

The Valuation Effects of Geographic Diversification: Evidence from U.S. Banks

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Questions

- ▶ How does geographic diversity influence corporate valuations?
 - ▶ Did the geographic diversification of bank assets through subsidiaries across the US states in the 1980s and 1990s increase or decrease the market's valuation of banks?



Motivation: Long debate

- ▶ **Diversity might boost valuations and reduce agency problems**
 - ▶ Scale economies (Gertner, Scharfstein, and Stein, 1994; Houston, James, and Marcus, 1997)
 - ▶ Reduce exposure to idiosyncratic shocks
 - ▶ Eases cost of delegated monitoring (Diamond, 1984)
- ▶ **Diversity might lower valuations and intensify agency problems**
 - ▶ Facilitate the exploitation of control (Jensen, 1986; Jensen and Meckling, 1986; Scharfstein and Stein, 2000)
 - ▶ Insiders will exploit private benefits if those benefits exceed the reduction in the value of their private holdings



We focus on the net effect

- ▶ We examine whether an exogenous increase in diversity causes valuations to rise or fall
- ▶ We do not examine the components: scale economies, diversification, agency problems



Why study geographic diversity of US BHCs?

▶ Identification:

- ▶ Geographic diversity in the 1980s and 1990s provides a natural experiment for examining the causal impact of diversity on valuations and insider lending

▶ Sets the bar very high:

- ▶ Benefits of risk diversification and scale economies should be high
- ▶ Therefore, if diversity *still* lowers valuations, then agency problems are probably first-order

▶ Real agenda ... contribute to better understanding of the corporate governance of banks



This builds on past work ...

- ▶ Laeven and Levine (2007, JFE)
 - ▶ Diversification discount in an international cross-section of banks
 - ▶ But:
 - Identification remains a concern
 - Product, not geographic diversification
- ▶ This paper also adds to research on nonfinancial corporate diversification
 - Identification
 - Pure geographic diversification, where risk diversification and scale economies should be large



This paper: 2 new identification strategies

$$\triangleright q_{ist} = \beta D_{ist} + X'_{ist} \rho + \delta_i + \delta_{st} + \delta_{ibt} + \varepsilon_{ist}$$

▶ Variables:

- ▶ q_{ist} = Tobin's q
- ▶ D_{ist} = measure of the BHCs geographic diversity
- ▶ X_{ist} = matrix of time-varying, state-varying, BHC traits
- ▶ δ 's = fixed effects
- ▶ Period: 1986 – 2007, deregulation triggered diversification
- ▶ Identification: X-state, X-time process of deregulation
 - ▶ Gravity model of BHC-specific diversification after deregulation





Some preliminaries



Key variables data

Diversification: 4 measures

- ① Diversification = 1 if a BHC has subsidiaries in more than one state, and 0 otherwise.
 - About 25% of BHCs
 - 50% of these are in 3 or more states
 - Undiversified banks typically have one subsidiary
- ② Fraction of assets held in out-of-state subsidiaries
- ③ $\ln(\text{Average distance between HQ and subsidiaries (in miles)} + 1)$
- ④ 1 – Herfindahl Index of assets across states



Sample construction

- ▶ Publicly listed BHCs, within 50 states & DC, 1986 – 2007
- ▶ \approx 28,000 BHC-quarter observations



Some more preliminaries

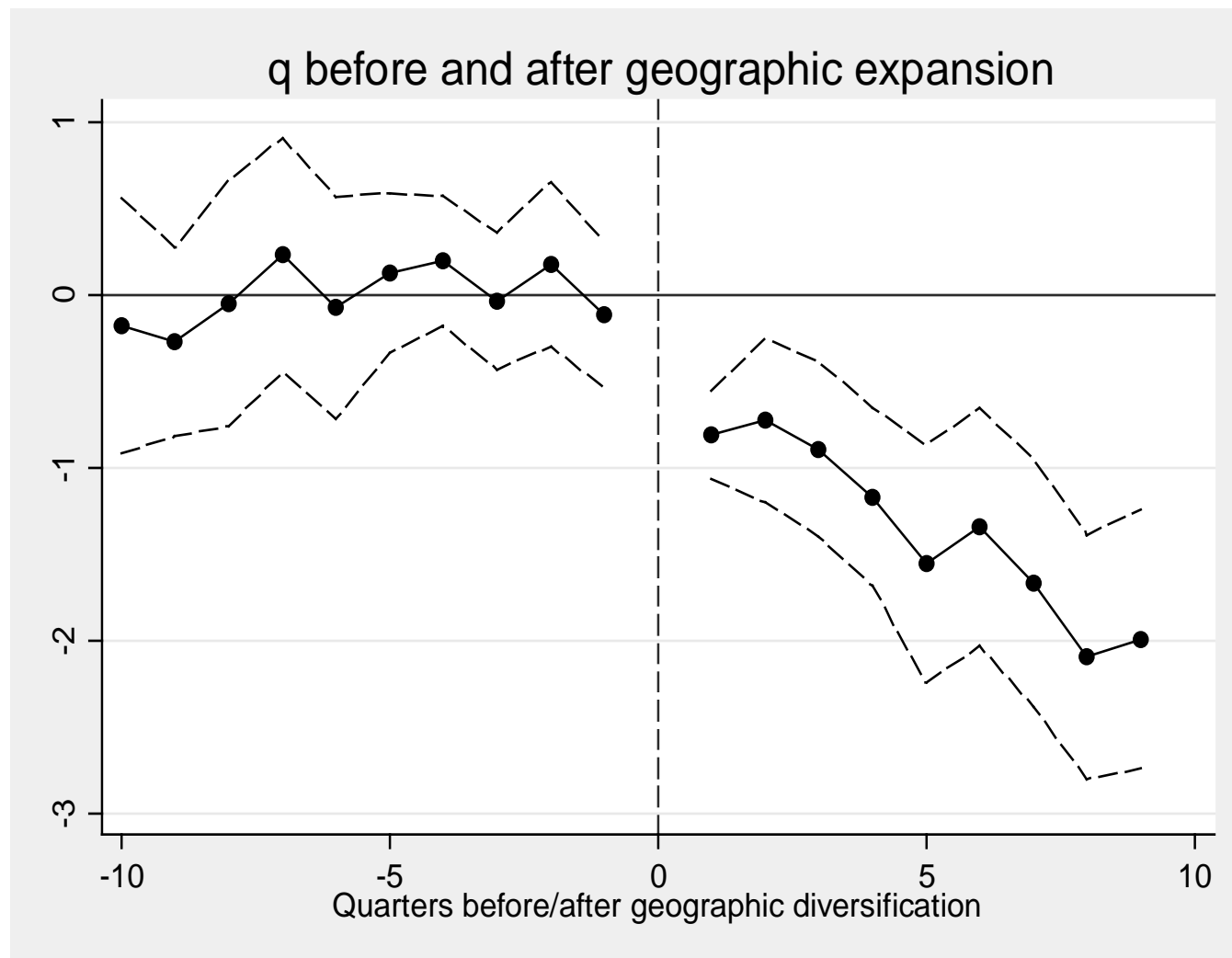
Patterns

OLS regressions of q on geographic diversification measures

- ▶ Conditioning on BHC FEs, the relationship between q and diversity changes, turning negative (Table 3)
- ▶ This is consistent with the view that higher valued, more profitable banks diversify, but diversification is associated with a drop in valuations ...



Dynamic relation between diversification and BHC valuations



Interstate deregulation

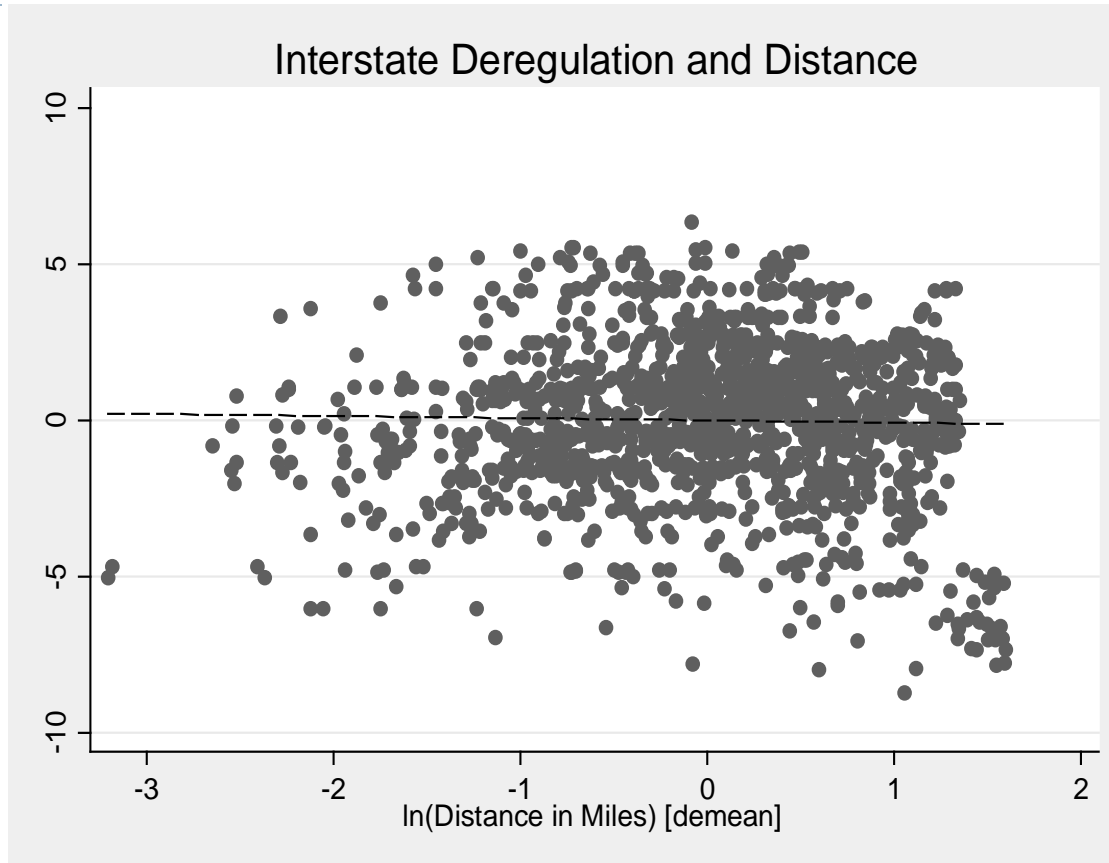
An identifying process, not an event

Interstate deregulation: 1978 - 1995

- ▶ Prior to 1978, BHCs restricted from establishing subsidiaries/branches across states
- ▶ Deregulation allowed
 - ▶ BHCs to purchase & establish subsidiaries
 - ▶ Also, with time, interstate banking through branching, which are not separately capitalized, legal entities
- ▶ State-specific evolution has been less studied



Is deregulation associated with distance?



For a state pair A-B, the y-axis measures the difference between the year of deregulation and the average year of A's Interstate Banking Deregulation with all states; the x-axis measures the difference between $\ln(\text{distance between A and B})$ and the average $\ln(\text{distance})$ between A and all states.

Identification

- ▶ Exploit X -state, X -time variation in the *process* of interstate bank deregulation to identify exogenous changes in BHC diversity
- ▶ The “process” characteristic is unique



Deregulation measures

Measures using start date

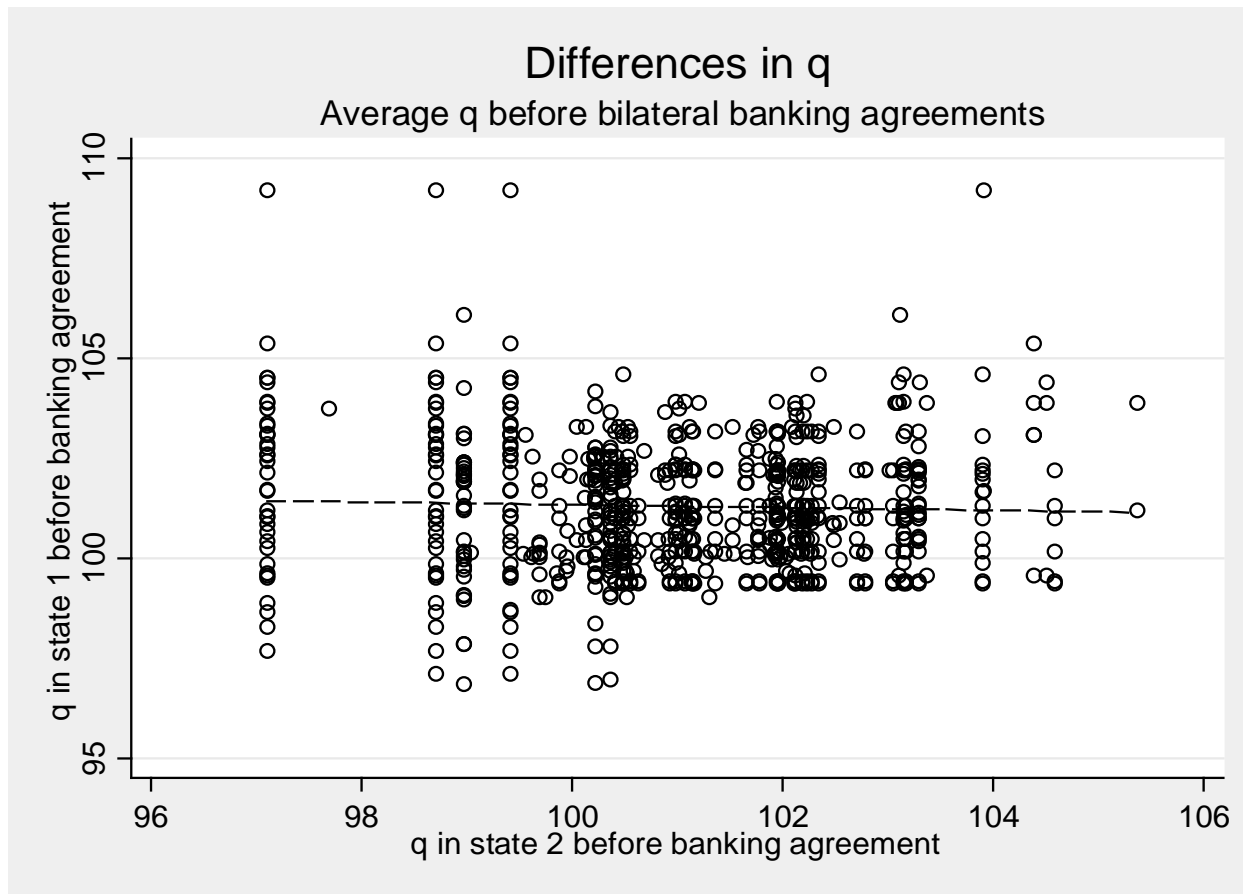
- ① Years since deregulation (and its square)
- ② Dummies for each year since deregulation
- ✧ When a state first opens

Measures using process of deregulation

- ① Ln (number of accessible states)
- ② Ln (Market population)
- ③ Ln (Market population/home population)
- ✧ Each of these done with and without weighting by distance
- ✧ These become our instruments



Between-state differences in q not associated with timing of deregulation



This figure plots the average q (in %) in state 1 against the average q (in %) in state 2 before both states remove their interstate banking. The dashed line represents the linear relationship, computed from an OLS regression.



We employ two IV strategies

The first operates at the state-time level

The second operates at the state-time-BHC level

Diversity & q : State-time IV (Table 5)

Tobin's q (second-stage)	(6)	(7)	(8)	(9)
1 - Herfindahl index of assets across states	-22.442** (10.405)	-17.341*** (5.151)	-12.620*** (4.842)	-11.728*** (3.185)
Bank and macro controls	✓	✓	✓	✓
State fixed effects	✓	✓	✓	✓
Quarter fixed effects	✓	✓	✓	✓
Observations	25,431	25,431	25,431	25,431
F Test of instruments' joint significance	6.335	19.88	16.58	36.74

Excluded instrument:

Ln(Market population) ✓

Ln(Market population - weighted) ✓

Ln(Market potential) ✓

Ln(Market potential - weighted) ✓



Deregulation & Diversity: 2

Identification: X-BHC, X-state, X-time

Now, Gravity-Deregulation Model

- ▶ **Combine:**
 - ▶ **Deregulation:**
 - ▶ **time-varying**
 - ▶ **bilateral-state level**
 - ▶ **Gravity model of**
 - ▶ **“foreign” direct investment**
 - ▶ **BHC (county)-bilateral-state level**
- ▶ **We use insights from the Frankel-Romer method**
 - ▶ They use a gravity model to estimate bilateral trade
 - ▶ They then aggregate to national trade, using this as an instruments for trade in a growth regression



Specifics

$$\text{Share}_{b,i,j,t} = a * \text{Distance}_{b,i,j} + b * \text{Ln}(\text{pop}_{i,t} / \text{pop}_{j,t}) + \delta_b + \delta_i + \delta_j (+\delta_{i,j}) + \delta_t + \varepsilon_{b,i,j,t}$$

- ① Estimate for state-pair-quarters in which expansion is possible
- ② Construct projected $\text{Share}_{b,i,j,t}$ as follows:
 - a) Use the estimated equation for state-pair-quarters in which diversity is possible
 - b) Impose a zero for state-pair-quarters when expansion is impossible because of regulation
- ③ From these projected $\text{Share}_{b,i,j,t}$ values build
 - a) I - Herfindahl Index of assets across states (predicted)
 - b) Which is at the b, i, t level and therefore BHC-specific



Patterns of diversification

An example

Diversification of Capital Bankcorp Ltd. 1990 → 2007



The gravity component of the gravity-regulation mModel

$$\text{Share}_{b,i,j,t} = a * \text{Dist.}_{b,i,j} + b * \text{Ln}(\text{pop}_{i,t} / \text{pop}_{j,t}) + \mathbf{c} * \mathbf{X}_{b,i,j,t} + \delta_b + \delta_i + \delta_j + \delta_{i,j} + \delta_t + \delta_{i,t} + \varepsilon$$

- Closeness: Distance (in 100s of miles) of county of BHC's headquarters to other state's capital ($a < 0$)
- Relative market size: population of BHC's home state divided by population of foreign state ($b < 0$)
- We find:
 - negative relation between BHC's holdings in "foreign" state and distance between BHC's county and "foreign" state
 - BHCs less likely to diversify into comparatively small states



Some advantages of the gravity model

- ▶ Concern: Results may be driven by greater competition from out-of-state banks, not by intensification of agency problems from diversification into other states
- ▶ **County-level analyses reduce this concern:**
 - ▶ They account for statewide, unobservable time-varying changes, such as changes in competition within a state, using state-quarter fixed effects
 - ▶ BHC-county-level instruments differentiate among BHCs within the *same* state and quarter, allowing for sharper inferences about the impact of BHC diversity on valuations



Comparison of estimated coefficients

	Tobin's Q OLS	Tobin's Q OLS BHC FE	Tobin's Q S-T Reg IV	Tobin's Q Grav-Reg IV BHC FE
Diversity	+1.5***	-0.4***	-11.7***	-33.7***

- As the treatment becomes more refined -- moving from a state-time treatment to a county-time instrument, we better identify the impact of an exogenous increase in diversification on BHC's valuations
- And, the estimated impact has a larger economic magnitude



Conclusions

- ▶ Using two new identification strategies based on the dynamic process deregulation, we find that exogenous increases in geographic diversity reduce BHC valuations
- ▶ Data are consistent with the view that geographic diversification increases organizational “complexity”
 - ▶ making it harder for outside shareholders to monitor
 - ▶ outweighing the valuation benefits of diversification
- ▶ Since this emerges from geographic diversity within U.S., it highlights the governance problems at banks



THANK YOU!



Gravity model: zero-stage (Table 6)

	(1)	(2)	(3)	(4)	(5)
Distance (in 100 miles)	-1.165*** (0.006)	-1.100*** (0.008)	-1.912*** (0.013)	-0.243*** (0.012)	-1.948*** (0.014)
Ln(population ratio)	-0.827*** (0.005)	-0.954*** (0.008)	-3.473*** (0.129)	-0.035 (0.042)	-5.829*** (0.248)
(County population in state-quarter above 66th percentile) × Ln(Population ratio)		0.257*** (0.011)	0.208*** (0.014)	0.032*** (0.005)	0.369*** (0.026)
(County population in state-quarter above 66th percentile) × Distance (in 100 miles)		-0.134*** (0.013)	-0.111*** (0.013)	0.035*** (0.003)	-0.097*** (0.014)
County population in state-quarter above 66th percentile		0.002*** (0.001)	0.002** (0.001)	-0.002*** (0.000)	0.001 (0.001)
State fixed effects			✓		
Quarter fixed effects			✓	✓	
Bank holding company fixed effects				✓	✓
State-pair fixed effects				✓	
State-quarter fixed effects					✓
Observations	1,123,007	1,122,940	1,122,940	1,122,940	1,122,940



Table 7: Diversity and value: BHC IVs based on gravity-deregulation model

Dependent variable: Tobin's Q		(1)
1 - Herfindahl Index of assets across states		-33.740*** (12.237)
Bank and macro controls		✓
Bank holding company fixed effects		✓
State-quarter fixed effects		✓
Observations		24,524
F-test of instruments' joint significance		12.84
Fixed effects in gravity model:		
Bank holding company fixed effects		✓
State-quarter fixed effects		✓

