



FEDERAL RESERVE BANK *of* NEW YORK

Cross-Border Financial Linkages: Bank complexity in transmission and vulnerability? Linda Goldberg

2014 IMF Statistical Forum, November 18 2014

Views expressed are those of the author and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System.

Philip Lane on Identifying and Measuring Vulnerabilities (1)

- ▶ Price based and quantity-based approaches
- ▶ Within quantity-based, most focus on banks and debt
 - Balance sheet key for transmission and vulnerabilities
 - 2013 work by countries in International Banking Research Network explores liquidity risk transmission internationally
- ▶ More attention should be paid to other sectors and flows
 - non-bank activity and intermediation chains
 - detailed counterparty and currency breakdowns
 - equity and contingent claims
 - intra-firm cross border financial transactions

Philip Lane on Identifying and Measuring Vulnerabilities (2)

My remarks will take off from two points raised:

- ▶ Offshore financial center activity
 - How are these used and with what implications?
 - Ex. Rose and Spiegel OFCs: Parasites or Symbionts? *EJ* 2007
- ▶ Scale of non-bank financial sector
 - Shadow banks are only partly in the shadows
 - Cross-industry acquisitions pervasive in finance
 - Ex. Cetorelli, McAndrews and Traina *EPR* 2014

Main point: Perhaps we need a third category of data, covering the **structure of BHCs**. A bank is more than a bank. This may matter for transmission, stress events and crises.

FSB Report to the G20 Leaders for Brisbane Summit. On Structural Bank Reforms. Oct. 27 2014.

“The recent financial crisis highlighted concerns around the **complexity** and resilience of banking group structures. A broad aim of many structural banking reforms is therefore to introduce a separation between certain ‘core’ banking activities ...and the risks emanating from investment banking and capital market activities., and more generally to **simplify legal and operational structures of complex banking groups, in order to enhance their supervisability and resolvability ...**”

- ▶ “Complex” is mentioned 5 times total, usually with size (“large and complex”), but is never defined over 21 pages.

Motivating complexity (1)

More needs to be developed around the organizational structures and international transmission mechanisms.

First exploration of alternative metrics of complexity in

Nicola Cetorelli and Linda Goldberg “Measures of Complexity in Global Banks” Federal Reserve Bank of New York *Economic Policy Review*, 2014.

Projects underway:

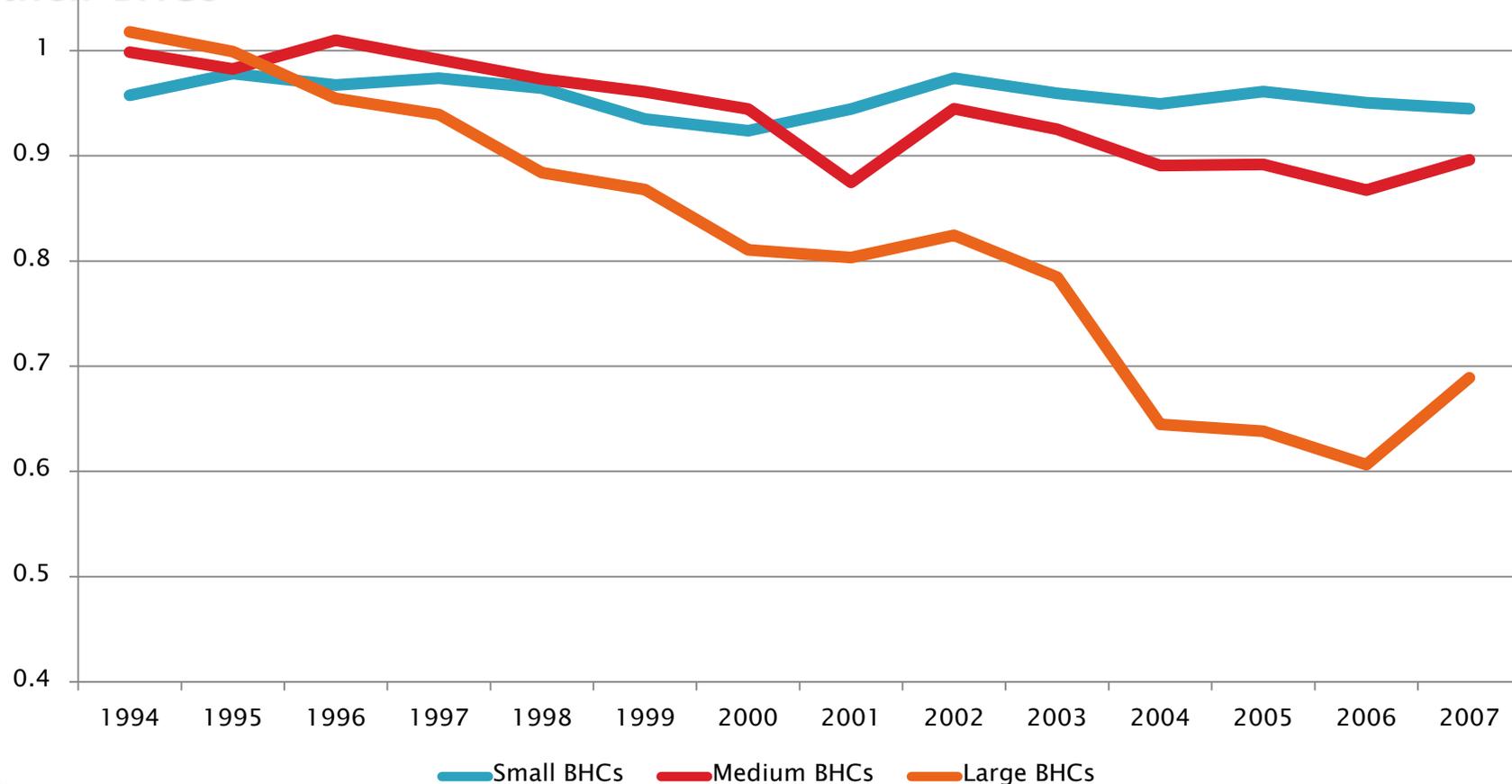
- What is complexity?
- Is this distinct from size?
- What are consequences for bank activities, international linkages, resiliency, and shock transmission?

Motivating complexity (2)

- ▶ Global banks are increasing “complex”
- ▶ Banks are parts of large organizations with
 - Business complexity (CG)
 - Increasing focus on trading activities, off-balance sheet instruments, asset management and fiduciary roles (not reflected on own balance sheet).
 - Products offered (Ricardo Correa and Tara Rice 2013)
 - Organizational complexity (CG)
 - Banks are not stand alone entities, but are part of organizations with ownership and control over diverse non-bank subsidiaries
 - Networks (Galina Hale et al 2013)

Increasing role of non-bank subsidiaries

Contribution of commercial bank subsidiaries to noninterest income of their BHCs



Copeland, EPR 2012

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Measuring complexity in global banks



Methodology for measuring complexity

No fully satisfactory metrics.

Follow a “Counts”-based [Herring and Carmassi 2010]

Data for Foreign Banking Organizations (FBOs) in US:

- Bankscope Ownership module (March 2013)
- Observe full ownership tree of Foreign Organization
 - Count the bank and non-bank affiliates
 - Include only those 50% owned or 25 % owned

Data for US Banking Organizations:

- ▶ Full subsidiary trees are filed with US regulators.

Do not have information on the size of all affiliates.

Our Complexity metrics

Type	Name	Construction by parent organization
Organizational	<i>Count</i>	count of 50+% owned affiliates
	<i>ComplexNBtoB</i>	Count of Non-Bank Affiliates relative to Count of Bank Affiliates

Business Complexity

$$\frac{T}{T-1} \left(1 - \sum_{i=1}^T \left(\frac{\text{count}^i}{\text{totalcount}^i} \right)^2 \right)$$

where T is the number of types

Normalized Herfindahl index based on affiliate types T:

- 1) banks,
- 2) insurance companies,
- 3) mutual and pension funds,
- 4) other financial subsidiaries, and
- 5) nonfinancial subsidiaries.

Output values range from 0 to 1, where 0 is lowest complexity and 1 is highest complexity.

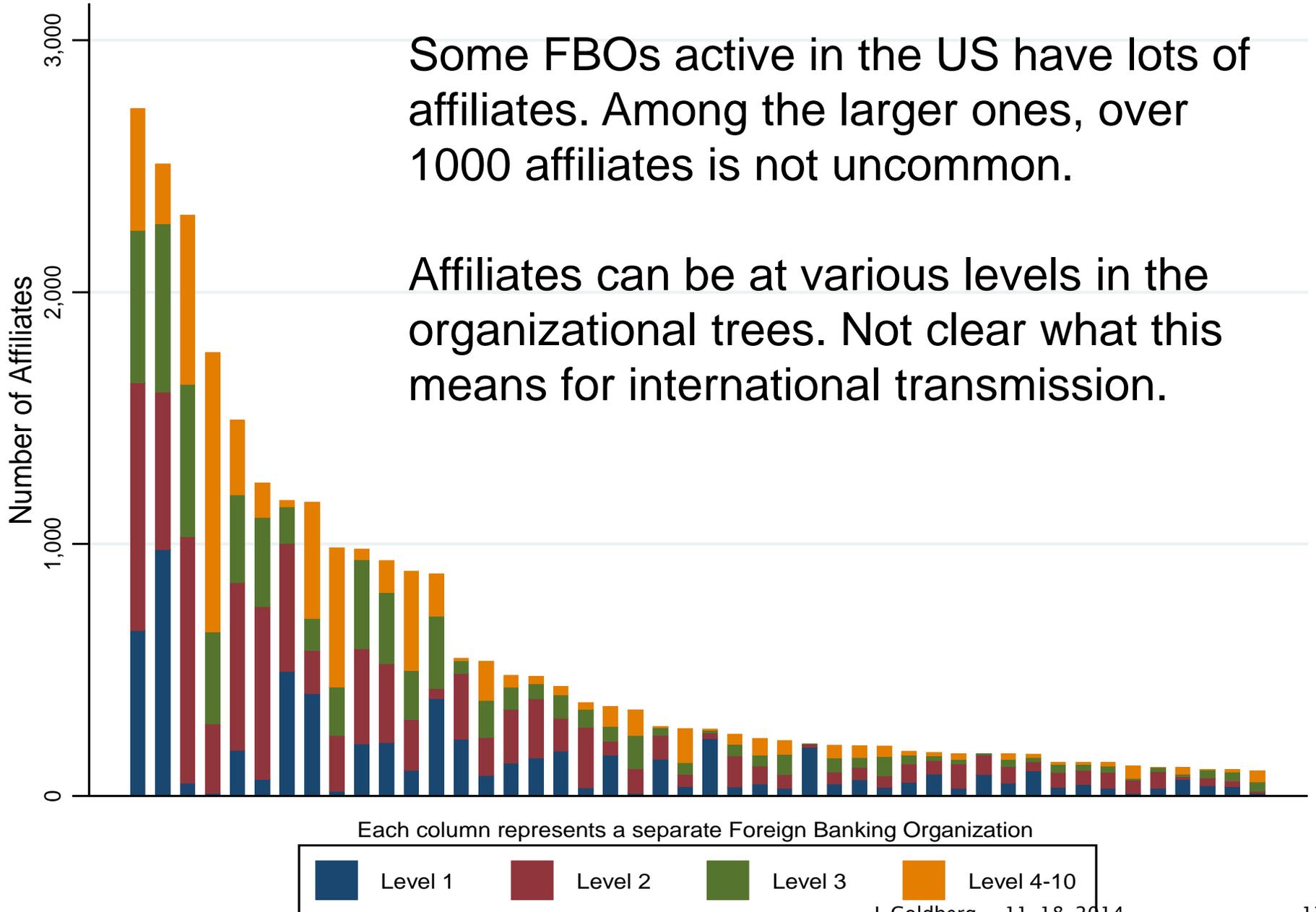
Our Complexity metrics

Type	Construction
Geographic Complexity	Normalized Herfindahl index based on affiliate regions R: 1) Euro Area 2) United Kingdom 3) Japan 4) South Korea 5) China 6) Canada 7) United States 8) Taiwan 9) Middle East 10) Other Americas 11) Other Europe 12) Other Asia 13) Other. Output values range from 0 to 1, where 0 is lowest complexity and 1 is highest complexity.

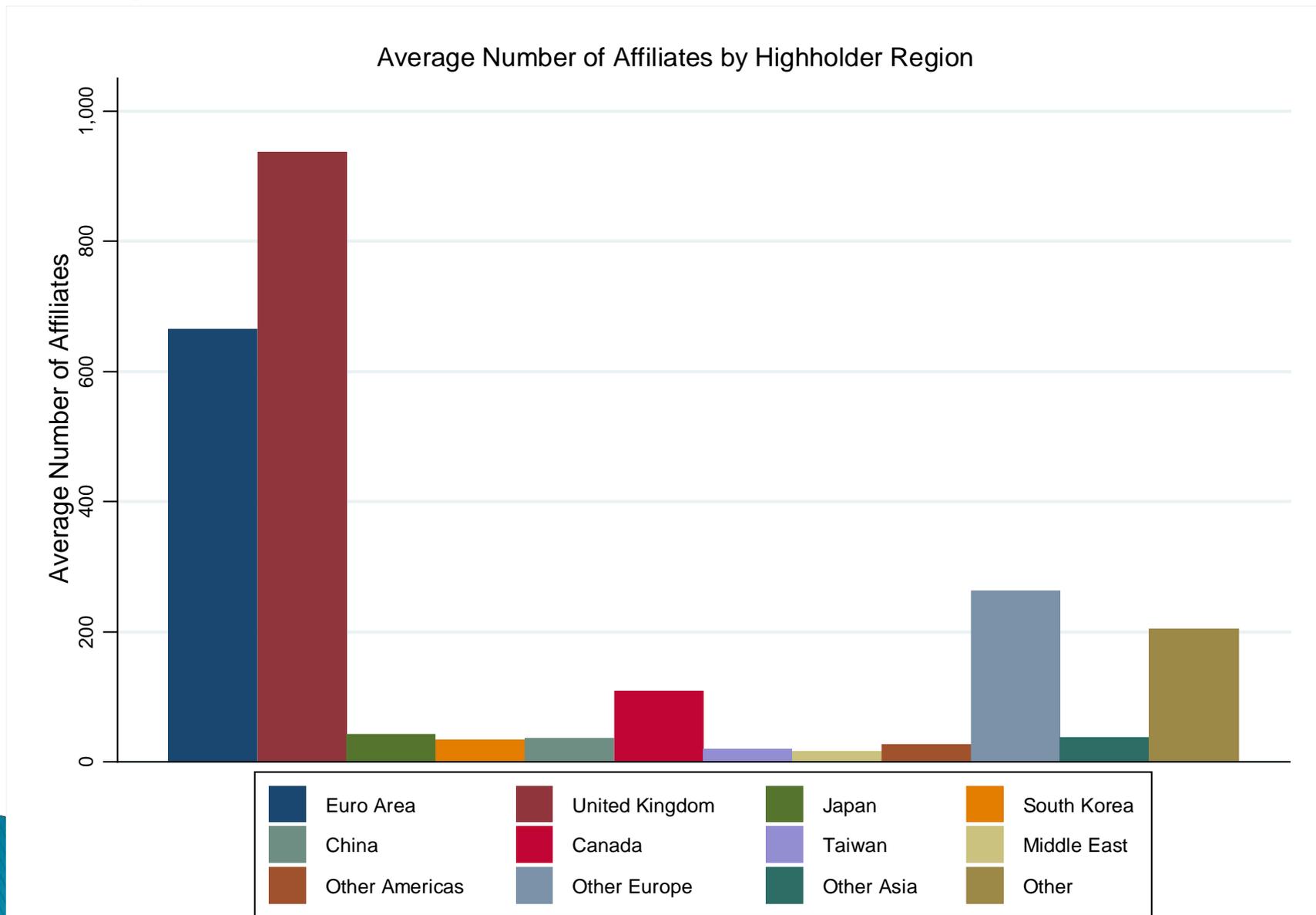
$$\frac{R}{R-1} \left(1 - \sum_{r=1}^R \left(\frac{\text{count}^r}{\text{totalcount}^r} \right)^2 \right)$$

where R is the number of regions

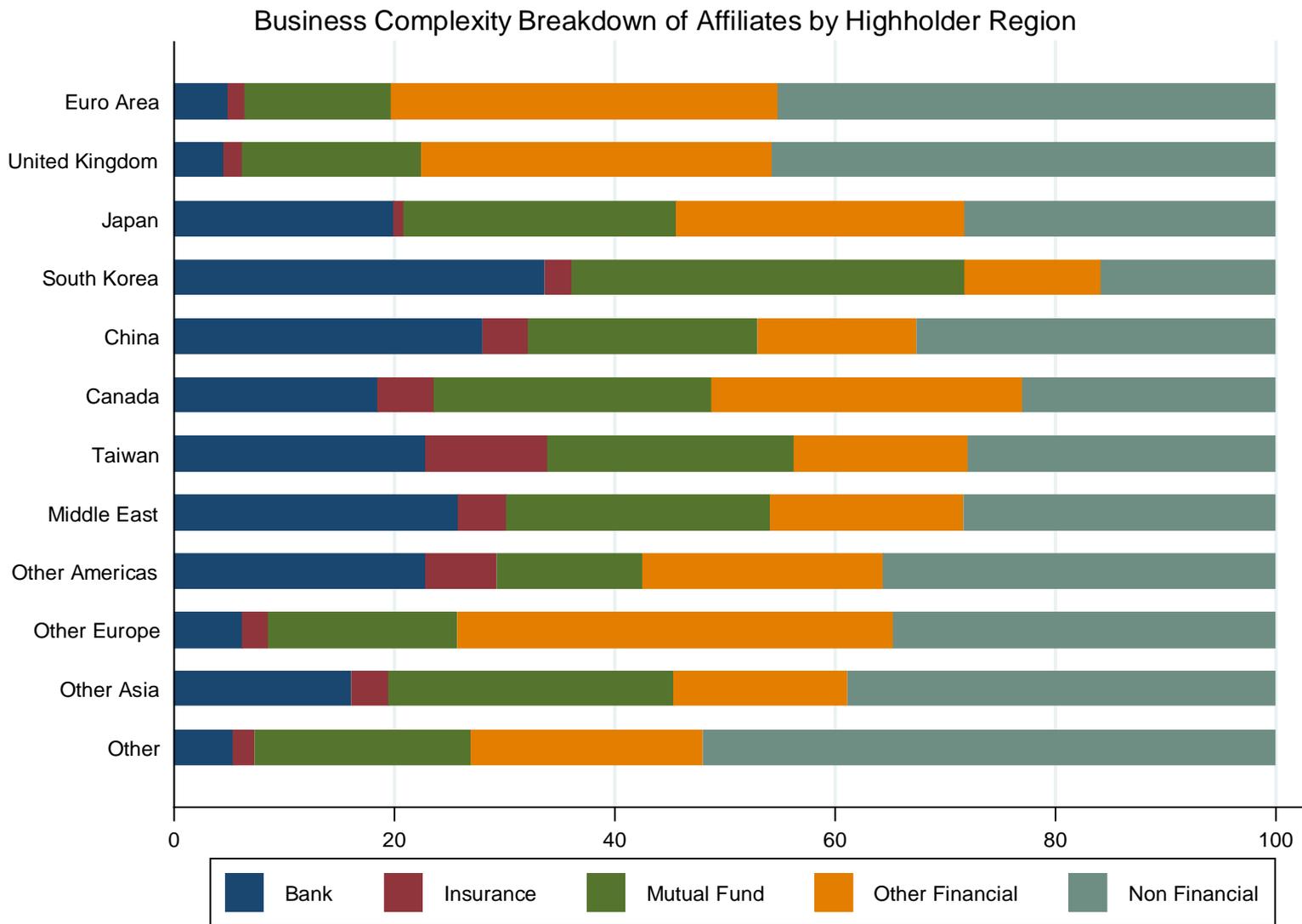
Foreign Banking Organizations with Over 100 Affiliates



UK and euro area global banking organizations have high average numbers of affiliates.

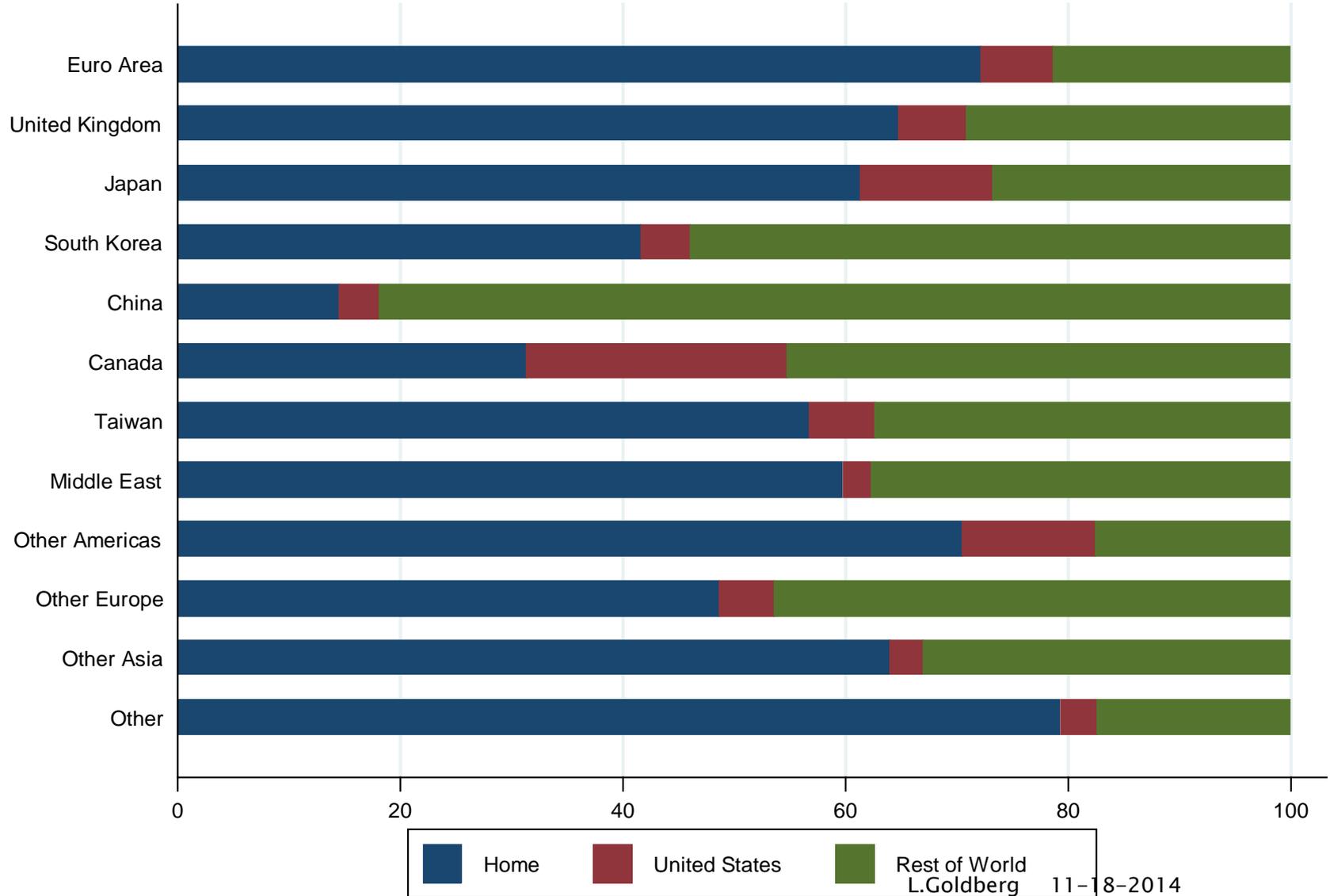


BHCs have diverse sectoral composition. Bank shares (counts) low for European parents, higher for Asia and Middle East. What is role of the non-financials in vulnerability (or strength)?



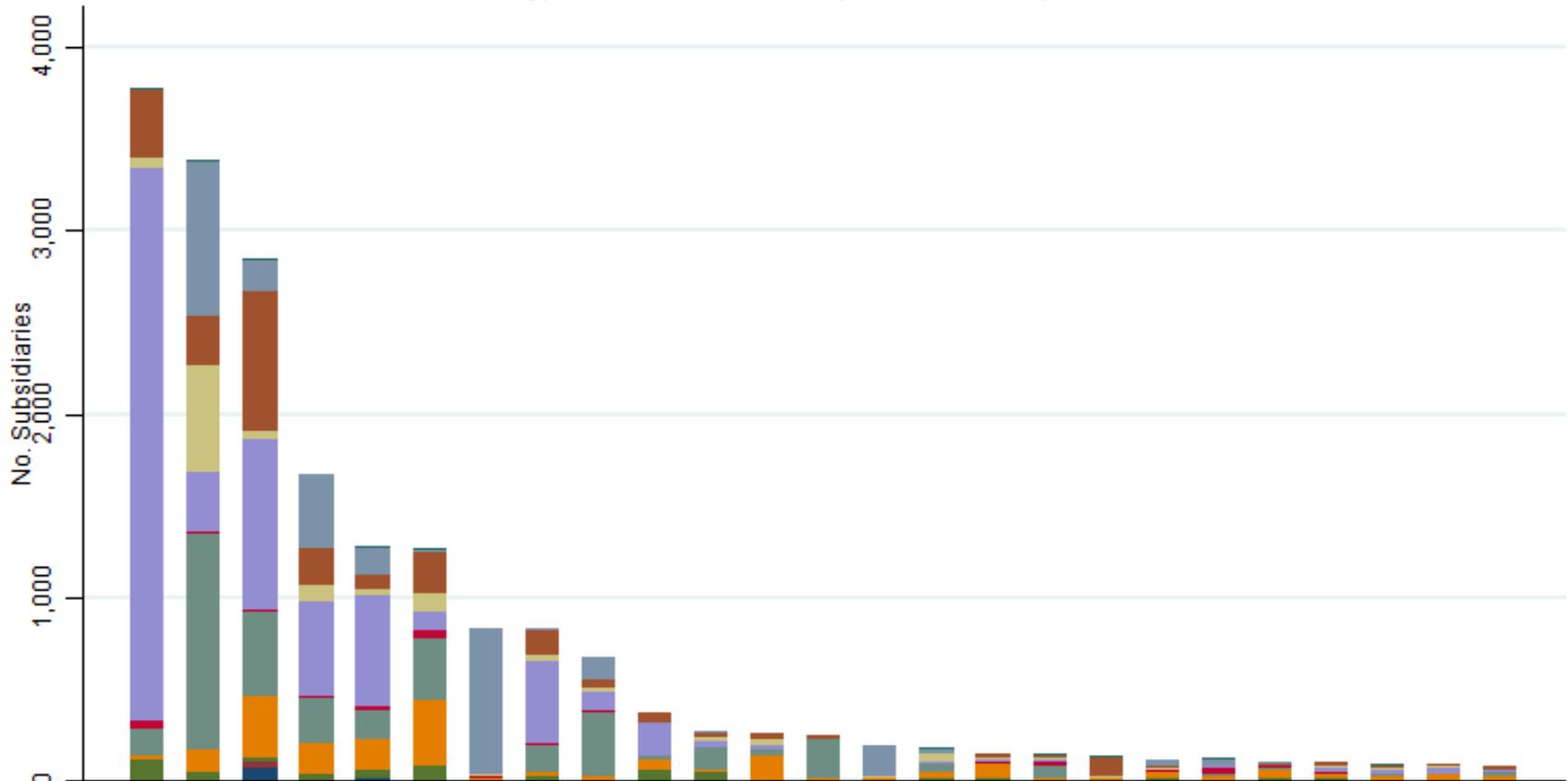
Geography varies considerably. Around 40 % of affiliates typically external. Purpose, use, and consequences?

Geographic Complexity Breakdown of Affiliates by Highholder Region



US large BHCs have diverse numbers and composition too. Top 25 by affiliate counts.

Type of Subsidiaries By Bank, 2013q4



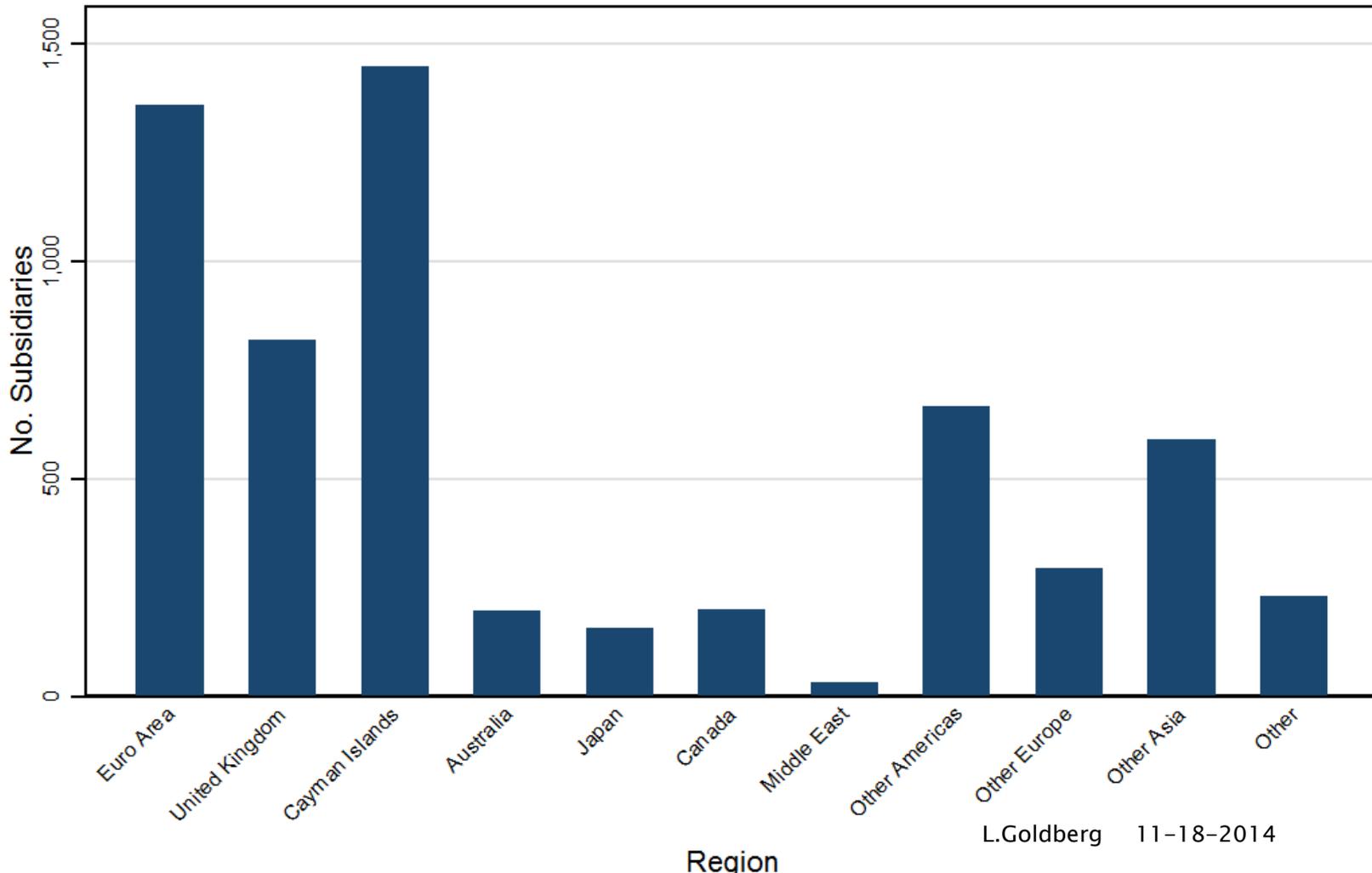
Each column represents a separate USBO



US large BHCs have diverse composition.

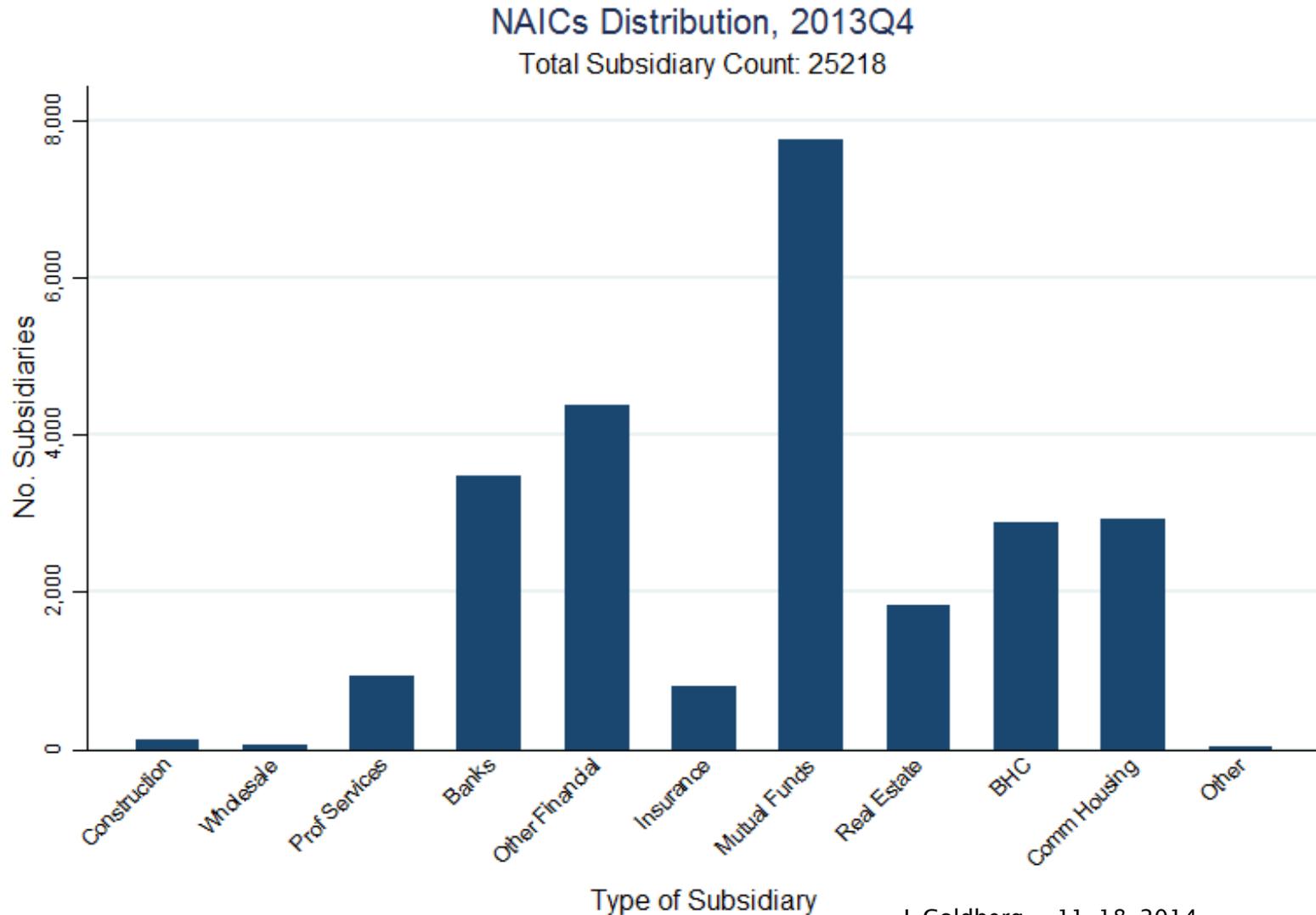
What are roles/consequences of affiliates across regions, including in OFCs?

Regional Subsidiary Count, 2013Q4
excl. United States



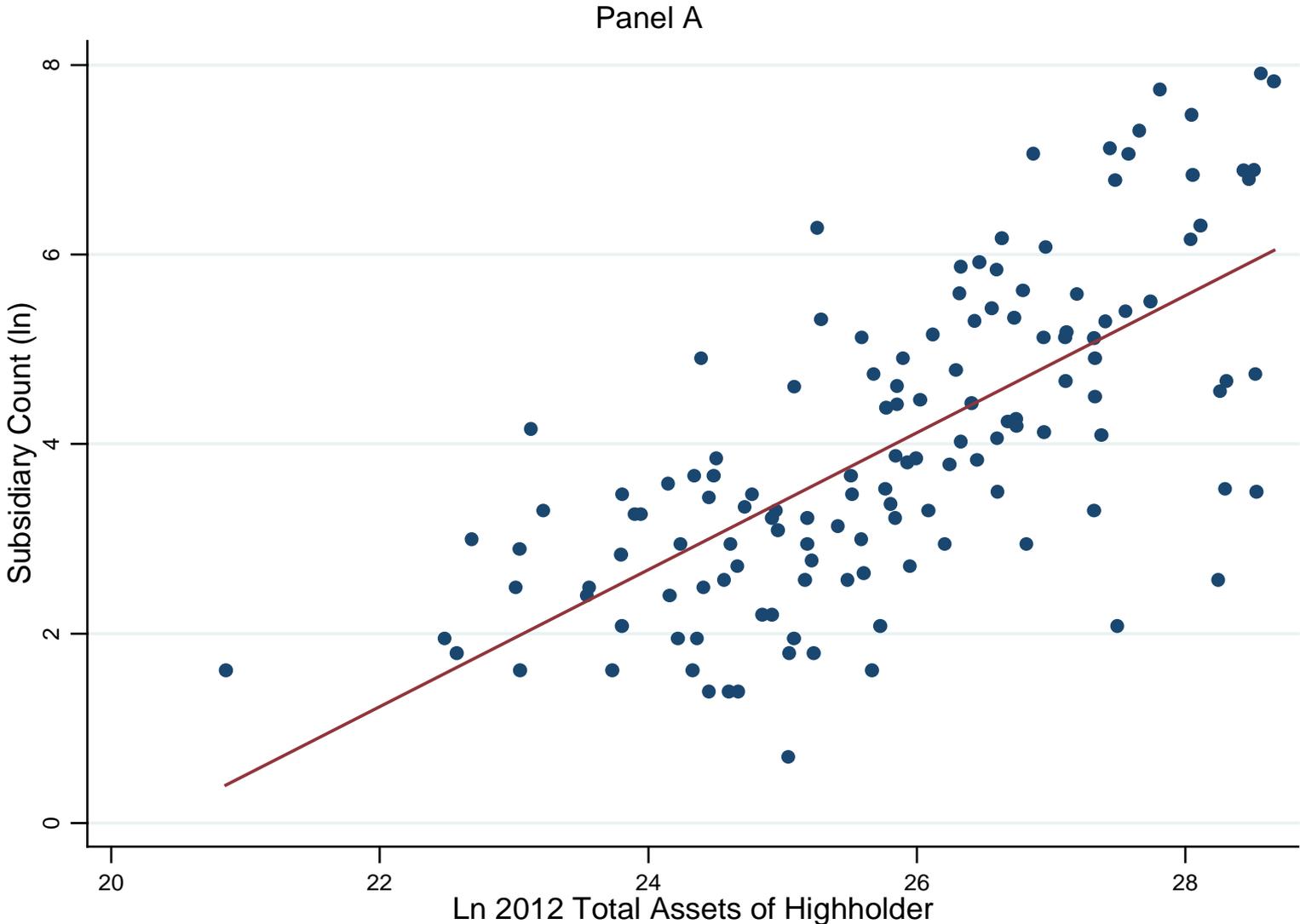
US large BHCs have diverse composition.

Roles of affiliates across types of entities, including management companies and related to local incentives?



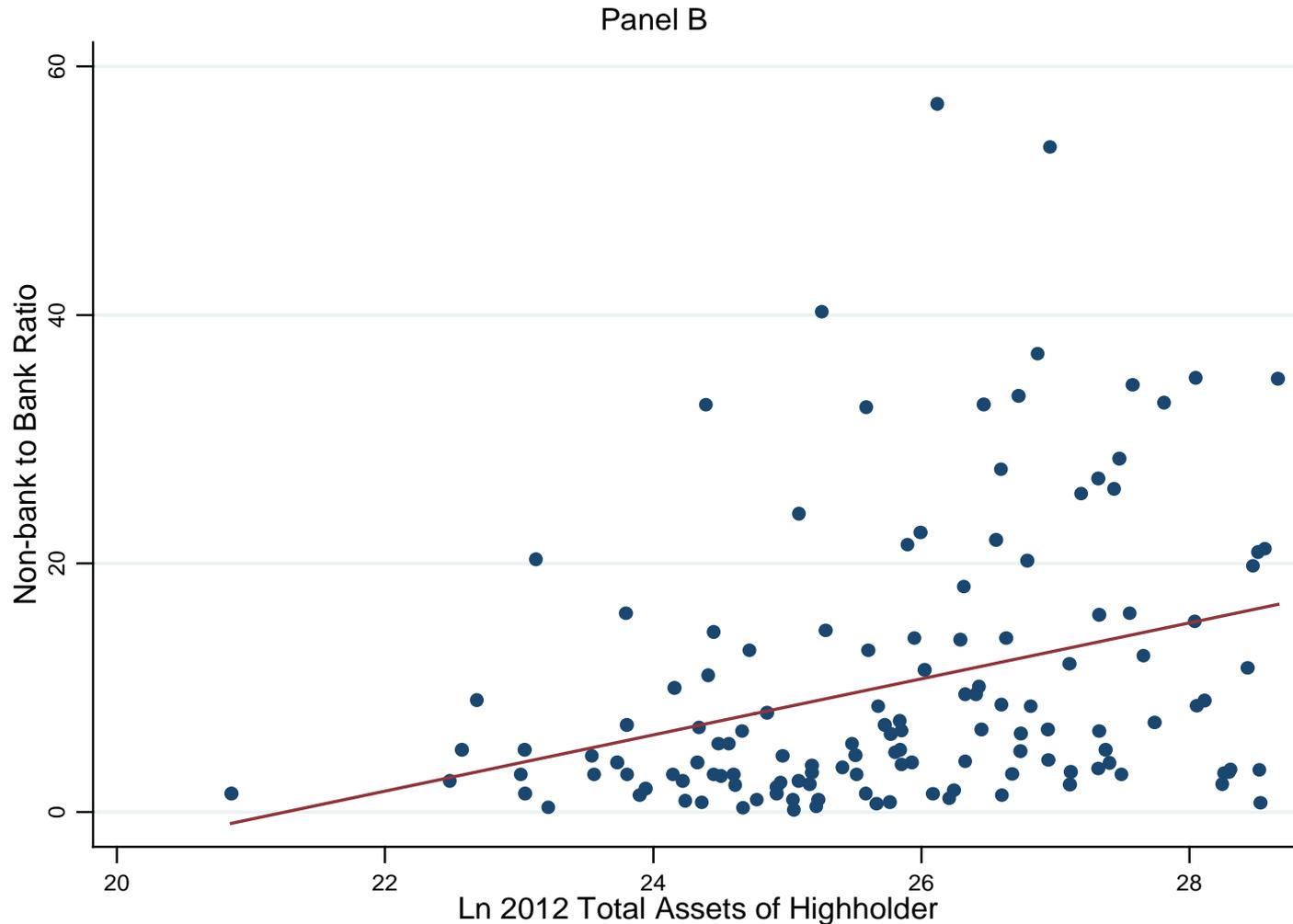
Bank complexity of some types differs from size, as shown with data on non-US FBOs.

Obs 1: Larger FBOs have more subsidiaries.



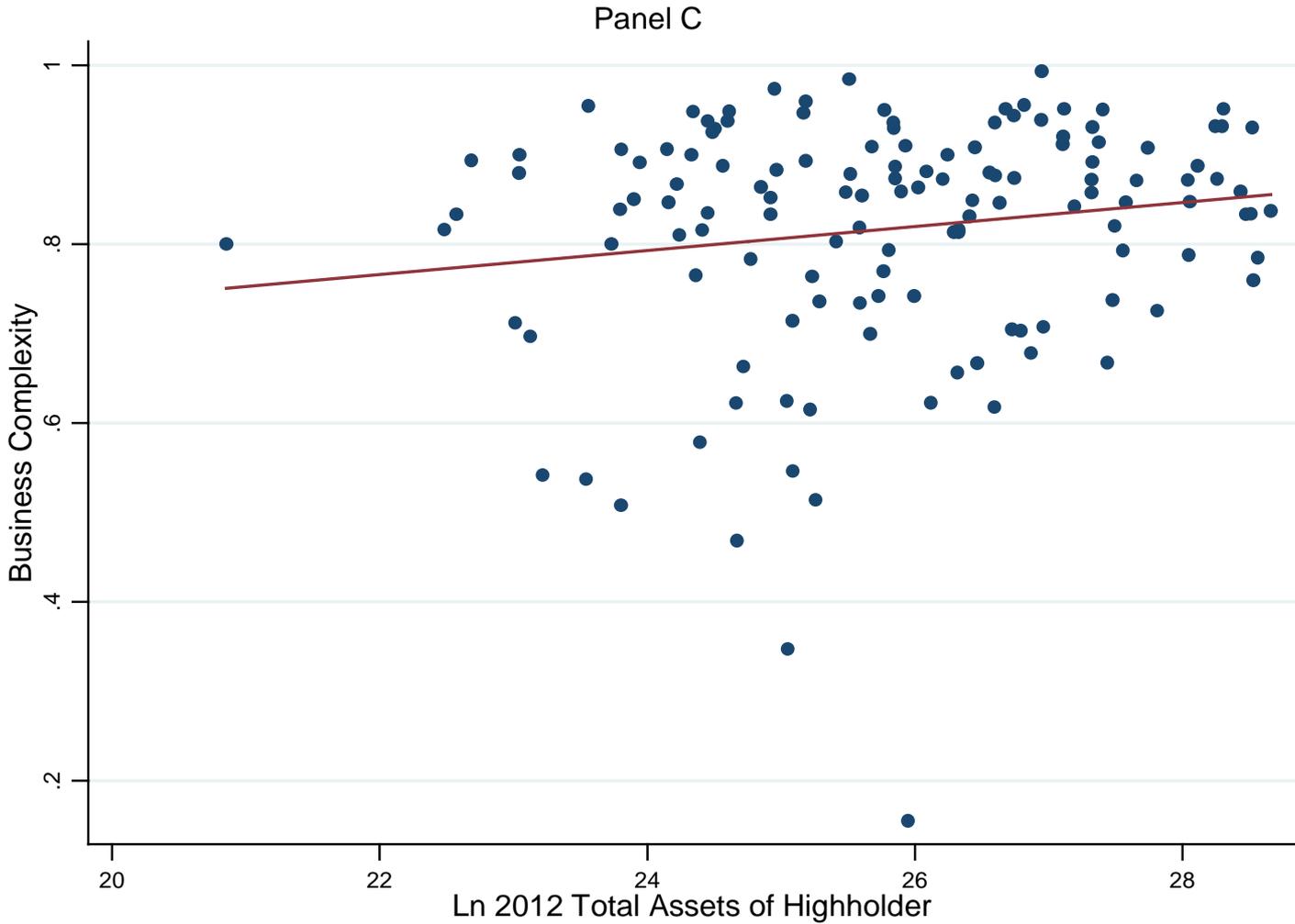
Slope of Fit Line = 0.723***
R Squared = 0.480

Obs 2. Large organizations have a larger number of non-bank to bank entities. But diverse models.



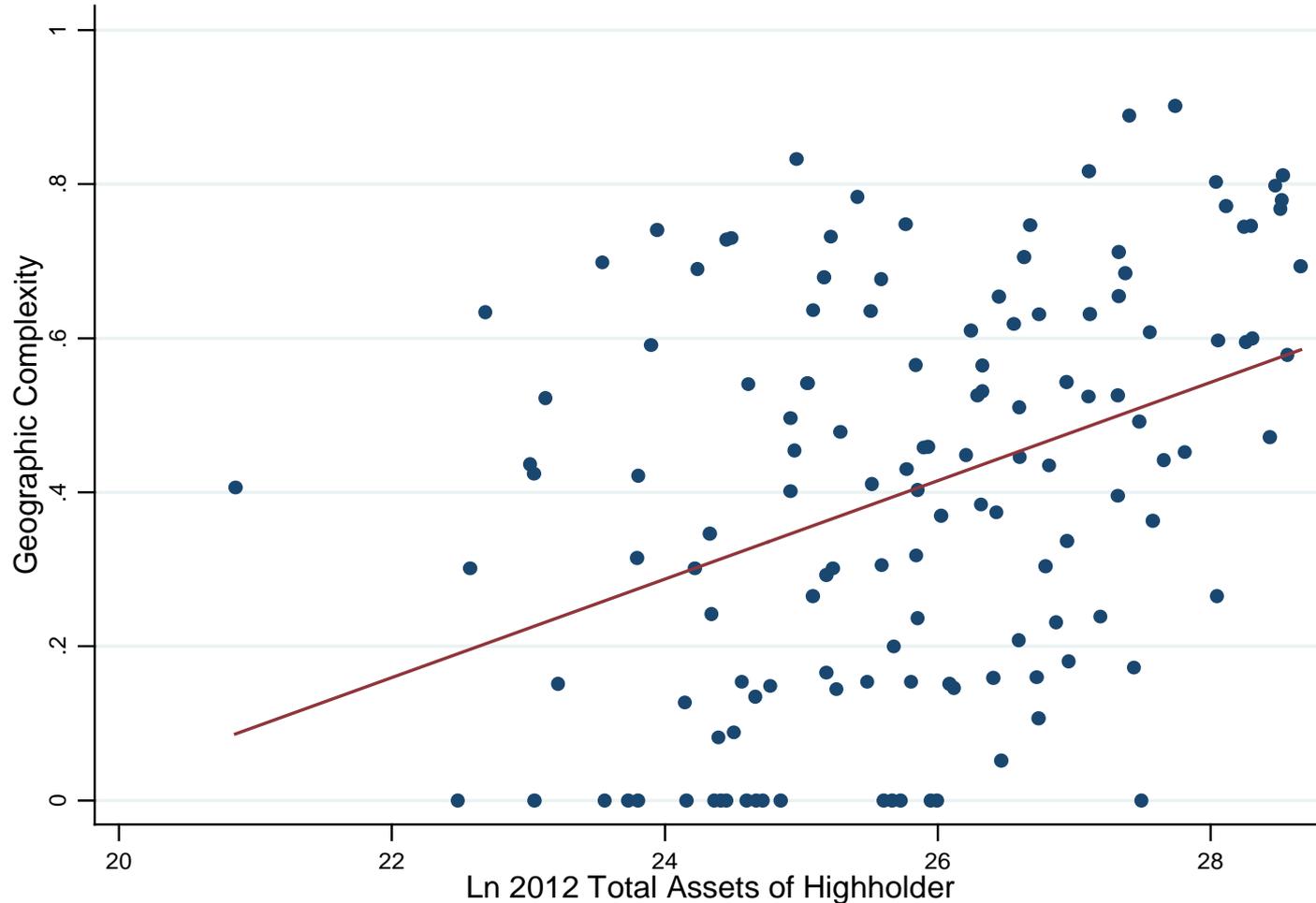
Slope of Fit Line = 2.254***
R Squared = 0.100

Obs 3. The relationship between size and business complexity is weak.



Obs 4. The relationship between size and geographic diversity is weak. Geographic dispersion not necessarily higher for larger FBOs.

Panel D



Slope of Fit Line = 0.064***
R Squared = 0.148

Concluding remarks

Open questions about the consequences of different forms of complexity, and the reasons for this complexity.

Our models and analysis of banking need to catch up with the new reality of the form of financial activity.

Does this matter for vulnerability and transmission?

Organizational structure data missing along with range of quantitative gaps identified by Philip Lane.

Thank you.