

# Uneven Geographies of Financial Control: Financialization as the New Regime of Property Relations

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## **Abstract:**

### 1. Introduction

Financialization is a term used to broadly describe the rising importance of finance in the global economy and society at large (Epstein, 2005). In the United States, one of the primary characteristics of the post-1980 financial turn has been the rising share of corporate profits accrued by the US financial sector (Krippner, 2005). This led to the conceptualization of financialization as a new regime of accumulation where profits increasingly accrue through financial rather than productive channels (ibid). By examining the primary profit-generating activities performed by the US financial sector as a whole and the composition of its income sources and assets, in my Master's thesis (Gibadullina, 2020) I demonstrated that the increased profitability of US finance can largely be attributed to a transition from credit intermediation (i.e. lending) to the management and ownership of capital. By showing how the share of US capital directly owned and managed by US financial firms has grown from 3 percent in 1945 to at least 62 percent in 2018, I proposed that financialization in the United States should be primarily understood as a new regime of property relations, in which the class of financiers have established themselves as the direct owners of the means of production, having at their discretion ultimate control over the US economy by way of collectively holding the most shares by far in American corporations.

This **analysis project** extends on the research conducted during my Master's by examining two main questions. First, I want to explore the extent to which financiers have established themselves as the new, dominant owners of capital in other countries or whether financialization as a new regime of property relations has been a US-only phenomenon. Secondly, I want to visualize the global dominance of American financial firms in this global corporate ownership network. The empirical analysis for this project will involve examining 6.4 million ownership ties of 2.9 million firms around world from 2018 that add up to \$114.4 trillion in owned equity (this dataset was obtained through the Orbis database). This project aims to expose a staggering consolidation of power obtained by the US financial sector through a series of static and interactive visualizations

and advance our understanding of the influence exerted by American finance in the global economy, contributing to the literatures of financialization, corporate networks, and geographies of advanced producer services. Visualizations will be developed primarily using R (e.g. a package for network visualization *ggraph*, a data visualization package *ggplot2*, an interactive graphing library *plotly*, and a package for creating web applications *shiny*). In cases when it would be impossible to make interactive network visualizations in R, I will use *D3* (a JavaScript library for visualizing data). Developed visualizations and analysis will be incorporated in an academic paper that will be submitted to the *Annals of the American Association of Geographers* (I am the end-user for this project).

**Part 1:** As much of our current understanding of financialization processes has been shaped by the scholarship emanating from either the United States or the United Kingdom, there is a notable lack of comparative studies in this scholarship.<sup>1</sup> The first objective of this project is to develop national estimates of the extent to which corporate ownership and corporate control have become financialized within each nation by measuring the share of national capital that is owned and controlled by domestic financial firms. This will be accomplished by aggregating corporate ownership ties between individual firms at the level of national industries (i.e. industries within each country).

**Part 2:** My second goal is to illustrate the global dominance of American financial firms in this corporate ownership network. As shown in the analysis of the global network of corporate control conducted by Vitali et al. (2011), the corporate ownership structure of 43,000 multinational corporations is highly concentrated with forty-five predominately British and American financial firms exerting control over a third of the (mostly non-financial) multinational corporations. Relying on my Orbis dataset, I will develop spatially sensitive network visualizations that will show the transnational interdependencies of the global corporate network and the patterns of extraction and unequal exchange relations that permeate it.

This project was a couple of years in the making. Having read the very influential and highly cited study by Vitali et al. (2011) as an undergraduate finance major, I wanted to further understand the influence that financial firms had in these networks and the power and control they were able to exert through their direct and indirect corporate ownership ties.<sup>2</sup> Having completed my Master's degree in a Geography department, I wanted to combine a finance-centric data exploration with a geographically sensitive analysis of the global corporate network and its spatiality. To complete this project, I have received methodological training in social network analysis through the summer schools offered by the University of Oxford and the University of Manchester. Through coursework, I have also gained a broad and relatively in-depth understanding of exploratory data

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<sup>1</sup> A notable exception is a study by Karkowski et al. (2020) that developed a cross-country analysis of financialization processes (and their distinct characteristics) for seventeen OECD countries.

<sup>2</sup> I initially learned about this paper after watching this Ted talk [https://www.youtube.com/watch?v=vSSKpL87\\_Rs](https://www.youtube.com/watch?v=vSSKpL87_Rs)

analysis and statistical inference, as well as some training in cartographical methods. I acquired my corporate ownership dataset in March 2020.

## 2. Related Work

### 2.1 Global Corporate Networks and Geographies of Financialization

Following the 2008 global financial crisis and the much publicized collapse of Lehman Brothers that exposed how one of the largest US investment banks operated an opaque network of over a hundred highly specialized shell companies and subsidiaries in jurisdictions with little to no financial regulations (Fernandez and Wigger, 2017), interest in understanding the structure and operations of global corporate networks has grown exponentially among heterodox economics scholars. The literature on corporate networks has been proliferating over the past decade with research examining everything from the uses of Special Purpose Vehicles (SPV) for off-balance sheet financing (e.g. Haberly and Wojcik, 2017a; Lysandrou and Nesvetailova, 2015) to the studies of offshore tax havens (e.g. Aalbers, 2017; Fichtner, 2016; Zucman, 2015). Geographers played a particularly central role in these conversations, emphasizing how corporations use space to take advantage of the fragmented regulatory and tax landscape, and in the process of doing so end up both undermining the authority of their respective nation-states while also directly contributing to the highly unequal and uneven patterns of economic exchange.

Concurrently with the rising interest in corporate networks, the 2008 crisis has also contributed to the proliferation of research projects on financialization. While this literature covers a broad range of topics related to the increasing role played by finance in our contemporary world, French et al. (2011) have identified three main schools of thought: (1) macro-economic literature in the tradition of the French Regulation Theory that sees financialization as a new regime of accumulation which followed the Fordist regime of mass consumption/production, (2) institutional scholarship that emphasizes the rise of the shareholder-value and the consequent financialization of non-financial corporations, and (3) and the socio-cultural literature that examines the financialization of everyday life. My project aims to contribute to this literature by highlighting how the underlying economic transformation that directly contributed to these three distinct phenomena has been the rise of financiers as the new owners of capital in the United States.

### 2.2 Network Visualization

**To be added:** More related work in visualization is necessary. Include work aimed at similar problems and similar solutions to your own, even if they aren't directly applicable.

## 3. Data and Task Abstraction

### 3.1 Domain

This project aims to bridge the methodological gap between the literatures on financialization (e.g. Krippner, 2011, Boyer, 2000), corporate networks (e.g. Fichtner, 2016; Garcia-Bernardo et al., 2017; Peetz and Murray, 2012) and geographies of advanced producer services (e.g. Sassen, 1991; Taylor, 2003) by moving beyond the nation space as a container of financial activity in the post-Bretton Woods era and presenting financialization as a globally interconnected, variegated, and path dependent process happening within and between nation states and developed through the mutual entanglements in the global circuits of capital.

### 3.2 Data and Task Abstractions

#### 3.2.1 Database Description

I will be relying on the Orbis database, provided by Bureau van Dijk, which offers the most comprehensive co-ownership dataset of firms (both public and private) and state enterprises available to date, covering over 375 million entities around the world, and providing detailed financial and geographical information for each firm and quantifiable ownership ties between them. Although the data coverage is uneven with significantly less information available on firms located in the Global South (see Garcia-Bernardo and Takes, 2018), for each firm Orbis tries to provide basic information on firm's location and industry, financial information from firm's balance-sheets and income statements, as well as data on corporate ownership ties by listing everyone who owns a particular firm and everyone who a particular firm owns.

#### 3.2.2 Filtering Data to Create a Dataset

While Orbis advertises that it has some information on 375 million firms, in 2018 only 8.9 million firms had available information on total assets (a metric relevant to estimating the value of equity and quantifying each ownership tie in dollar terms). As often the case with financial data, the distribution of the "total assets" variable was highly skewed with a small number of firms accounting for a large share of total assets. I filtered my sample of firms based on the total assets variable, collecting information on all firms with at least \$1 million in total assets in 2018. My dataset features 2.9 million unique firms located in 202 countries. I estimate that cumulatively these 2.9 million firms account for 99% of total assets in the Orbis database. For each firm, I collected basic and financial information, as well as information on all of its shareholders (and their respective basic and financial information). My core list of 2.9 million firms has 6.4 million unique shareholders, featuring 6.7 million weighted ownership ties between them, totalling \$114.4 trillion in owned equity.<sup>3</sup> Information on the available data attributes can be seen in Table 1.

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<sup>3</sup> For comparison, at the end of 2018, the market capitalization of all publicly traded domestic firm was \$68.65 trillion (World Bank, 2020). Because Orbis features both publicly traded and privately owned firms, the total value of owned equity provided by Orbis is much higher than the market capitalization value. Additionally, since Orbis provides information on both consolidated

Table 1: Available data attributes

Data attributes	Type of data	Core set of 2.9 million firms	Set of 6.4 million shareholders
<b>Basic information</b>			
Name	Identifier variable	2.9m unique observations	6.4m unique observations
Orbis ID	Identifier variable		
Country	Categorical - Nominal	202 levels	
Consolidation Type	Categorical - Nominal	6 levels	
NACE Industry Classification	Categorical - Nominal	272 levels	
<b>Financial information</b>			
Total Assets 2018	Quantitative - Interval	Range from \$1.0 million to \$5.4 trillion	Range from \$0.001 million to \$5.4 trillion
Total Equity 2018	Quantitative - Interval	Range from \$0.001 million to \$1.2 trillion	
Operating Revenue 2018	Quantitative - Interval	Range from -\$14.8 billion to \$514 billion	
Net Income 2018	Quantitative - Interval	Range from -\$36.7 billion to \$111 billion	
Number of Employees 2018	Quantitative - Ratio	Range from 0 to 2.2 million	
<b>Ownership information</b>			
Name of Shareholder	Identifier variable	6.4m unique observations	N.A.
Orbis ID	Identifier variable		N.A.
Direct Ownership Tie 2018	Quantitative – Ratio	Range from 0% to 100%	N.A.
Direct Ownership Tie Latest	Quantitative – Ratio	Range from 0% to 100%	N.A.
Total Ownership Tie 2018	Quantitative – Ratio	Range from 0% to 100%	N.A.
Total Ownership Tie Latest	Quantitative – Ratio	Range from 0% to 100%	N.A.

and unconsolidated entities, adding the value of all known ownership ties is likely to be double-counting total equity of consolidated firms with many subsidiaries.

### 3.2.3 Deriving New Data Attributes

In order to conduct my analysis, I had to derive three new variables:

#### Sector

- NACE industrial classification includes 272 possible options
- My derived sector classifications include only 20 levels (one of them is finance)

#### Finance

- Finance = “Yes” if NACE Industry Classification  $\geq 6400$  and  $< 6700$ , Otherwise “No”

#### Ownership Tie (in \$)

- Ownership Tie 2018 = Max {Direct Ownership Tie 2018, Total Ownership Tie 2018}
- If Ownership Tie 2018 is missing value, Ownership Tie 2018 = Max {Direct Ownership Tie Latest, Total Ownership Tie Latest}
- If Sum(Ownership Tie 2018) for a firm  $> 100\%$ , proportionally decrease the value of each ownership tie: Ownership Tie 2018 = Ownership Tie 2018/Sum(Ownership Tie 2018) (this ensures that total ownership of any firm does not add up to more than 100%)
- Ownership Tie 2018 \$ = Total Equity 2018 \* Ownership Tie 2018

My derived dataset is composed of (1) the node attributes file where each node is represented by a unique firm, and each node has firm-specific information: Sector, Finance, and Country, and (2) the edge list file where edge weights measure the value of equity (in \$) of each unique firm (from the core list 2.9 million firms) owned by each unique shareholder (from the list of 6.4m shareholders). Information on the derived data attributes can be seen in Table 2.

Table 2: Derived data attributes at the level of firms

Data attributes	Type of data	Description
<b>Node Attributes</b>		
Name	Identifier Variable	6.6m unique observations
Orbis ID	Identifier Variable	6.6m unique observations
Sector	Categorical - Nominal	20 levels
Finance	Categorical - Nominal	2 levels: Yes or No
Country	Categorical - Nominal	202 levels
<b>Edge List</b>		
Source: Shareholder Orbis ID	Identifier Variable	6.4m unique observations
Target: Firm Orbis ID	Identifier Variable	2.9m unique observations
Weight: Ownership Tie 2018 \$	Quantitative - Interval	Range from \$0.001m to \$1.2tril
Edge Type	Categorical - Nominal	1 level: Directed

### 3.2.4 Aggregating Data at the Level of Countries and Industries

Given that it is next to impossible to properly visualize 6.6 million nodes with 6.7 million edges, I have aggregated information in the derived dataset (described in Table 2) at the level of countries and sectors (see Table 3). This aggregation will enable me to visualize the dominance of the domestic financial sector within each country as well as visualize the power of the US financial sector in the global corporate network.

Table 3: Derived data attributes at the level of countries and industries

Data attributes	Type of data	Description
<b>Node Attributes</b>		
Country Industry	Identifier Variable	4040 unique observations
Country	Categorical – Nominal	202 levels
Sector	Categorical – Nominal	20 levels
Finance	Categorical – Nominal	2 levels: Yes or No
<b>Edge List</b>		
Source: Country Industry	Identifier Variable	4040 unique observations
Target: Country Industry	Identifier Variable	4040 unique observations
Weight: Ownership Tie 2018 \$	Quantitative – Interval	Range from \$0.001m to \$1.2tril
Edge Type	Categorical – Nominal	1 level: Directed

### 3.2.5 Deriving New Data Attributes

For each country, I will estimate the national rate of financialization of corporate ownership by measuring the share of national capital (i.e. total equity) owned by the domestic financial sector.

National rate of financialization of corporate ownership for Country  $i$  =

$$\frac{\sum_{Country\ i, owned\ by\ finance} Ownership\ Tie\ 2018\ \$}{\sum_{Country\ i, All\ sectors} Ownership\ Tie\ 2018\ \$}$$

For each country, I will estimate the global rate of financialization of corporate ownership by measuring the share of global capital (i.e. total equity) owned by each domestic financial sector.

Global rate of financialization of corporate ownership for Country  $i$  =

$$\frac{\sum_{Country\ i, owned\ by\ finance} Ownership\ Tie\ 2018\ \$}{\sum_{All\ countris, All\ sectors} Ownership\ Tie\ 2018\ \$}$$

Given the complex corporate structures of multinational corporations today, I need to be able to differentiate between ownership ties within the same corporation vs. ownership between different corporations. I plan on accounting for the intra-firm subsidiary connections by excluding ownership ties belonging to holding companies and ownership between firms belonging to the same industry. I will recalculate all the rates of financialization with these corrections in mind and examine the extent to which the final metrics have been altered when excluding intra-firm subsidiary connections.

### 3.2.6. Selecting Appropriate Design Idioms

The selected idioms for the national rate of financialization of corporate ownership need to:

1. Visualize the differences in the financialization rates between countries;
2. Visualize the corporate ownership structure at the level of industries within each country

The selected idioms for the global rate of financialization of corporate ownership need to:

1. Visualize the corporate ownership connections/ties between countries;
2. Visualize the dominance of the US financial sector in the global corporate network

## 4. Proposed infovis solution

I am planning on using various R packages for most of the visualizations: a package for network visualization *ggraph*, a data visualization package *ggplot2*, an interactive graphing library *plotly*, and a package for creating web applications *shiny*. In cases when it would be impossible to make interactive network visualizations in R, I will use *D3* (a JavaScript library for data visualization).

For this project, I will be developing four distinct visualizations (shown below).

### **Proposed visualization idiom # 1: Interactive scatterplots**

Goal: Visualize the differences in the financialization rates between countries

Marks:

- Points represent individual countries

Channels:

- Vertical position represents the share of domestic non-financial capital owned by finance
- Horizontal position represents the share of domestic financial capital owned by finance
- Size represents the value of total equity of firms located in that country
- Colour represents different continents



Solution: Generate an interactive scatterplot using *ggplot2* and *plotly* packages

Figure 1: Scatterplot of financialization of corporate ownership by country (preliminary analysis)

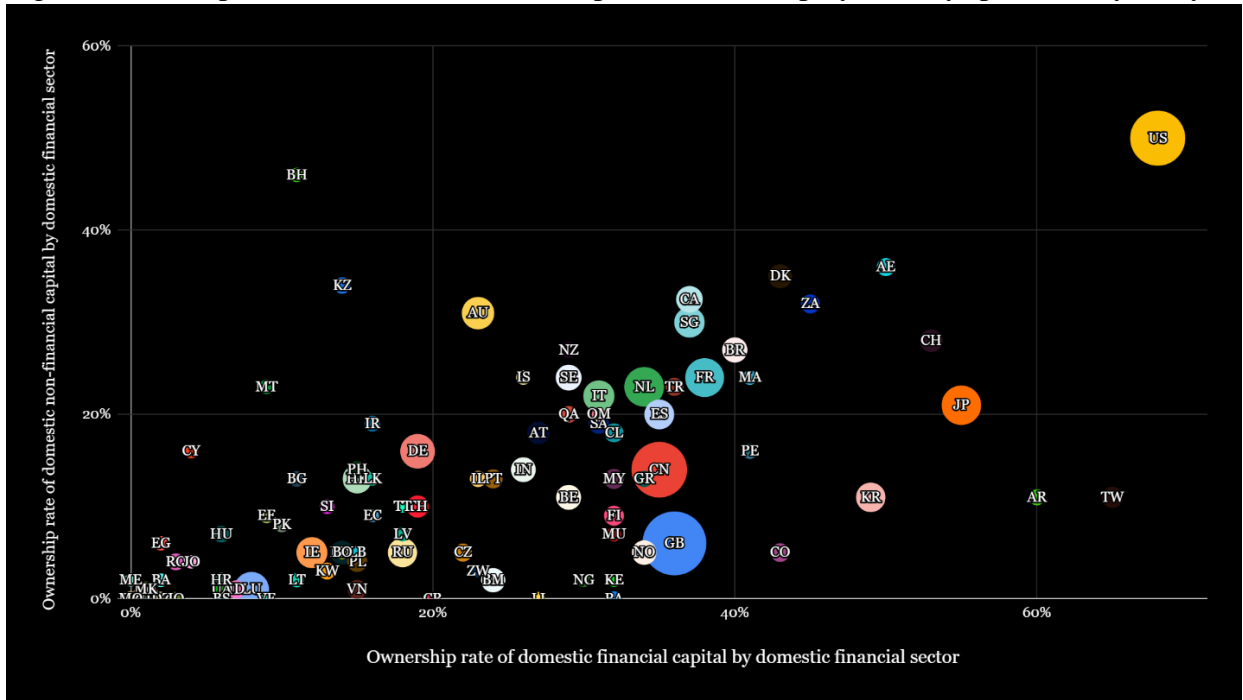
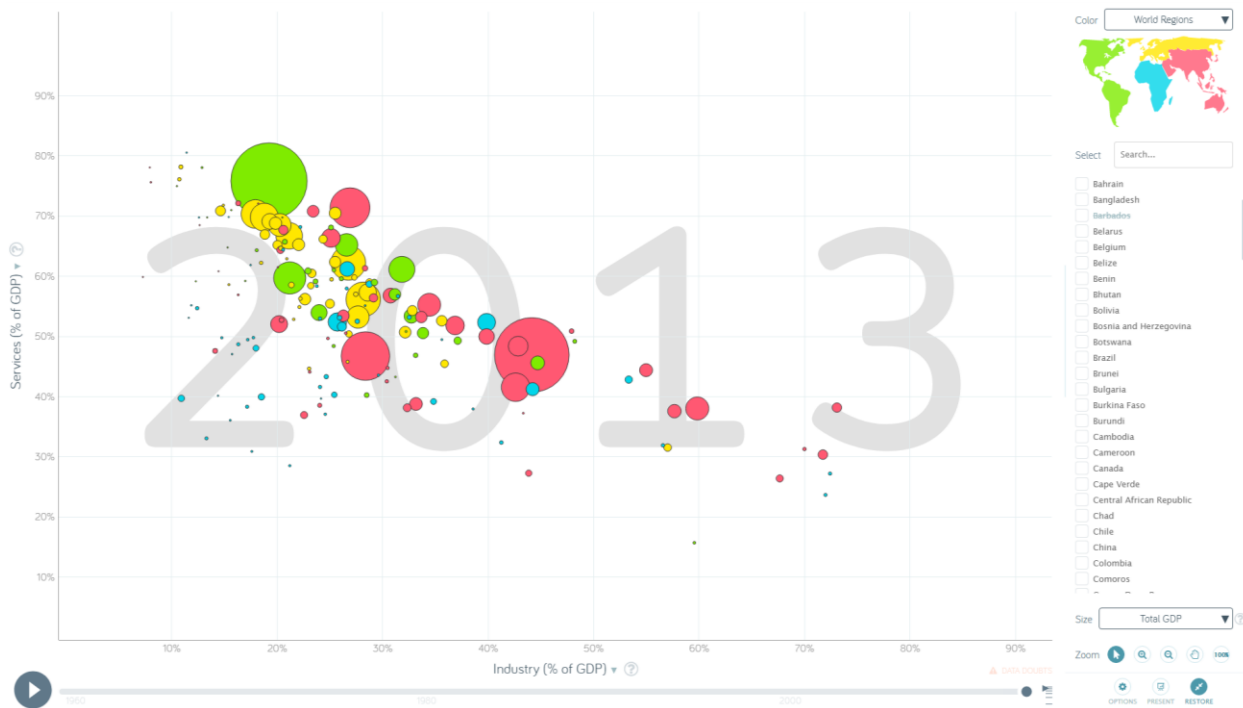


Figure 2: A visualization example of an interactive scatterplot using Gapminder dataset<sup>4</sup>



<sup>4</sup> Source: [https://www.gapminder.org/tools/#\\$chart-type=bubbles](https://www.gapminder.org/tools/#$chart-type=bubbles)

## Proposed visualization idiom # 2: Small multiple network visualizations

Goal: Visualize the differences of corporate ownership structures at the level of industries within each country for many countries simultaneously

### Marks:

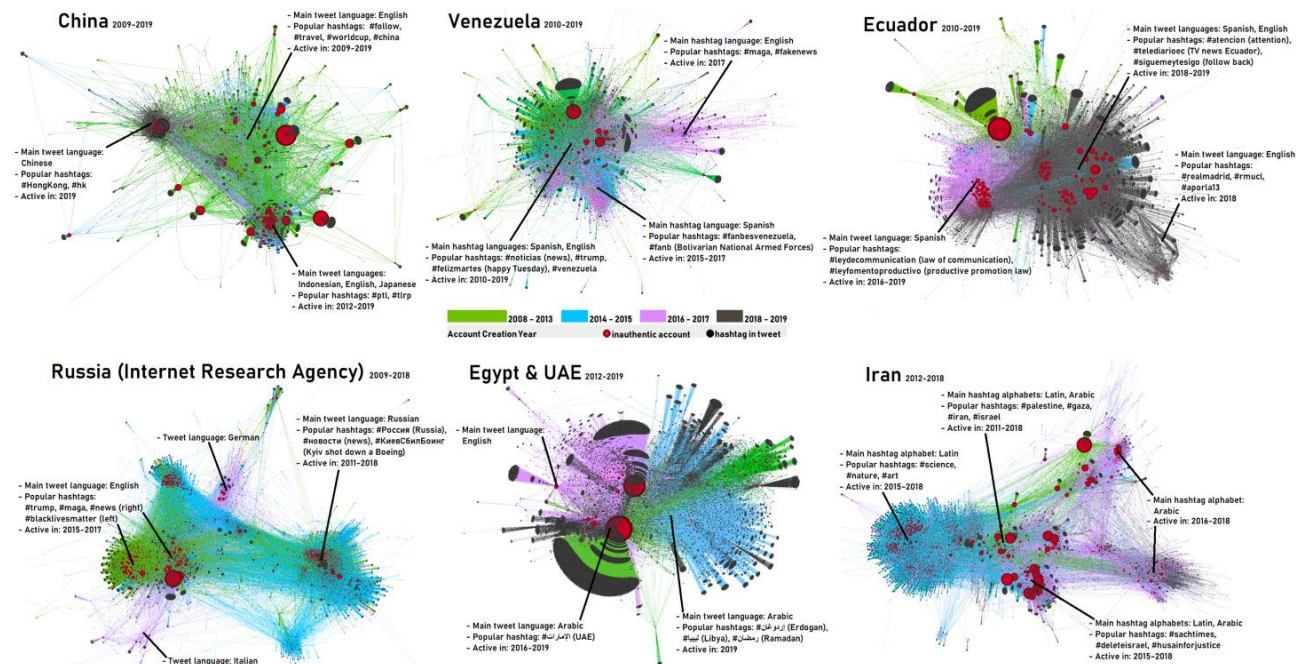
- Points represent industries (272 levels) within individual countries
- Lines represent ownership ties (in \$) between industries within each country

### Channels:

- Vertical and horizontal positions at the macro-scale correspond to different countries
- Size represents the value of total equity owned by an industry in an individual country
- Colour represents different economic sectors (20 levels)

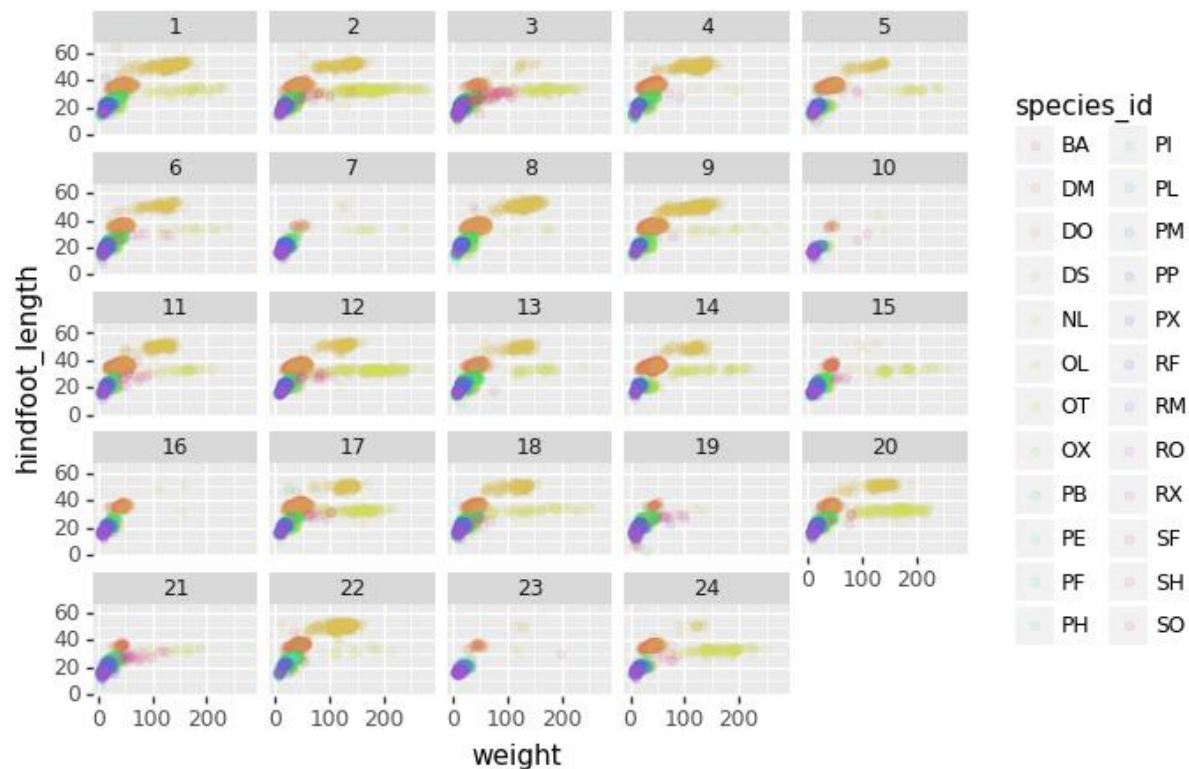
Solution: Generate a small-multiple network visualization of corporate ownership structure using *ggraph* package and *facet\_wrap* command for the most significant countries (sort and filter based on the value of total equity of firms located in that country).

Figure 3: A visualization example of small multiple network from Alexa Pavliuc<sup>5</sup>



<sup>5</sup> Source: <https://medium.com/swlh/watch-six-decade-long-disinformation-operations-unfold-in-six-minutes-5f69a7e75fb3>

Figure 4: A visualization example of small multiple network using `facet_wrap()` command<sup>6</sup>



### Proposed visualization idiom # 3: Spatial network visualizations

Goal: Visualize the corporate ownership connections/ties between countries

Marks:

- Points represent countries (202 levels)
- Lines represent ownership ties (in \$) between countries

Channels:

- Vertical and horizontal positions represent the approximate geographical location of countries
- Size represents the value of total equity owned by an individual country
- Colour (ordered, continuous) represents the share of domestic capital owned by finance (0% to 100%)

Solution: Generate a network visualization using *ggraph* package

<sup>6</sup> Source: <https://datacarpentry.org/python-ecology-lesson/07-visualization-ggplot-python/index.html>

Figure 5: A visualization example of corporate ownership network from Haberly and Wojcik (2017b)

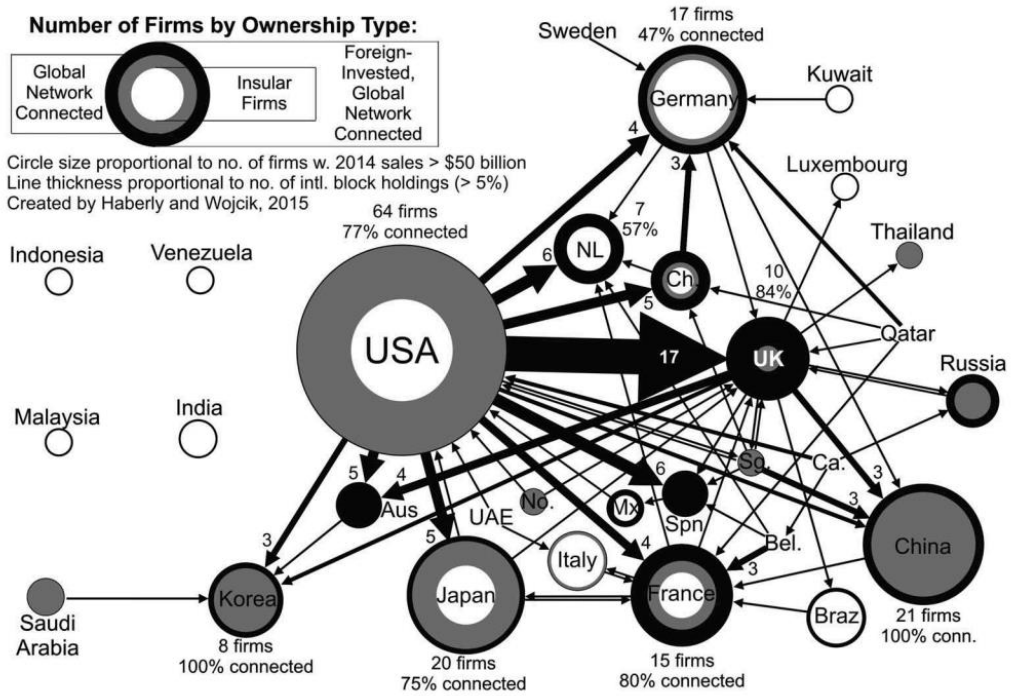
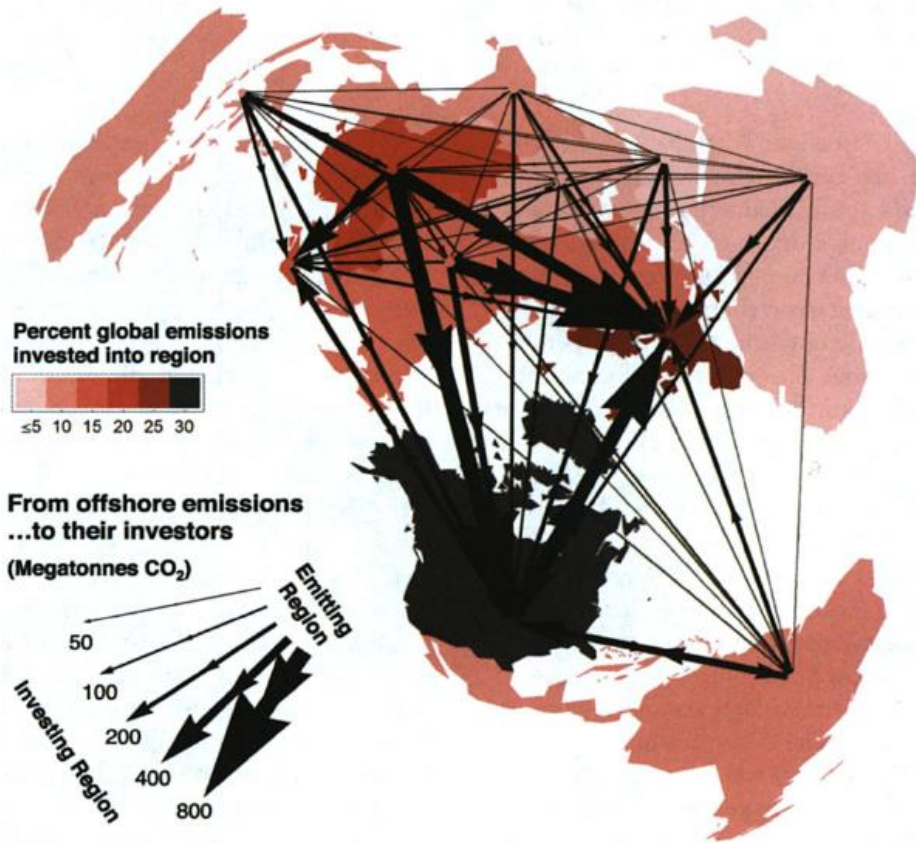


Figure 6: A visualization example of a global flow map from Bergmann (2013)



## Proposed visualization idiom # 4: Circle packing with hierarchical edge bundling

Goal: Visualize the dominance of the US financial sector in the global corporate network

Marks:

- Smaller points represent sectors (20 levels)
- Larger points represent countries (202 levels)
- Lines represent ownership ties (in \$) between industries in each country

Channels:

- Size of smaller points represents the value of total equity owned by a sector in a country
- Size of larger points represents the value of total equity owned by a given country
- Colour of smaller points represents different industries (20 levels)
- Color of lines represents a type of ownership tie (4 levels: finance owned by finance, finance owned by non-finance, non-finance owned by finance, non-finance owned by non-finance)

Solution:

- Generate a static network visualization using *ggraph* package (see Figure 7)
- Generate an interactive network visualization using *D3* (see Figure 8)
- Generate an interactive network visualization using *D3* with an option to highlight a sector in a given country and all of its incoming and outgoing ownership ties (see Figure 9)

Figure 7: A visualization example of circle packing with hierarchical edge bundling in *ggraph*

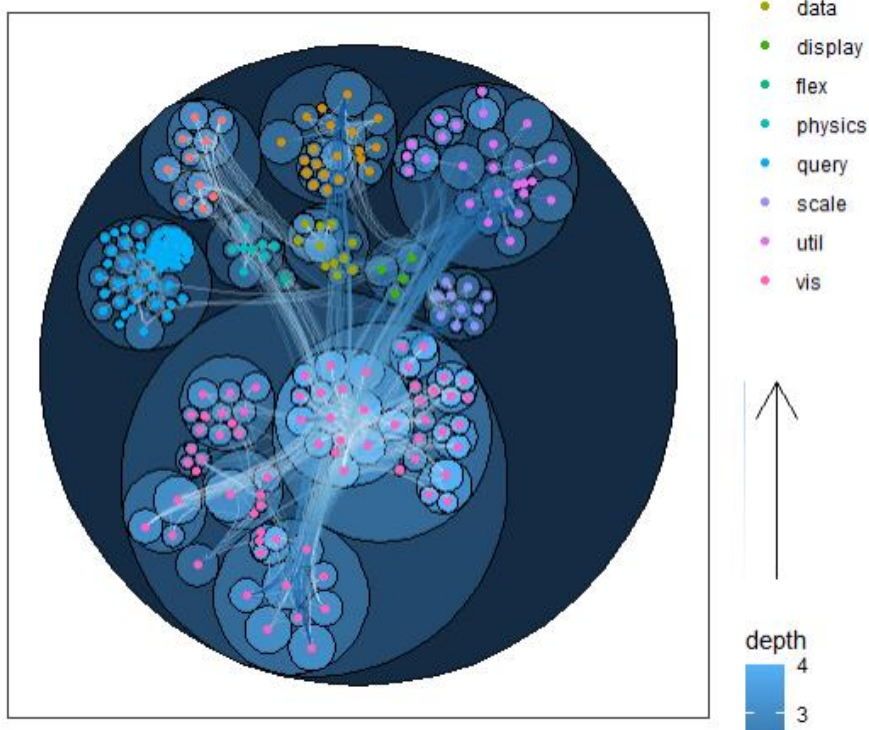


Figure 8: A visualization example of circle packing with hierarchical edge bundling in  $D3^7$

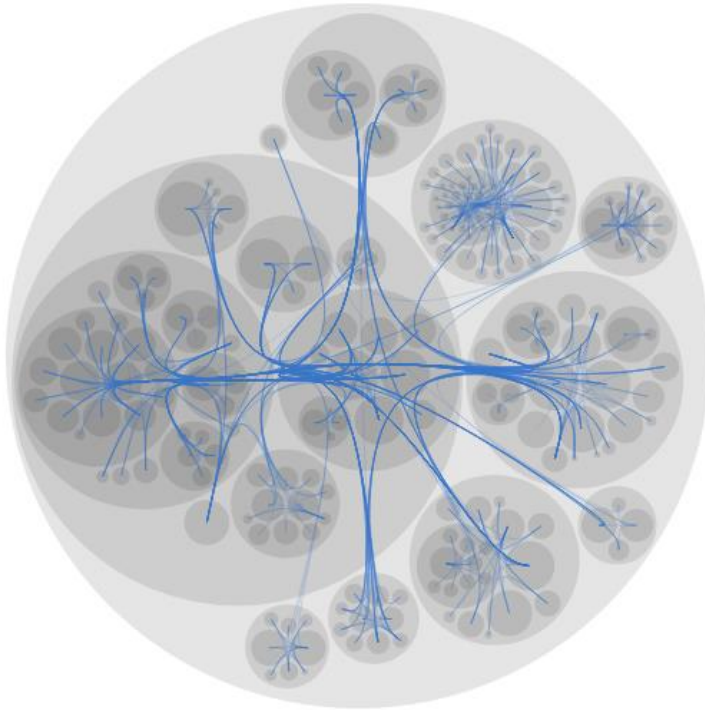
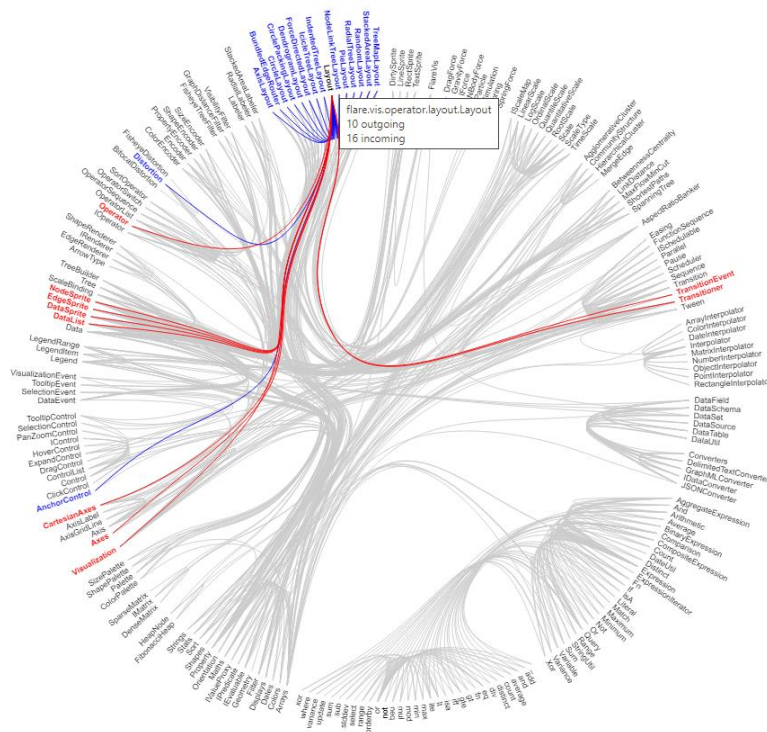


Figure 9: A visualization example of hierarchical edge bundling in  $D3^8$



<sup>7</sup> Source: <https://bl.ocks.org/nitaku/972a1a1ca93bb3da54505f3b0f3bb335>

<sup>8</sup> Source: <https://observablehq.com/@d3/hierarchical-edge-bundling>

## 5. Milestones

Project milestones, their description, expected time to complete the milestone, and their respective deadlines can be seen in Table 3.

Table 3: Milestones schedule

Milestone	Time (hrs)	Deadline	Description	Part of CPSC 547
Data collection	20	March 15, 2020	Querying data from Orbis based on the selected criteria	No
Data cleaning	20	March 30, 2020	Combining downloaded data files into one single file, formatting data values to ensure format consistency, identifying data entry errors	No
Pitch	3	October 1, 2020	Preparing presentation slides, developing a summary of the project, recording presentation	Yes
Pre-proposal meeting	2	October 15, 2020	Preparing presentation slides in preparation for the proposal	Yes
Proposal	10	October 23, 2020	Reviewing existing work, summarizing data, writing proposal	Yes
Conduct a literature review	15	November 10, 2020	Completing a literature review on financialization, corporate networks, and methodological papers using Orbis database	Yes
Review network packages in R	15	November 10, 2020	Examining existing network packages in R and their functions, including igraph, network, statnet, qgraph	Yes
Review possible visualization options	10	November 15, 2020	Considering different visualization options, including necklace maps, flow maps, bow-tie network visualizations, small multiples, semi-geographical networks	Yes
Measure the national rates of financialization, visualize them	25	November 15, 2020	Develop a measurement for the rate of financialized corporate ownership and control for each nation, visualize the differences between nations	Yes
Peer Review	5	November 19, 2020	Preparing presentation slides for peer-review	Yes

Visualize global hegemony of US finance	30	December 10, 2020	Develop a measurement for the rate of financialized corporate ownership and control between nations, visualize the dominance of US financial firms	Yes
Final Presentation	10	December 10, 2020	Preparing presentation slides for the final presentation	Yes
Final Report	30	December 14, 2020	Finishing writing final report	Yes
Term paper for GEOG 547	80	January 1, 2021	Use developed visualizations and analysis for sections 4, 5 in a term paper for GEOG 547	No



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