Financial Flow Analysis Methodology

Inland Empire Vital Conditions Philanthropic Network Study
By Mapping Black California

DATA SOURCE & SCOPE

Dataset Characteristics

- **Source Information:** IRS Form 990 data for organizations operating in Riverside and San Bernardino Counties
- **Observation Unit:** Individual grant transactions
- **Total Records:** 1,599 grants
- **Time Period:** 2023-2025 (primary concentration: 2023-2024)
- **Total Capital:** $140,535,303
- **Geographic Scope:** Riverside and San Bernardino Counties, California

Entity Coverage

- **Foundations:** 204 unique grantmaking organizations (identified by EIN)
- **Recipients:** 702 unique receiving organizations (identified by EIN)
- **Network Edges:** 1,599 directed foundation to recipient relationships

DATA STRUCTURE & VARIABLES

Key Variables Analyzed

Transaction-Level:
- Grant amount (USD)
- Grant purpose (categorical)
- Fiscal year (temporal)

Foundation Attributes:
- Foundation name
- EIN (Employer Identification Number)
- NTEE code (primary and major category)
- Location (City, county, state)
- Total assets, revenues, expenses
- Endowment status (binary)

Recipient Attributes:

- Recipient name
- EIN
- NTEE code (primary and major category)
- Location (City, county, state)
- Total assets, revenues, expenses
- Full-time employee status (binary)
- Endowment status (binary)

ANALYTICAL FRAMEWORK

Network Analysis Approach

Treated dataset as **directed, weighted network** where:

- **Nodes:** Foundations (sources) and Recipients (targets)
- **Edges:** Grant transactions (directed from foundation to recipient)
- **Edge Weights:** Grant amounts (size)

Primary Analytical Methods

Descriptive Network Statistics

- Node degree distribution (in-degree for recipients, out-degree for foundations)
- Edge weight distributions (grant size analysis)
- Network density and centrality measures
- Geographic clustering analysis

Categorical Aggregation

- NTEE major category grouping (24 sectors identified using first letter of code)
- Geographic aggregation (county-level analysis)
- Temporal aggregation (annual trends)
- Institutional vs. community network segmentation

Flow Pattern Analysis

- Foundation sector to Recipient sector giving flows
- Same-sector vs. cross-sector classification
- Hub identification (recipients with 5+ unique funders)
- Funder diversity metrics (unique funders per recipient)

Comparative Analysis

- Full network (n=1,599) vs. Community network (n=1,592)
- County-level comparisons (Riverside vs. San Bernardino)
- Sector-level magnetism analysis (average funders per organization by NTEE)

DATA CLEANING & PREPARATION

NTEE Code Standardization

Extract major category (first letter of NTEE code):

```
df['NTEE.Major'] = df['NTEE code, primary'].str[0]
```

Map codes to sector names covering 24 total categories by IRS Publication 4838 - National Taxonomy of Exempt Entities (NTEE) Codes

https://www.irs.gov/pub/irs-tege/p4838.pdf

Network Segmentation

Identified and separated institutional mega-players. The following 7 foundations representing 2.1% of grants but 54.8% of dollars were classified as institutional infrastructure transfers, not discretionary philanthropy:

- Loma Linda University Health Care
- Loma Linda University
- Loma Linda University Shared Services
- Seventh-Day Adventists Loma Linda University Medical Center
- UC Riverside Foundation
- The Linfield Foundation
- Barbara and Steve Wilson Educational Fund

KEY ANALYTICAL QUESTIONS & METHODS

Question 1: What are the dominant giving patterns?

Method: Aggregated grants by (Foundation.NTEE.Major to Recipient.NTEE.Major) pairs. Calculated count, sum, mean for each flow. Ranked flows by total dollars and grant count. Classified same-sector (F.NTEE == R.NTEE) vs. cross-sector.

Question 2: Which organizations are hub recipients?

Method: Grouped by recipient EIN, counted unique foundation EINs. Ranked recipients by funder count. Analyzed characteristics of top hubs.

Question 3: What predicts grant magnetism?

Method: Correlation and group comparison analysis.
Tested Predictors:

- Full-time staff (binary)
- Organizational size (assets in categories)
- Organization age (years since formation)
- NTEE sector (categorical)
- Geographic location (city/county)

Question 4: How do networks differ geographically?

Method: County-level stratified analysis. Calculated: foundation count, grant count, total dollars, average grant. Computed ratios and compared distributions.

Question 5: What changes without institutional mega-players?

Method: Comparative analysis (full vs. community network). Recalculated all metrics after removing 7 institutional foundations. Compared sector rankings, flow patterns, average grants. Quantified shifts in percentages and absolute amounts.

DATA QUALITY CONSIDERATIONS

Missing Data

NTEE Codes:
$31M (22%) classified as 'Z' (Unknown/Unclassified). Treatment: Manually reclassified major recipients; flagged for policy recommendation.

Temporal Data:
5 grants in 2025 (incomplete year). Treatment: Included but noted as partial-year data; flagged for future recalculations.

Organizational Attributes:
Variable completeness: Assets/Revenues (78% complete), Year formed (97% complete). Treatment: Used available-case analysis; reported N for each metric.

Assumptions & Limitations

Assumption 1: Single grant record = single decision (multi-year pledges may appear as multiple grants)
Assumption 2: Foundation NTEE represents organizational mission (though grantmaking may be broader)

Assumption 3: Organizations report financial data accurately and consistently

Limitation 1: Analysis limited to 501(c) organizations with IRS filings

Excludes: Religious congregations below filing threshold, informal community groups, grassroots organizations without tax-exempt status, government agencies, for-profit social enterprises

Limitation 2: Data represents only foundation-to-recipient grants; excludes: individual donor contributions, government grants, corporate sponsorships, fee-for-service revenue.

Limitation 3: Network limited to intra-Inland Empire flows; excludes: IE foundations giving outside region, external foundations giving into region. Preserved for future analysis.

Limitation 4: Point-in-time snapshot (2023-2025).

VALIDATION & RELIABILITY

Total Dataset: N = 1,599 grants

Fields with 100% Completeness (N = 1,599)

Transaction-Level:

- Grant amounts: N = 1,599
- Fiscal year when grants made: N = 1,599

Foundation Attributes:

- Foundation name: N = 1,599
- Foundation EIN: N = 1,599
- Foundation NTEE code, primary: N = 1,599
- Foundation city: N = 1,599
- Foundation county: N = 1,599
- Foundation state: N = 1,599

Recipient Attributes:

- Grant recipient name: N = 1,599
- Grant recipient EIN: N = 1,599
- Recipient NTEE code, primary: N = 1,599
- Recipient City: N = 1,599
- Recipient County: N = 1,599
- Recipient Year formed: N = 1,599 (range: 1887 to 2025)
- Recipient Has full-time employees: N = 1,599
- Recipient Has endowment support: N = 1,599

Fields with Missing Data (86.9% Complete)

Financial Data:

- Recipient Total assets: N = 1,390 (86.9% complete, 209 missing)
- Recipient Total revenues: N = 1,390 (86.9% complete, 209 missing)
- Recipient Total expenses: N = 1,390 (86.9% complete, 209 missing)