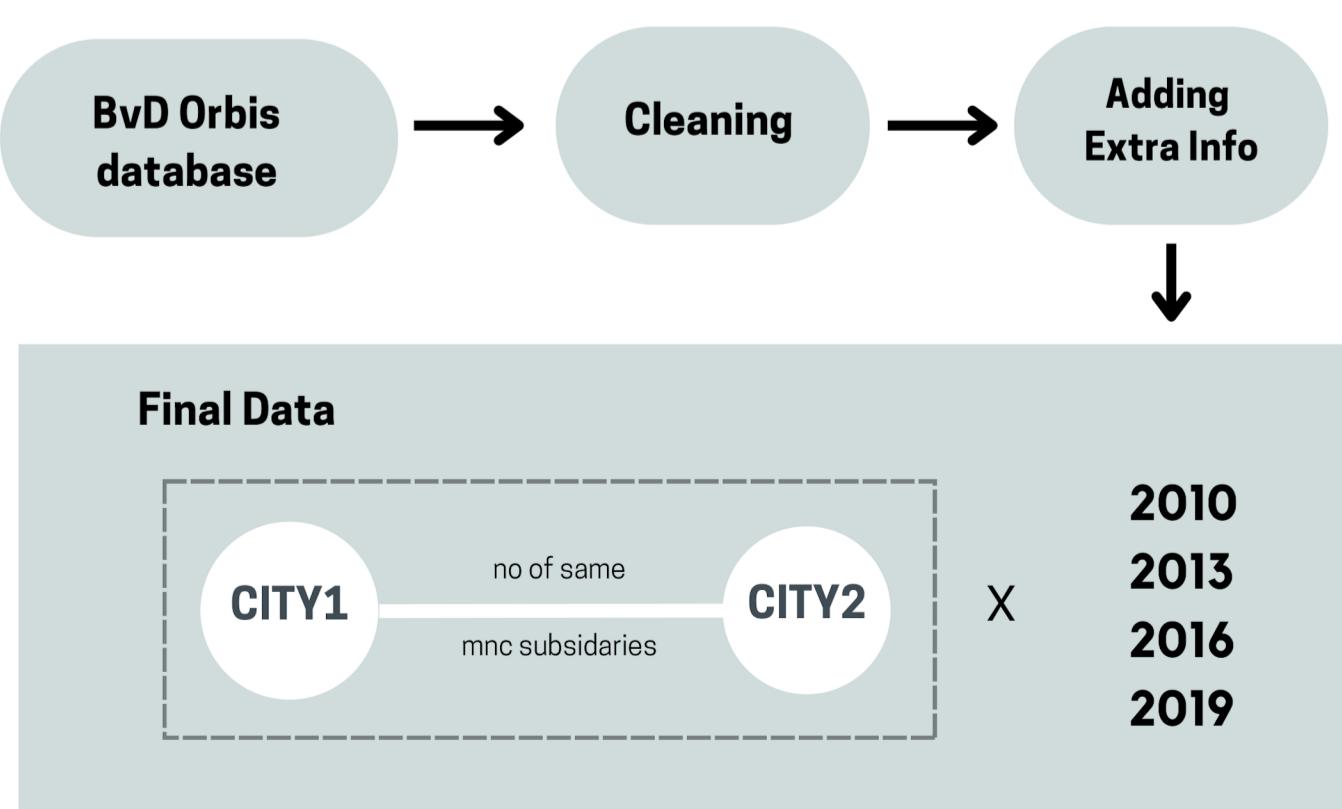
Globalization has drawn countries together through political, economic, and social links. MNCs have advanced this process of connecting cities and countries in a dense global network by integrating markets into the global economy. When hosting a subsidiary of the same MNC in two cities, resources, cash, and information must be shared to strengthen ties. This means that two cities with more mutual MNC branches are strongly linked. These subsidiaries and their links support the financial development of these cities, creating a financial tiny globe. Thus, this study report examined the cities, specifically the Large Urban Areas that have dominated the global economy and financial sector and how they changed over time.

OBJECTIVES

Understand the financial world created by MNCs and its change over the period of time

Make use of the metrics to understand the cities with the most central position and strongest ties, and the geographical exploration of cities with shared MNC subsidiaries globally and their change over time.

METHODOLOGY



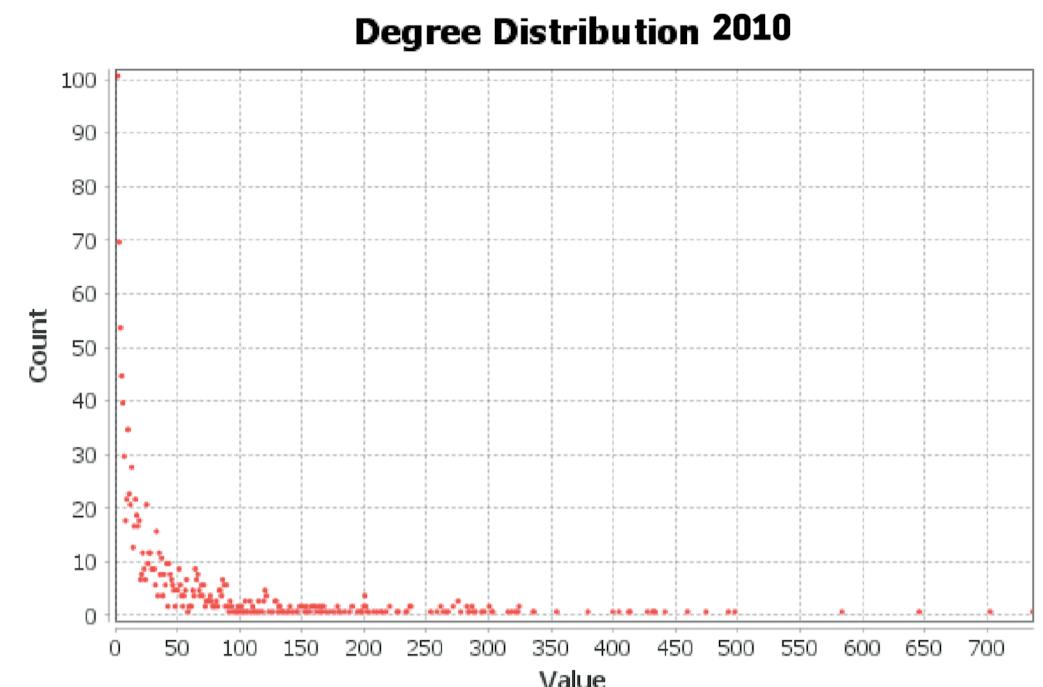
UNDERSTANDING THE NETWORK

All 4 networks had the following property in common. The network's edges, nodes, and average degree increase. Small-world networks have a short average path length, which is similar to our network is highly interconnected and has a shorter distance between nodes. This power law distribution occurs in other years.

The **Barabási-Albert model**, which generates complex networks, has these properties.

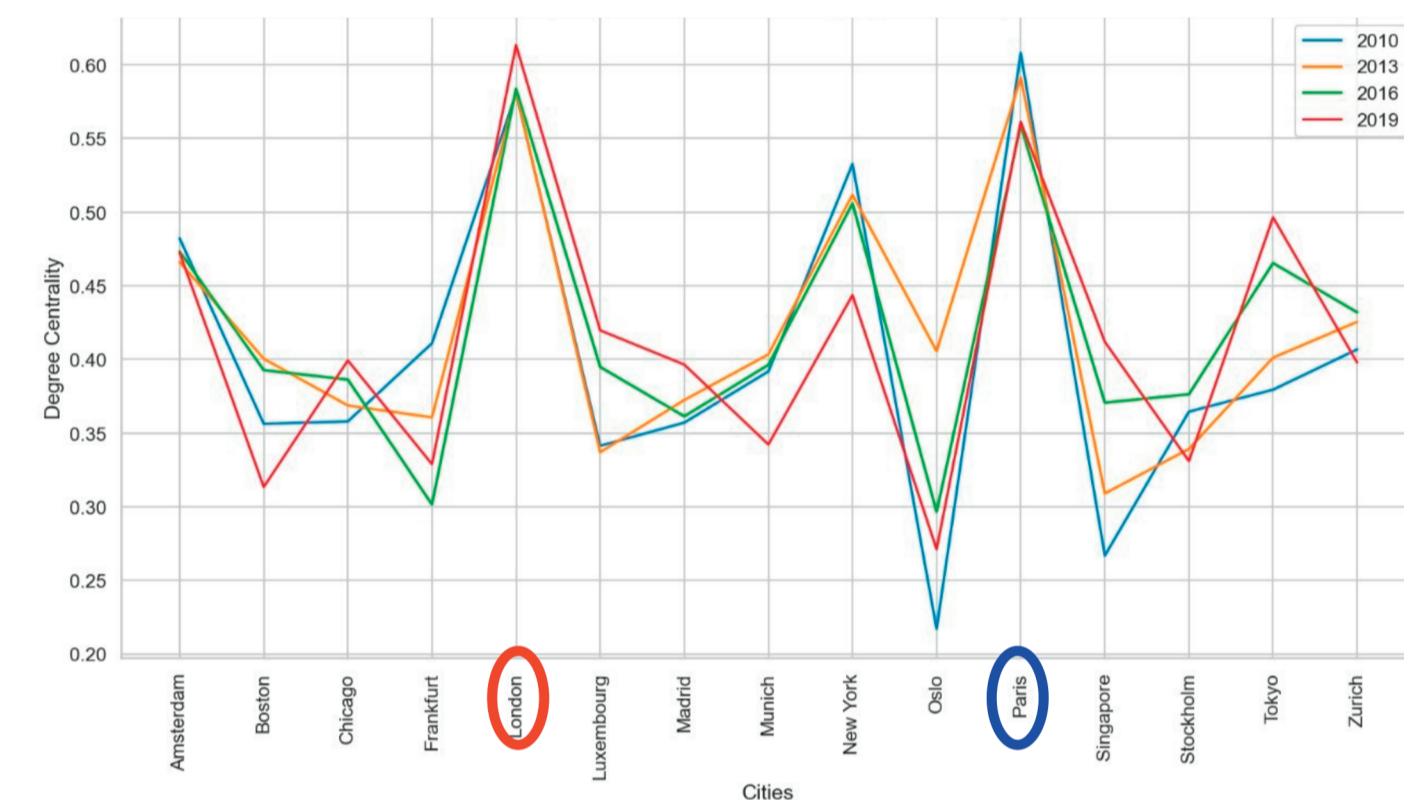
MNCs created a small-world financial network with high clustering and connectivity

Property	2010	2013	2016	2019
Nodes	1210	1358	1406	1423
Edges	31545	39560	48344	52953
Average Degree	52.14	58.262	68.768	74.424
Density	0.043	0.043	0.049	0.052
APL	2.288	2.268	2.264	2.245
Avg CC	0.707	0.72	0.712	0.704

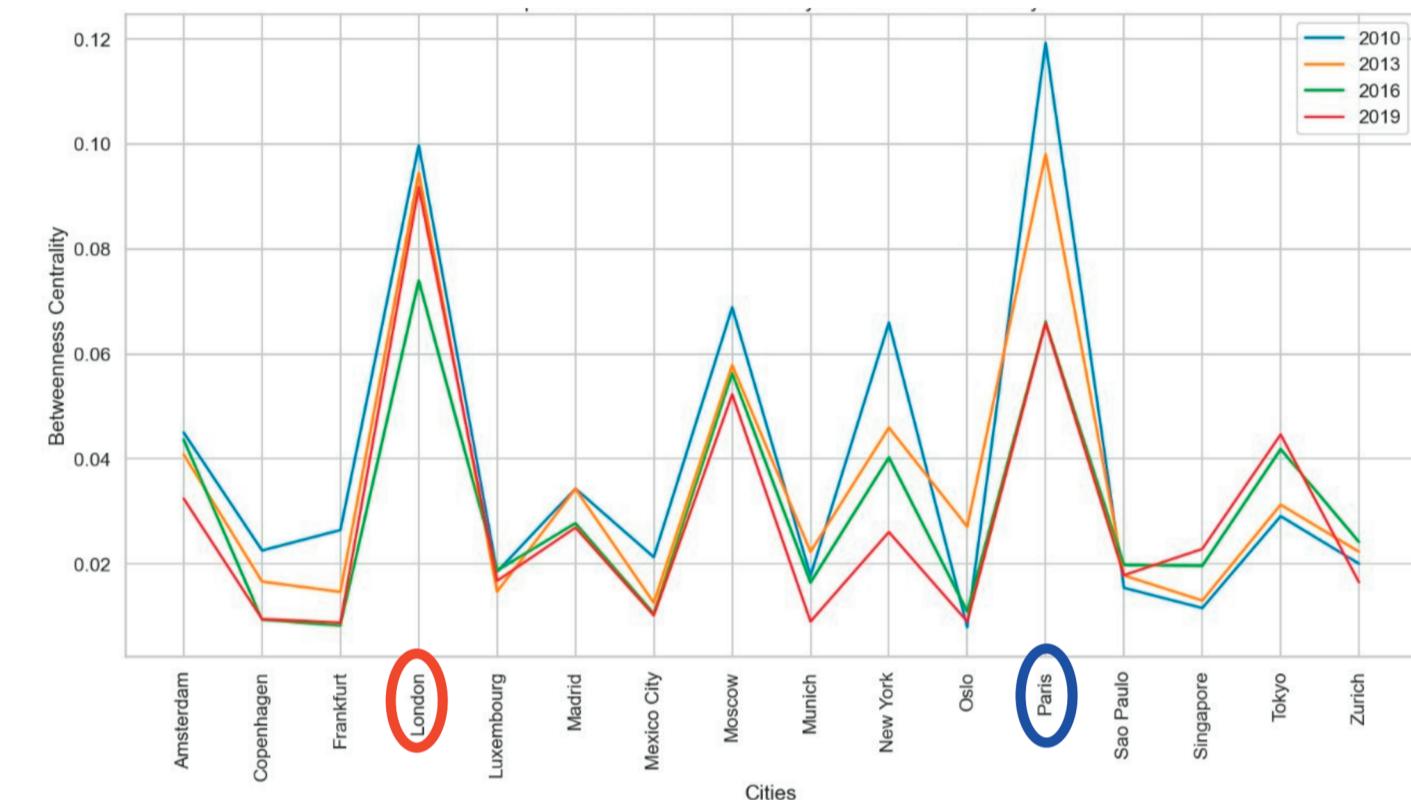


CENTRAL CITIES

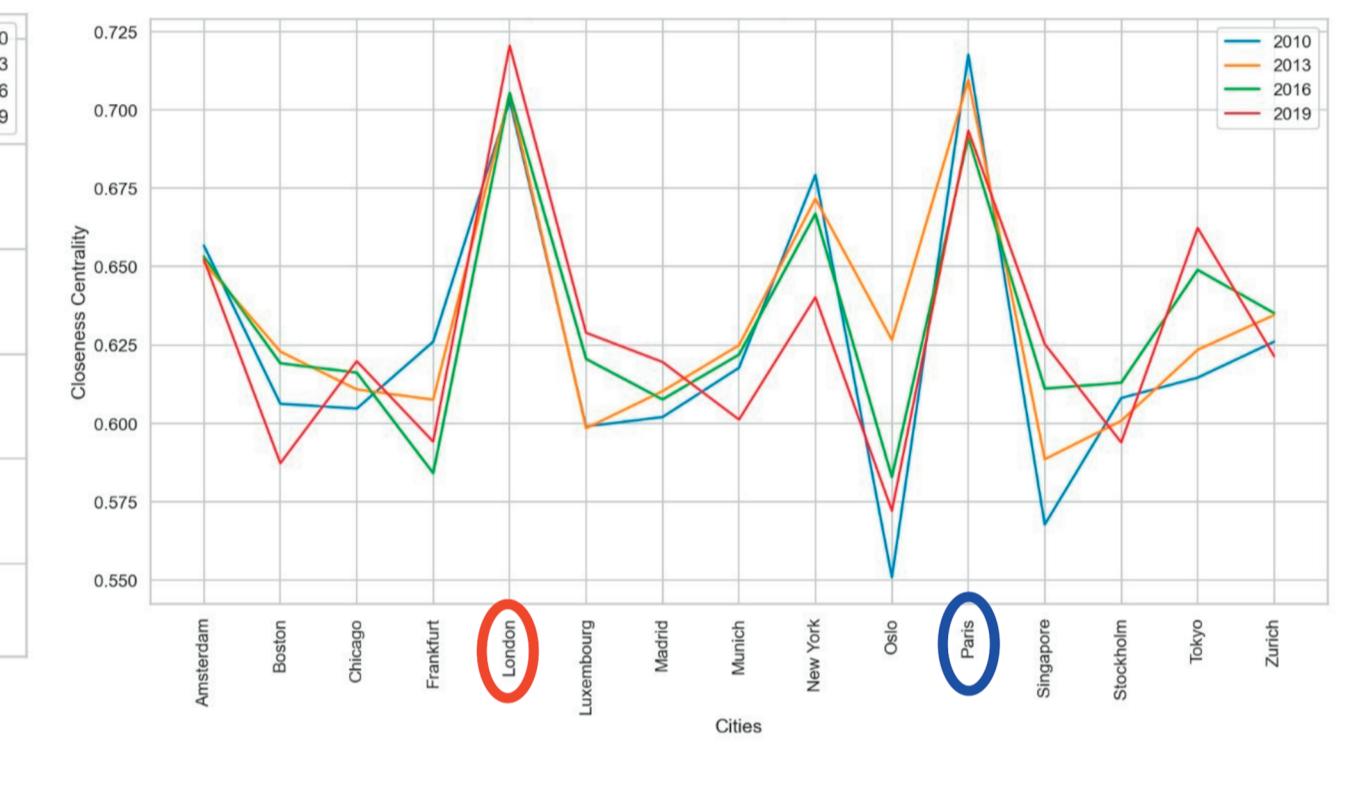
Degree Centrality



Betweenness Centrality

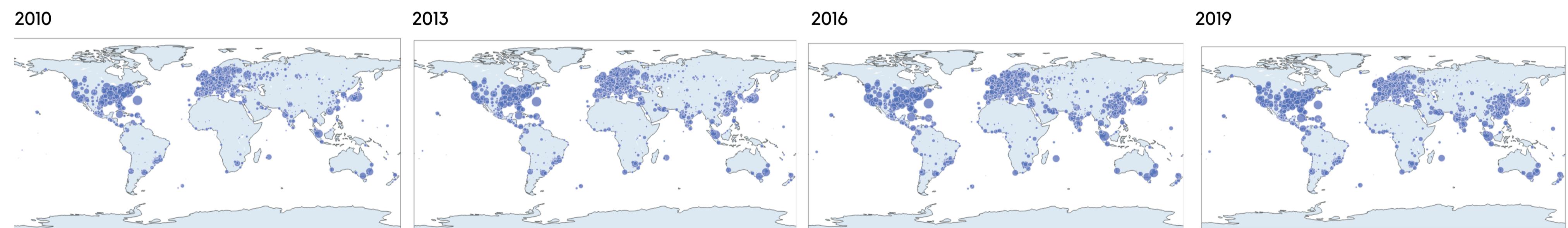


Closeness Centrality



We used different centrality measures to get the most central cities. **Paris** stayed the most dominant in 2010 and 2013. However, the centralities change over time. According to the network of 2016 and 2019, **London** enjoys the most central position

THE FINANCIAL WORLD MAP



Southern and Eastern Asia have changed. Delhi, India, increased from 127 MNC subsidiaries in 2010 to 301 in 2019. Shanghai's shared MNC subsidiaries rose from 127 in 2010 to 419 in 2016. MNC subsidiaries helped many other cities in this region join the global economy. In this financial small world, Europe has many cities with high degrees that participate in the global economy. Europe and North America have the most cities with MNC subsidiaries. South Africa and South America have seen some growth in cities with MNC subsidiaries, but most of the region has remained relatively stable from 2010 to 2016.

OTHER FINDINGS

According to the study of strongest edge between two cities that depict the highest number of shared MNC subsidiaries, there were some interesting findings. In year 2010, Tokyo and Osaka shared the strongest edge of 4628.0. In 2013, the maximum shared MNC subsidiaries were between London and New York of value 4471.0. New York and Wilmington DE shared the highest number of MNC subsidiaries for both the year 2016 and the year 2019, with an edge weight of 13625.0 and 13432.2 respectively. It can be noticed that apart from 2013, in all other years a pattern can be seen. The two cities with the highest share of mutual MNC subsidiaries belong to the same country, Japan in 2010's case and the United States in 2016 and 2019's case. This might be due to favorable financial compatibility owing to similar legal, social, political, and economic conditions. This also shows how in the larger picture the strongest connection in the network between to cities is benefitting the same country, and its role in the global economy.