THE ELUSIVE SCALE ECONOMIES OF THE LARGEST BANKS AND THEIR IMPLICATIONS FOR GLOBAL COMPETITIVENESS

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The Trade-off
between Systemic Risk and Efficiency at Large Institutions

- Would restricting scale reduce their cost efficiency and global competitiveness?

- Is the size of the largest financial institutions the result of

  - technological advantages that improve the efficiency of capital allocation and liquidity?
  - safety-net subsidies (e.g. too big to fail) that confer a funding cost advantage?

- Is the trade-off genuine?

The Issues

- What are scale economies?
- What are their technological sources?
- How are they measured?
- Why are they so hard to detect?
- Is evidence of scale economies at the largest financial institutions due to too-big-to-fail subsidies rather than technology?
- How would restrictions on size affect global competitiveness?

What are scale economies?

- How minimum cost varies with output
- A proportional increase in output
  - A **less than proportional increase** in cost
    - Cost elasticity < 1

    Economies of scale (increasing returns)
    - 1 / cost elasticity > 1

  - A **more than proportional increase** in cost
    - Cost elasticity > 1

    Diseconomies of scale (decreasing returns)
    - 1 / cost elasticity < 1

What are the technological sources of scale economies?

- Standard textbook explanations of scale economies associated with larger output

  - spreading the overhead, especially information technology

  - diversification of liquidity risk

  - diversification of credit risk

- Relatively fewer resources required to manage liquidity and credit risk

- Network economies in payments

How are scale economies measured? What are bank costs?

- Interest expense
  - Insured deposits (an input price)
  - Uninsured deposits (an input price)
  - Other borrowed funds (an input price)

- Noninterest expense
  - Labor (an input price)
  - Physical capital (an input price)

- Cost or quantity of equity capital

- Quantity of nonperforming loans

How are scale economies measured? What are bank outputs?

- Loans

- Liquid assets
  - Reserves, repos and fed funds sold

- Securities
  - Treasuries, Agencies, MBS, ABS, etc.

- Trading assets

- Off-balance-sheet activities
  - lines of credit, letters of credit, derivatives measured by credit equivalents

How are scale economies measured? The relationship of cost to outputs

- **Standard assumption of minimum cost**
  - Given financial outputs
  - Given prices of inputs
  - Given equity capital or shadow price of equity
  - Given asset quality

- **Econometric estimation**
  - Cost as a function of outputs, input prices, equity, asset quality

- **Common finding**
  - Slight scale economies at smaller banks
  - Scale *diseconomies* at largest banks

The Common Finding Summarized by Alan Greenspan ("The Crisis," 2010)

"For years the Federal Reserve had been concerned about the ever larger size of our financial institutions.

Federal Reserve research had been unable to find economies of scale in banking beyond a modest-sized institution."

Is the Finding of Diseconomies at the Largest Institutions Credible?

- Textbooks assert that scale economies characterize banking.

- Large institutions have historically continued to grow larger.

- Institutions merge to create larger institutions.

- But becoming large to obtain too-big-to-fail subsidies may overcome diseconomies.

# Who Has Found Evidence of Scale Economies at Large Banks?

- Hughes, Lang*, Mester*, and Moon (*JMCB* 1996)

- Berger* and Mester* (*JBF* 1997)

- Hughes and Mester* (*ReStat* 1998)

- Hughes, Mester*, and Moon (*JBF* 2001)

- Bossone and Lee (*IMF* 2004)

- Wheelock* and Wilson (2009)

- Feng and Serletis (*JBF* 2010)

 * Current and former Federal Reserve System economists

Why Are Scale Economies So Hard to Detect?

- Endogenous risk-taking

- Better diversification as scale increases
  - Improved risk-expected-return frontier
  - Lower marginal cost of risk management

- Larger institutions tend to take more risk in response to the improved frontier.

- Separate diversification's cost-saving from risk-taking's potential cost-enhancement.
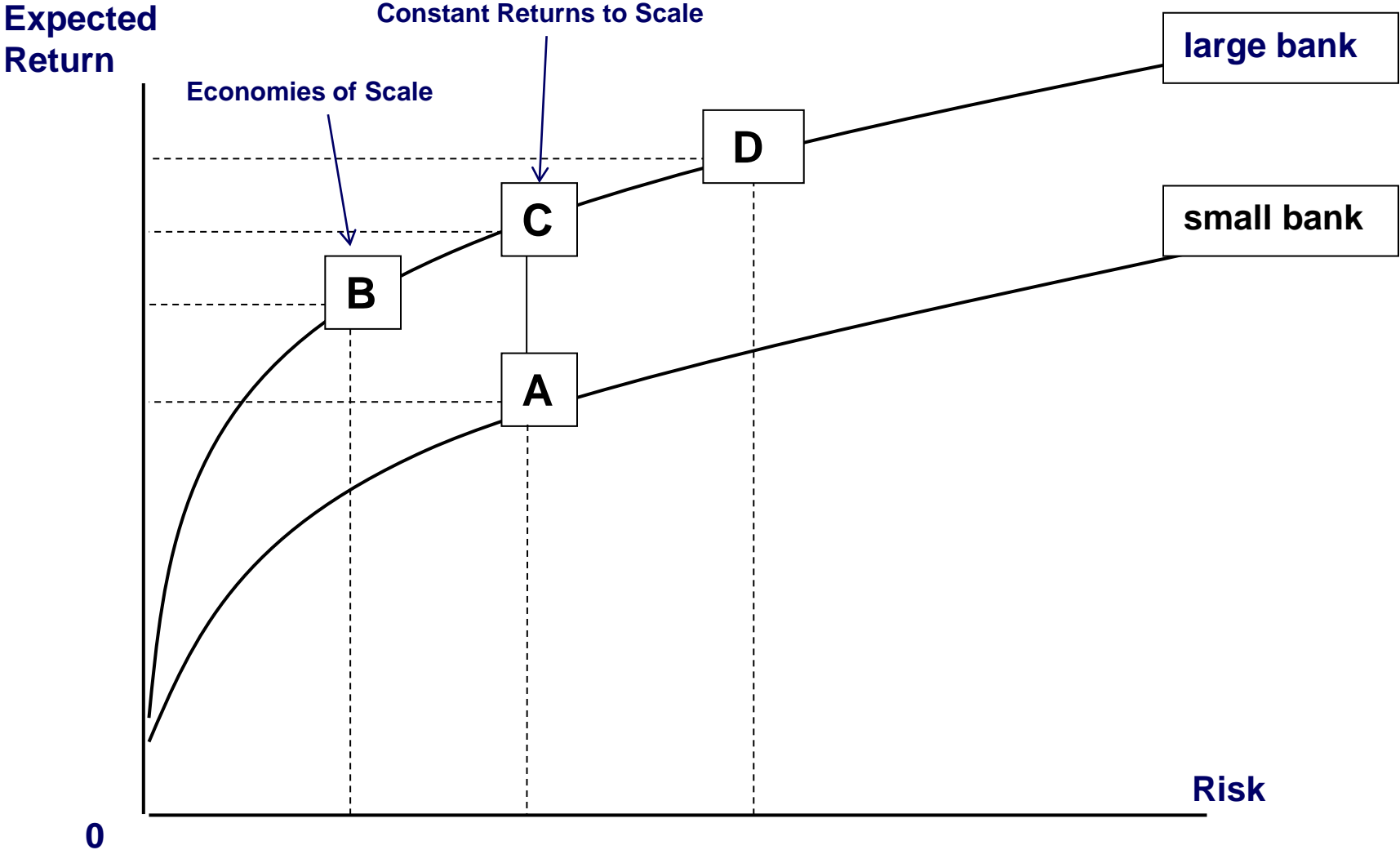
Diversification Effect vs Risk-Taking Effect
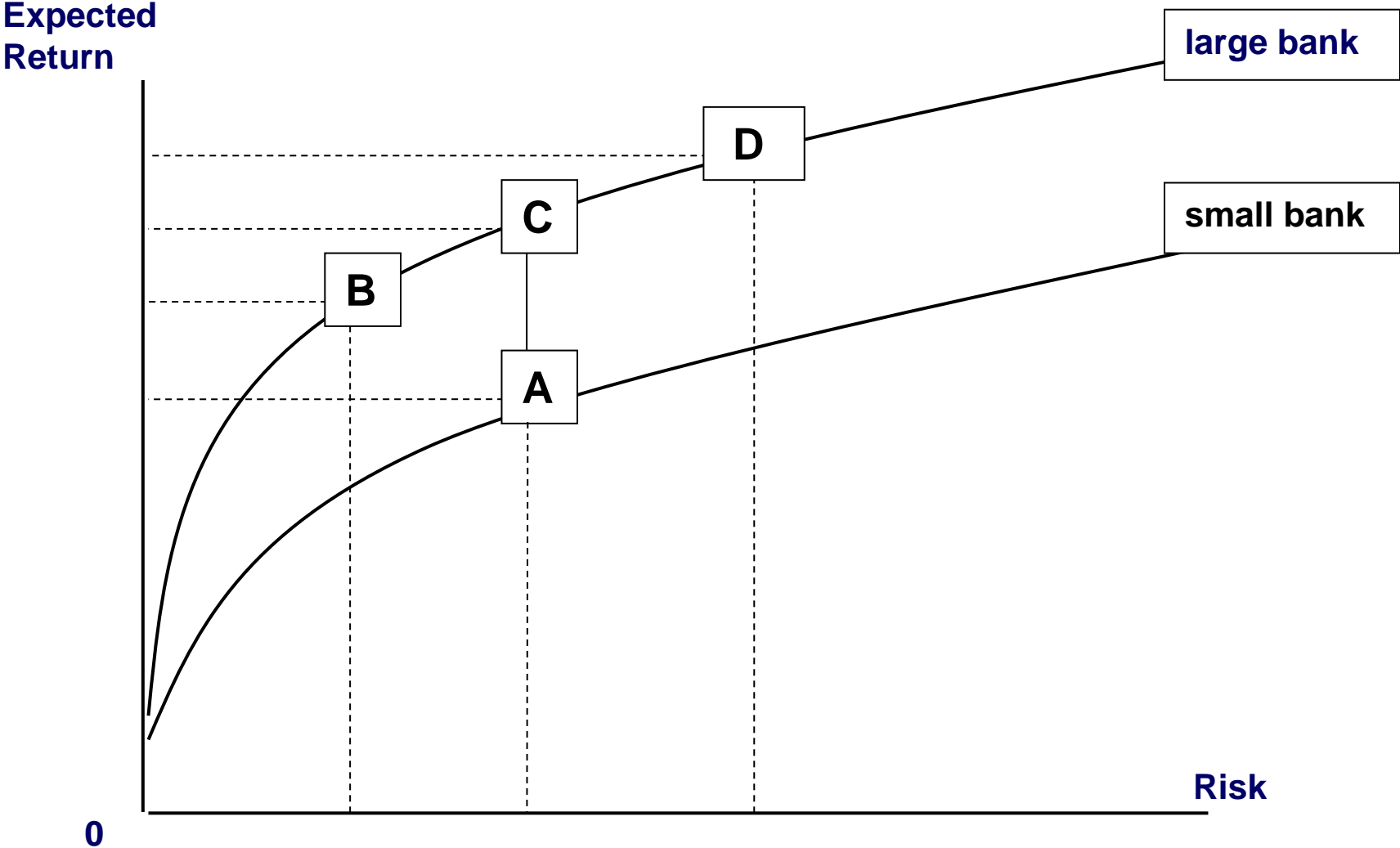
Expected Return

large bank

small bank
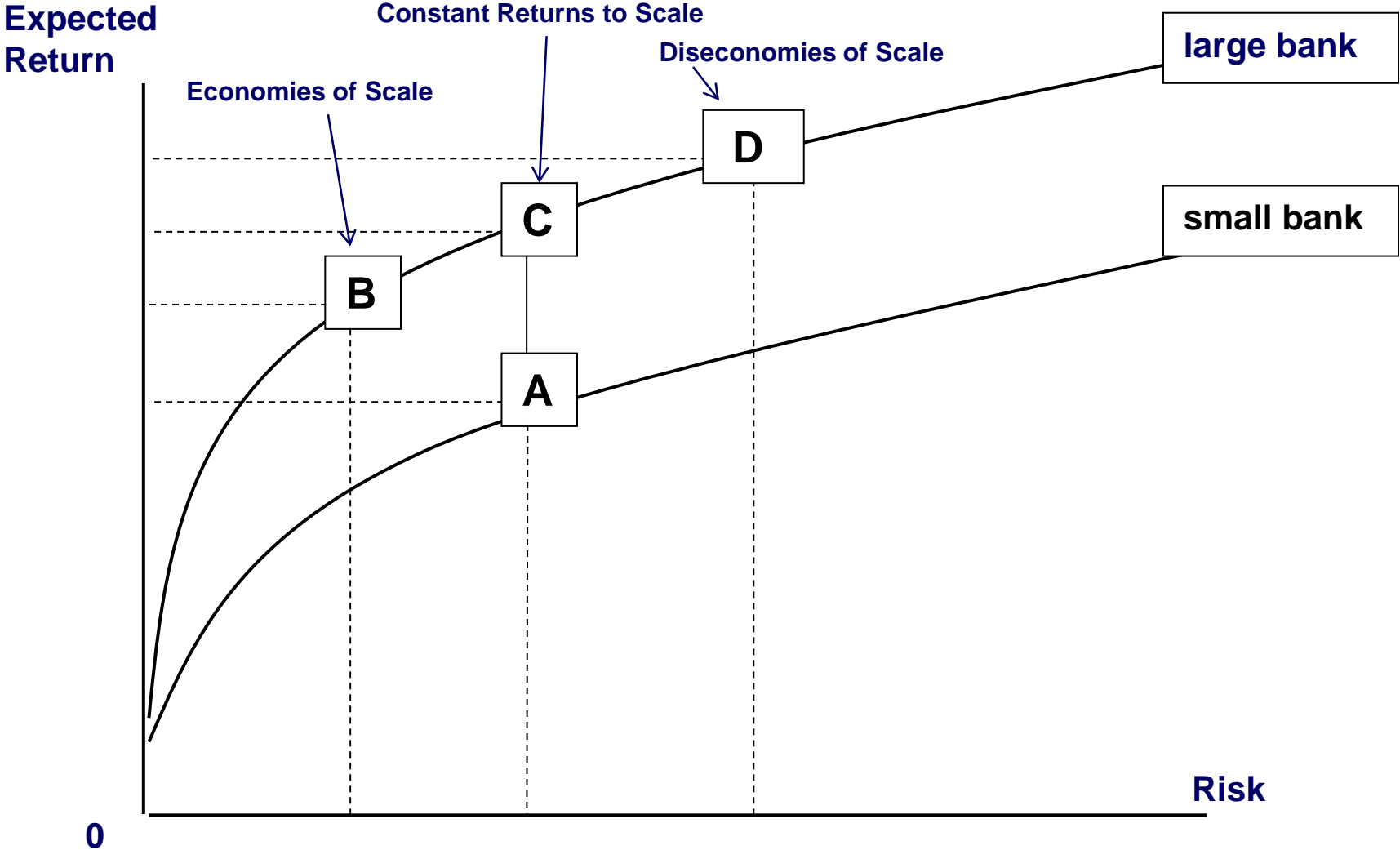
D

C

B

A

Risk

0

Diversification Effect vs Risk-Taking Effect
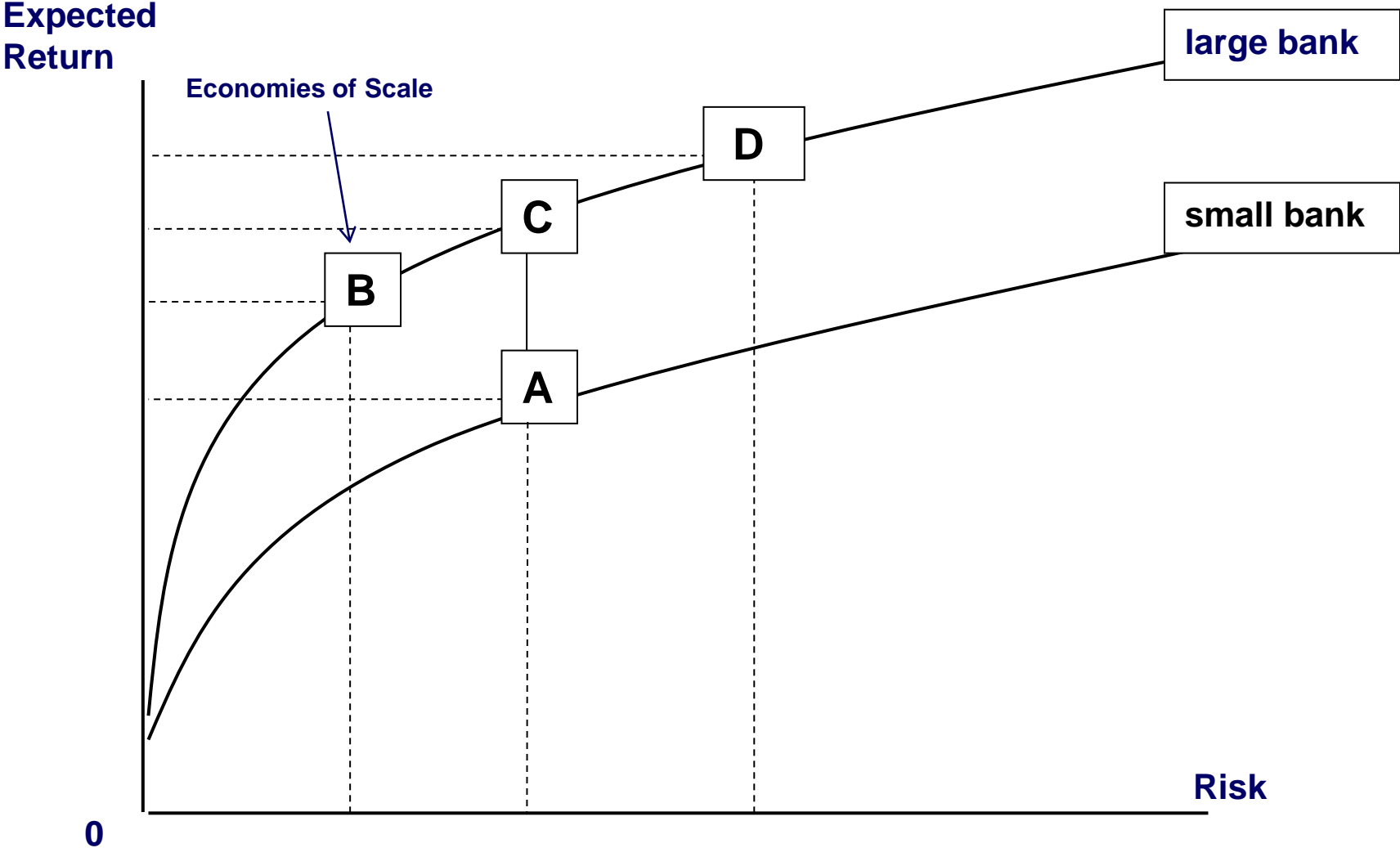
Diversification Effect vs Risk-Taking Effect

# Diversification Effect vs Risk-Taking Effect

What is the effect of increased risk-taking on cost?

- Scale-related diversification reduces cost elasticity, *ceteris paribus*

-     -- **the diversification effect**

   but **. . .**

- Additional risk-taking may increase cost elasticity, *ceteris paribus*

   -- **the risk-taking effect**

- Does the **risk-taking effect** mask cost economies due to the **diversification effect**?

Diversification Effect vs Risk-Taking Effect
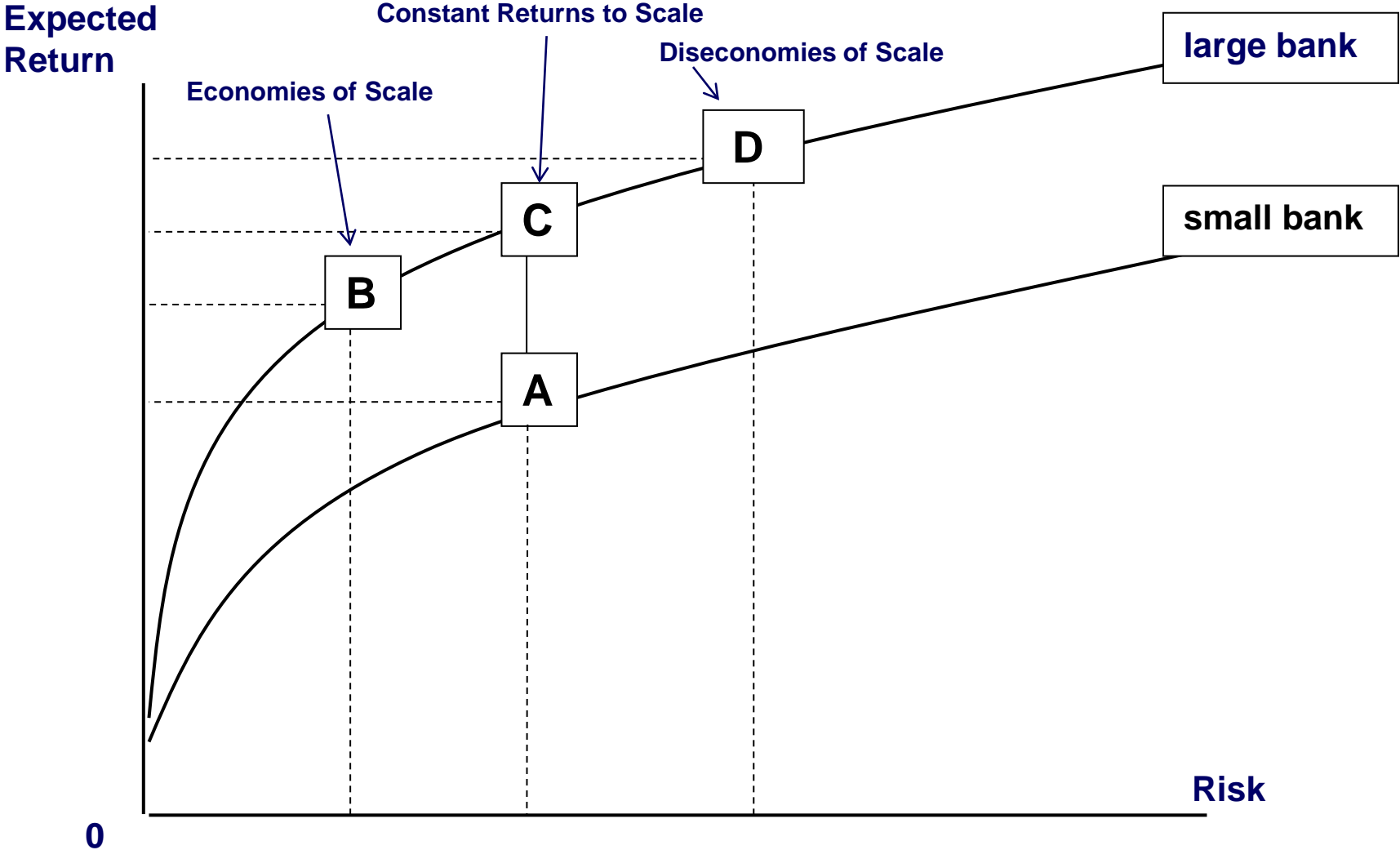
Size-Related Risk-Taking Incentives

- Marcus (1984)
- Banks with valuable growth opportunities
  - **Lower risk investment strategies** to avoid potential loss of charter (smaller banks)

  versus

- Banks with poorer growth opportunities
  - **Higher risk investment strategies** to exploit safety-net subsidies (larger banks)
- Grossman (1992), Keeley (1990)
- Hughes, Lang, Moon, Pagano (1997)

Diversification Effect vs Risk-Taking Effect
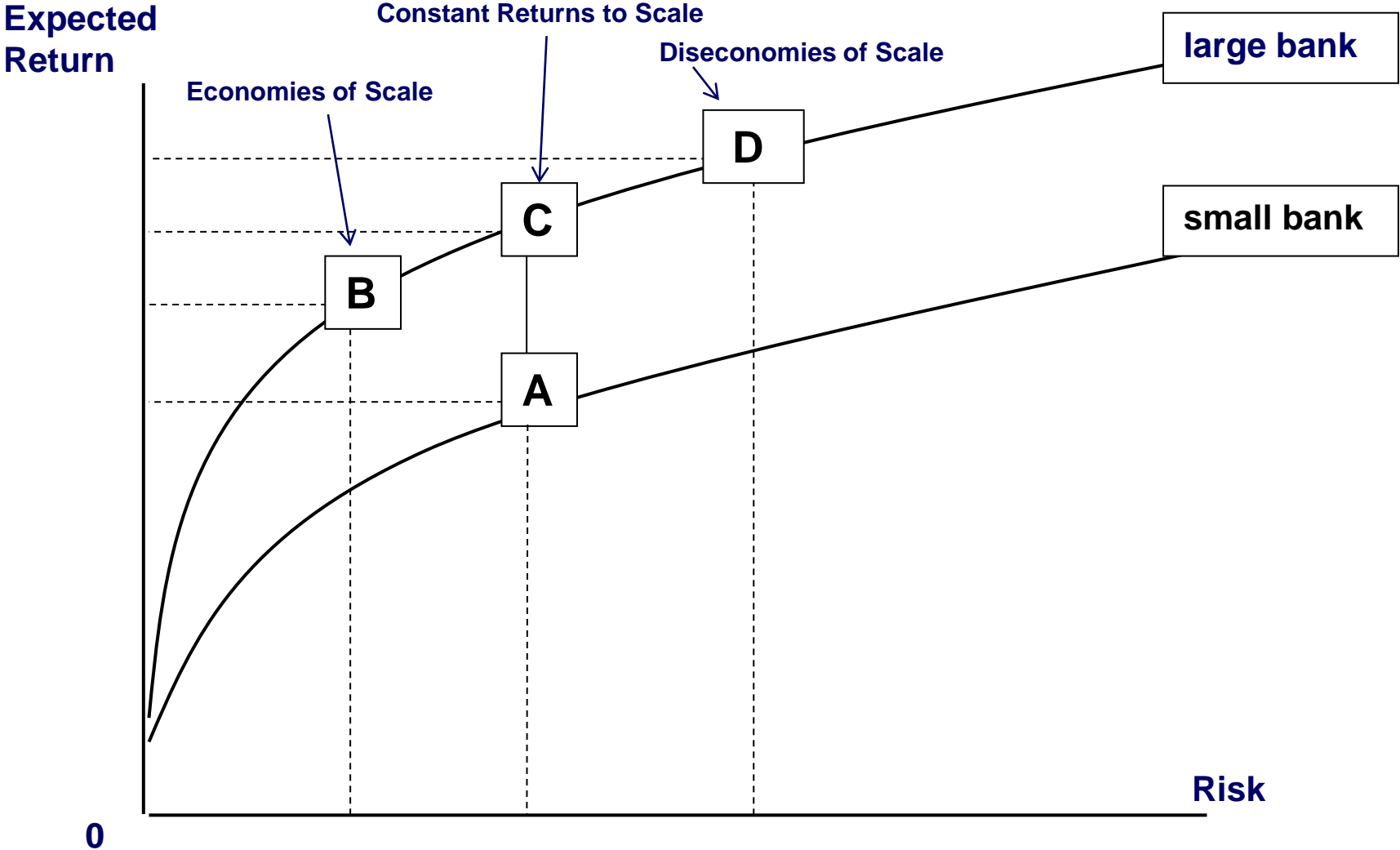
Risk-Return Driven Cost

- **Standard minimum cost function**
  - Ignores endogenous risk-taking
  - **Risk-taking effect** can obscure the presence of scale economies at large, well diversified banks

- **Cost function driven by expected return and risk-taking**
  - Hughes, Lang, Mester, and Moon 1996, 2000
  - Hughes, Mester, and Moon 2001
  - Hughes and Mester 2010 (revised 2011)
  - **Models risk-expected return decisions in production and infers cost from them**
  - Captures diversification and risk-taking effects
  - **Isolates scale economies due to better diversification and other scale advantages**

Mean Cost Elasticities (842 US Top-Tier Bank Holding Companies 2007)
Hughes and Mester 2011

Total Assets	Standard Cost Function Omits Level of Equity
< $0.8 billion n = 328	**0.97**
$0.8 billion – $2 billion n = 299	**0.97**
$2 billion – $10 billion n = 155	**0.97**
$10 billion – $50 billion n=31	**0.98**
$50 billion - $100 billion n = 12	**0.98**
> $100 billion n = 17	0.99

Estimates of scale economies in **bold** are significantly different from 1 at the 1% level.

Mean Cost Elasticities (842 US Top-Tier Bank Holding Companies 2007) Hughes and Mester 2011

Total Assets	Standard Cost Function Omits Level of Equity	Standard Cost Function Conditioned on Level of Equity
< $0.8 billion n = 328	**0.97**	1.04**
$0.8 billion – $2 billion n = 299	**0.97**	1.04 **
$2 billion – $10 billion n = 155	**0.97**	1.05**
$10 billion – $50 billion n = 31	**0.98**	1.07**
$50 billion – $100 billion n = 12	**0.98**	**1.11**
> $100 billion n = 17	0.99	**1.13**

Estimates of scale economies in **bold** are significantly different from 1 at the 1% level.
 * Significantly different from 1 at the 10 percent level
** Significantly different from 1 at the 5 percent level

Mean Cost Elasticities (842 US Top-Tier Bank Holding Companies 2007) Hughes and Mester 2011

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< $0.8 billion n = 328	**0.97**	1.04**	**0.96**
$0.8 billion – $2 billion n = 299	**0.97**	1.04 **	**0.96**
$2 billion – $10 billion n = 155	**0.97**	1.05**	**0.97**
$10 billion – $50 billion n=31	**0.98**	1.07**	0.97**
$50 billion - $100 billion n = 12	**0.98**	**1.11**	0.97**
> $100 billion n = 17	0.99	**1.13**	0.97

Estimates of scale economies in **bold** are significantly different from 1 at the 1% level.
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Mean Cost Elasticities (842 US Top-Tier Bank Holding Companies 2007) Hughes and Mester 2011

Total Assets	Standard Cost Function Omits Level of Equity	Standard Cost Function Conditioned on Level of Equity	Standard Cost Function Includes Shadow Cost of Equity	Risk-Return -Driven Cost Function
< $0.8 billion n = 328	**0.97**	1.04**	**0.96**	**0.88**
$0.8 billion – $2 billion n = 299	**0.97**	1.04 **	**0.96**	**0.88**
$2 billion – $10 billion n = 155	**0.97**	1.05**	**0.97**	**0.87**
$10 billion – $50 billion n=31	**0.98**	1.07**	0.97**	**0.85**
$50 billion - $100 billion n = 12	**0.98**	**1.11**	0.97**	**0.81**
> $100 billion n = 17	0.99	**1.13**	0.97	**0.74**

Estimates of scale economies in **bold** are significantly different from 1 at the 1% level.
 *   Significantly different from 1 at the 10 percent level
 **   Significantly different from 1 at the 5 percent level

Are the Estimated Scale Economies at the Largest Institutions Credible?

- Robustness checks (Hughes and Mester 2011)

- Similar results are obtained
  - Using 1994 data

- Similar results are obtained using 2007 data
  - Dropping institutions smaller than $2 billion in assets
  - Dropping institutions larger than $100 billion in assets – too-big-to-fail institutions – and predicting scale economies for these banks out of sample

Are the Large-Bank Scale Economies due to Too-Big-To-Fail Subsidies?

- Technology or Too Big To Fail?

- Recalculation of scale economies for each bank larger than $100 billion (too big to fail)

  – Eliminate any cost-of-funds advantage of large banks

  – Replace the average interest rate paid on each of the three types of borrowed funds with the median interest rate paid by banks smaller than $100 billion

  – Similar measured scale economies at largest banks

- Technology – not too big to fail

Gov. Tarullo (2011) on the Trade-off between Systemic Risk and Efficiency

"An additional concern would arise if some countries made the trade-off by limiting the size or configuration of their financial firms for systemic risk reasons at the cost of realizing genuine economies of scope or scale, while other countries did not.

In this case, firms from the first group of countries might well be at a competitive disadvantage in the provision of certain cross-border activities."

Restrictions on the Size of the Largest Financial Institutions and their Global Competitiveness

- Wheelock and Wilson (2010)
  - Cost comparison of 4 largest institutions in 2009 ($1.244 – 2.225 trillion) with a number of $1 trillion institutions equaling total assets of the four largest
  - **9% higher total cost for the $1 trillion institutions**

- Hughes and Mester (2011)
  - Cost comparison of 17 largest institutions (> $100 billion) scaled back to $100 billion with same product mix as larger institution; increase number of banks to equal total assets of the 17 largest
  - **Predicted costs of smaller banks 2.4 times larger**

The Conclusions

- Scale economies are hard to detect because costly endogenous risk-taking related to technological scale advantages tends to obscure them.

- The largest financial institutions experience the largest scale economies.

- Technology rather than safety-net subsidies appear to generate them.

- Restrictions on size are likely to reduce the global competitiveness of these banks.