

# **Lecture 4:**

# **Competition in banking**

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# Outline

- The Industrial Organization of Banking
- Theory
- Empirics
- Behavioral Industrial Organization and Banking

# Imperfect competition in banking

- The perfect competition model does not apply to banking due to market power, asymmetric information, externalities, and behavioral biases.
- *Sources of market power*: switching costs, asymmetric information.
- *Barriers to entry* are present at different levels of the banking business
  - Regulatory barriers – charter and capital requirements – and TBTF policies
  - Economic barriers – investment in physical capital (economies of scale and scope, branch&ATMs network, IT equipment)
  - Reputation– building up a clientele and a reputation for solvency
  - Adverse selection
- *Multiproduct industry* with different segments having different levels of competition and barriers to entry
  - Local dimension (retail and SME market) vs. global dimension (wholesale/investment banking)
  - Internet banking

# Imperfect competition in banking

- Theories of contestable markets are not applicable either. However:
- Modern market-based banking is more contestable and may induce concentrated market structure due to high endogenous fixed costs
- Changes in technology and emergence of *fintech* competitors may work in favor of contestability of the banking market

# Theory

- Pricing
- Product Differentiation
- Switching Costs and Asymmetric Information
- Network Externalities and Two-Sided Markets
- Market Structure, Entry, and New Competitors
- Mergers

# Monti-Klein model

- Monopolistic bank facing supply of deposits and demand for loans where bank can access a competitive interbank market.
  - For deposit market, price is the deposit rate. For loan market, price is loan interest rate.
- Extension of the model to an oligopoly situation with banks competing *à la Cournot* with homogeneous deposits and loans or *à la Bertrand* assuming that the products and services of banks are differentiated.

# Monti-Klein model

- The monopolistic bank is confronted with an (inverse) downward-sloping demand  $r_L(L)$  for loans and an (inverse) upward-sloping supply of deposits  $r_D(D)$
- Bank's decision variables:  $L$  (amount of loans) and  $D$  (amount of deposits)
  - Level of equity is assumed to be given
- Bank takes into account influence of  $L$  on  $r_L$  and  $D$  on  $r_D$
- Bank takes interbank rate  $r$  as given (set by Central bank or determined by equilibrium rate on international capital markets);  $\alpha$  is the reserve coefficient

# Monti-Klein model

- Bank's profit is the sum of intermediation margins on loans and on deposits minus management costs

$$\begin{aligned}\pi(L, D) &= r_L(L)L + r((1 - \alpha)D - L) - r_D(D)D - C(D, L) \\ &= (r_L(L) - r)L + (r(1 - \alpha) - r_D(D))D - C(D, L)\end{aligned}$$

- Assume  $\pi(L, D)$  is concave. FOC:

$$\frac{\partial \pi}{\partial L} = r'_L(L)L + r_L - r - C'_L(D, L) = 0,$$

$$\frac{\partial \pi}{\partial D} = r'_D(D)D + r(1 - \alpha) - r_D - C'_D(D, L) = 0$$

# Monti-Klein model

- Elasticities of demand for loans and supply for deposits:

$$\eta_L = -\frac{r_L L'(r_L)}{L(r_L)} > 0 \text{ and } \eta_D = \frac{r_D D'(r_D)}{D(r_D)} > 0$$

Lerner indices:

$$\frac{r_L^* - (r + C_L')}{r_L^*} = \frac{1}{\eta_L(r_L^*)},$$

$$\frac{r(1 - \alpha) - C_D' - r_D^*}{r_D^*} = \frac{1}{\eta_D(r_D^*)}$$

- Solution of FOC is independent for  $D$  and  $L$  if costs are separable.

# Cournot Oligopoly model (symmetric)

$$\frac{r_L^* - (r + C'_L)}{r_L^*} = \frac{1}{N\eta_L(r_L^*)},$$

$$\frac{r(1 - \alpha) - C'_D - r_D^*}{r_D^*} = \frac{1}{N\eta_D(r_D^*)}.$$

- Monti-Klein can be reinterpreted as model of imperfect competition with extremes  $N = 1$  (monopoly) and  $N = +\infty$  (perfect competition)

# Cournot Oligopoly model (symmetric)

- Previous results provide a possible test of imperfect competition on the banking sector.
- Assuming that marginal costs and the elasticities are constant:

$$\frac{\partial r_L^*}{\partial r} = \frac{1}{1 - \frac{1}{N\eta_L}} > 1 \text{ and } \frac{\partial r_D^*}{\partial r} = \frac{1-\alpha}{1 + \frac{1}{N\eta_D}} < 1,$$

- As the intensity of competition increases ( $N$  grows),  $r_L^*$  (resp.  $r_D^*$ ) becomes less (resp. more) sensitive to changes in  $r$ .

# Collusion

- Industry (traditionally) with structure and practices conducive to collusion:
  - Repeated interaction in stable environment
  - Multimarket contact: Deviation in one market can be punished in others
  - Incentives for building a cooperative (collusive) behaviour reputation (history and focal points)
  - Regulatory forbearance
- Transparency: effect is ambiguous.
  - For consumers: Pro-competitive
  - For banks: good for collusion because easier to detect price cuts

# Product differentiation

- Location/horizontal differentiation models:
  - Bank retail clients experience disutility associated with distance from branch (transportation cost), allowing banks to price-discriminate spatially and use branch network as barrier to entry
    - Ho and Ishii (2011), Thisse and Vives (1988)
  - Location models also used to model product differentiation and impact of regulation in banking
    - Chiappori et al. (1995); Matutes and Vives (1996)
- Vertical differentiation – reputation (probability of failure) differentiates banks in competition for deposits.
  - Low-risk banks enjoy larger margins, profits, and market shares (Matutes and Vives (1996)).
  - Vertical differentiation may give banking a natural oligopoly structure.

# Switching costs

- Switching costs: substitution cost of moving from one bank to another
  - Collusive outcomes once firms have established a customer base that remains captive
  - However, switching costs may induce competition to enlarge customer base
    - Advantageous introductory pricing schemes (which may be reduced after locked-in customer)
  - Switching costs induce a less elastic demand from customers, increasing profits of banks
  - Large institutions have a tendency to exploit locked-in customers
  - Asymmetric information may induce switching cost: loss of established relationship with bank (especially important for firms, as bank loans serve an accreditation purpose)

# Asymmetric information

- Broecker (1990), Riordan (1993), Gehrig (1998), Marquez (2002), Hauswald and Marquez (2006)
- Winner's curse: more competition worsens adverse selection problem as a higher loan rate set by a bank tends to worsen the quality of firms accepting the loan
  - a firm accepts a higher loan rate by a bank only after being rejected by all other banks that set lower rates, which implies that, on average, the firm has low creditworthiness (its average decreasing in the number of banks)
- Screening incentives of banks are reduced with more competition, as more competition reduces loan profitability
- Lower quality of borrowers as competition increases may also increase loan rates to compensate for higher portfolio risk
  - High loan rates and Lerner indices would be associated with more competition
  - Endogenous information acquisition restores 'normal' association between rates and number of banks (more competition induces more information acquisition)

# Relationship banking

- Banks have ex-post monopoly of information on its borrowers. Competitors face winner's curse since they are uninformed.
- More private information (soft) increases ex-post information monopoly. More public (hard) information has opposite effect (Rajan (1992), Sharpe (1990), Hauswald and Marquez (2003))
  - Market power gives incentives to alleviate asymmetric information problem by investing in monitoring projects of firms and establishing value-enhancing relationship banking.
- More competition may have two different effects (Besanko and Thakor (1993), Petersen and Rajan (1994, 1995), Berlin and Mester (1999), Boot and Thakor (2000)).
  - May destroy long-term relationships because banks need a fat margin to provide finance insurance to firms.
  - Or foster relationship banking by increasing probability of success of firms through better terms. Xavier Vives

# Information sharing

- Sharing information among banks on the credit record of borrowers alleviates asymmetric information problems and may enhance competition (Pagano and Japelli (1993), Padilla and Pagano (1997)).
  - Facilitates entry of new lenders
  - Reduces informational advantage of incumbents
  - Reduces switching costs to acquire creditworthy borrowers
  - Disciplines borrowers (affects ability to borrow in the future)
  - Committing banks not to exploit borrowers because of their informational monopoly

# Network externalities

- ATM compatibility (Matutes and Padilla (1994))
  - Small banks have incentives for ATM compatibility (free riding on the network of larger banks)
  - Large banks prefer incompatible system
  - ATM networks can be used as a strategic variable to affect price competition on the deposit market and prevent entry of potential entrants. In equilibrium there is no full sharing:
    - Partial sharing obtains when a large ATM network allows the bank to offer lower deposit rates.
    - No sharing obtains when a large network increases rivalry in prices as banks become less differentiated.
- Remote access to customers (Degryse (1996)).
  - Introduce vertical differentiation between banks
  - Reduce the degree of horizontal differentiation

# Two-sided markets

- Example: payment card systems with acquiring and issuing functions.
  - Intermediation platform makes possible the interaction between end users (merchants and cardholders) and gets the two sides on board to accomplish payment or cash withdrawal transactions
- Analysis of pricing in two-sided markets has to take both sides into account since the value each group puts on the platform services depends on the size of the group on the other side of the market (Rochet and Tirole (2006)).
- Two-sided markets as multiproduct market competition with network externalities.
  - Issuing externality (value added to an acquiring bank/retailer when another consumer gets a payment card) & acquiring externalities (value added to an issuing bank/cardholder when an acquiring bank affiliates a retailer with the card payment system).
- Implications:
  - Increasing competition among service providers need not be welfare improving.
  - Platforms not only choose a price level, but also establish the pricing structure of the platform
    - Fee structure: pricing below marginal costs on one side and above marginal cost on the other is a normal practice that cannot be interpreted, respectively, as “predation” or “excessive market power.”
  - Platforms have to protect the investment of members against the possible free-riding of new entrants.

# Market structure and entry

- Concentration decreases as the sunk cost of entry decreases relative to market size
  - Implication: a larger size of market (e.g. market integration) decreases concentration. Indeed, smaller markets tend to be more concentrated.
- In the presence of fixed costs of entry, higher competitive intensity in the market induces less entry and higher concentration
  - Implication: deregulation that increases competition will tend to increase concentration.
- Transformation of banking: now the sunk cost of entry are endogenous and controlled by the banks via investment in IT and information acquisition for lending purposes (Vives (2000, 2001); Sutton (1991), Vives (2008))
  - Vertical differentiation through cost of production and delivering services and/or the quality of services
  - Implication: increase in market size need not lower concentration
    - Adverse selection acts as a barrier to entry.
  - Degree of endogeneity of sunk costs is still an empirical question

# New competitors and digital technology

**To what extent does emergence of fintech competitors makes retail banking more contestable?**

- Disruptive potential of fintech and bigtech
- Lighter regulation of fintech providers but enhanced conduct of business regulation may impair the access of new entrants to the infrastructure by incumbent banks
- Switching costs: both endogenous and exogenous
  - Institutions may counter enhanced Internet search facilities with obfuscation strategies that increase frictions and restore margins
  - Enhanced price transparency brought by digital technology may have ambiguous dynamic pricing effects

# Strategies of players

- They will depend on:
  - Whether investment makes a firm tough or soft in the competition.
  - Whether competition involves strategic substitutes or complements.
- Incumbent may decide to *accommodate or prevent entry* depending on the underlying characteristics of industry
  - For example, in presence of switching costs, an incumbent bank will behave as a peaceful 'fat-cat' to protect the profitability of its large customer base.
  - Accommodation/partnership will work if cut in revenues to banks for each purchase with fintech platform is more than compensated by increase in aggregate transactions.
  - Incumbents may foreclose entry shutting out entrants from infrastructure.
- Entrant may want to *commit to remain small* so as to not elicit an aggressive response from incumbent
  - Peer-to-peer lending: example of small-scale entry since they cater in part to unbanked segments of the population
- Partnerships between entrant and incumbent may be formed
  - E.g., incumbents could benefit from IT knowledge as well as regulatory arbitrage by having a partnership with new entrants, as the latter experience lighter regulation

# Mergers

- Traditional IO analysis weighs efficiencies of a merger with the potential to raise prices (market power)
- Diversion ratios – measure the competition loss resulting from the merging of two firms that produce differentiated products.
  - The higher the diversion ratio between two firms, the more problematic the merger
- Other methods for estimating impact of mergers:
  - Estimation of demand systems for differentiated products
  - Structural competition models – differentiated products and the impact of the merger are simulated with an explicit competition model
  - Specificities of banking for estimating impact of mergers:
    - Multimarket and multiproduct with asymmetric information
    - Lack of relevant and appropriate data

# Overlapping ownership and partial mergers

- Effects of a merger can also be partially accomplished with common ownership and cross-participations
  - Common interests in firms in the same industry tend to relax competition
    - Owner/controller does not want to harm rival's profits, as it will decrease the potential revenues from other firm
    - The same happens with cross-shareholdings
  - The presence of common and cross-ownership arrangements means that the standard concentration measures such as HHI have to be modified
    - Bresnahan and Salop (1986), O'Brien and Salop (2000), Azar et. al (2016).

# Common ownership

(Salop and O'Brien (2000))

- Industry with  $N$  firms and  $M$  owners:
  - Ownership share (cash flow rights) of firm  $j$  accruing to investor  $i$ :  $\beta_{ij}$
  - Control rights of firm  $j$  held by owner  $i$ :  $\gamma_{ij}$ .

- Total portfolio profits of investor  $i$ :

$$\sum_{k=1}^N \beta_{ik} \pi_k, \text{ where } \pi_k \text{ are the profits of portfolio firm } k$$

- Manager of firm  $j$  maximizes a weighted average of its shareholders' portfolio profits (weights are given by the control rights  $\gamma_{ij}$ ):

$$\sum_{i=1}^M \gamma_{ij} \sum_{k=1}^N \beta_{ik} \pi_k, \text{ or equivalently}$$

$$\pi_j + \sum_{k \neq j} \lambda_{jk} \pi_k$$

where

$$\lambda_{jk} \equiv \frac{\sum_i \gamma_{ij} \beta_{ik}}{\sum_i \gamma_{ij} \beta_{ij}}$$

measures the degree of sympathy of the manager of firm  $j$  for firm  $k$ .

# Cournot with common ownership

(Reynolds & Snapp (1986), Bresnahan & Salop (1986))

- In equilibrium, the market share-weighted Lerner index in the industry is

$$\sum_j s_j [p - C'_j(x_j)]/p = \frac{1}{\eta} \left[ \sum_j \sum_k \lambda_{jk} s_j s_k \right] = \frac{1}{\eta} MHHI$$

where  $\eta$  is the price elasticity of demand and  $s_j$  the market share of firm  $j$ ,

and

$$MHHI \equiv \sum_j \sum_k s_j s_k \lambda_{jk} = HHI + \sum_j \sum_{k \neq j} s_j s_k \lambda_{jk} = HHI + \Delta.$$

- $\Delta$  is a measure of the unilateral anti-competitive incentives due to common ownership.

# GHHI

$$\text{GHHI} = s' \Lambda s = \sum_j \sum_k \lambda_{jk} s_j s_k$$

where

$$\Lambda = \text{diag}(\Gamma' B)^{-1} \Gamma' B$$

$$\lambda_{jk} \equiv \frac{\sum_i \gamma_{ij} \beta_{ik}}{\sum_i \gamma_{ij} \beta_{ij}}$$

with

- $\beta_{ij}$  the ultimate financial interest by shareholder  $i$  in firm  $j$ ,
- $\gamma_{ij}$  the ultimate control share by shareholder  $i$  in firm  $j$ ,
- $\lambda_{jk}$  the weight that the manager of firm  $j$  puts in the profits of firm  $k$ .

# Empirical studies

- The SCP Paradigm
  - Economies of scale and scope
  - Concentration, common ownership
- The New Empirical IO
- The Impact of Deregulation
- Asymmetric Information and Relationship Banking
- Mergers

# The SCP paradigm

- Market power hypothesis: concentrated markets protected by barriers to entry are positively correlated with higher profits. Studies have supported:
  - Negative impact of concentration on deposit rates
  - Positive impact of concentration on loan rates (varying degrees of impact)
  - Evidence of market power hypothesis found for European Banking (Goddard et al. (2011))
- Efficiency hypothesis: more efficient banks would have a large market share and will be more profitable linking concentration and profitability
  - Evidence of efficiency hypothesis found for US banking (although interpretation is open to question, Berger (1995)).
- Traditional SCP approach is often based on simple concentration measures such as HHI on branches due to data limitations.
  - Pass-through coefficients of changes in interbank rates using pooled data (and not panel data) -> comparability problems

# Are there *economies of scale* in banking? (I)

- Mixed evidence (mostly from US):
  - (1) Existence of economies of scale for small banks and
  - (2) financing economies of scale for banks up to the size of the very large banks.
- U-shaped form in average cost curve with an efficient scale of less than \$500 million of total assets (Berger et al (1993) & studies Fed Board (2010))
  - However, transformation of banking has implied large expenses in fixed costs, which may have increased the optimal size of the banking firm.
- Clearing House Association (2011) – Although largest US banks show downward unit cost curves, costs are as low as other relatively smaller banks
  - Scherer (2013) argues that this finding suggests that economies of scale are not so compelling

# Are there *economies of scale* in banking? (II)

- Hughes and Mester (2014) study period 2003-2010 in the US taking into account diversification effects of scale.
  - They find economies of scale in a model with endogenous risk taking and managerial risk preferences.
  - Effect not attributed to funding economies of large banks that are TBTF.
- Davies and Tracey (2014) also find economies of scale without controlling for TBTF effects, but effects disappear when taking into account standalone credit rating of banks, excluding possible government support (none for international banks with assets above \$100 billion)

# Are there *economies of scope* in banking?

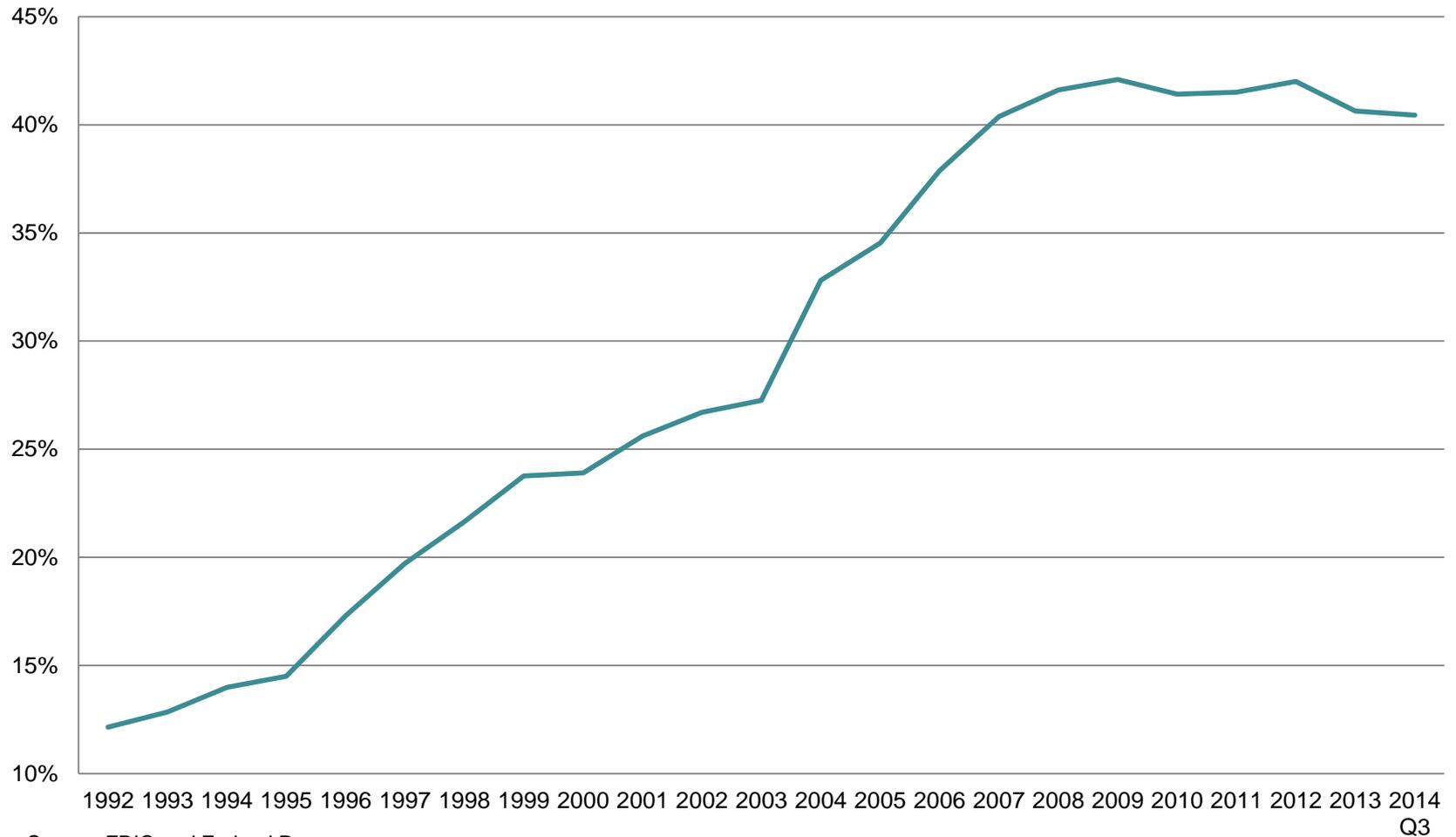
- Origin: common inputs and information economies both on cost and revenue sides (through relationship value with client and decreasing market costs).
- Mixed evidence of existence of economies of scope:
  - Saunders and Walter (1994) - economies of super-scale in the specialized banks in the US and Japan and diseconomies of scope between investment and commercial banking in European universal banks
  - Evidence of scope economies between lending and market-based activities
    - Kroszner and Rajan (1994), Puri (1996), Vander Venet (2002), Drucker and Puri (2005)
  - Evidence that activities of banks other than traditional deposit taking and lending are more risky
    - De Jonghe (2010), Demirgüç-Kunt and Huizinga (2010), and DeYoung and Torna (2013)
- Agency costs in financial conglomerates may counteract the economies of scope
  - Laeven and Levine (2007) and Schmid and Walter (2009)
- Such conglomerates may end up with lower market valuations and/or lower risk-adjusted returns.
  - Baele et al. (2007), Stiroh (2004), and Stiroh and Rumble (2006)

# Concentration increased before and after the crisis

Intensified competitive pressure  
and technological transformation  
led to increasing market concentration...  
...which after the crisis has been exacerbated in the  
EU and stabilized in the US,  
with no clear tendency in emerging economies.

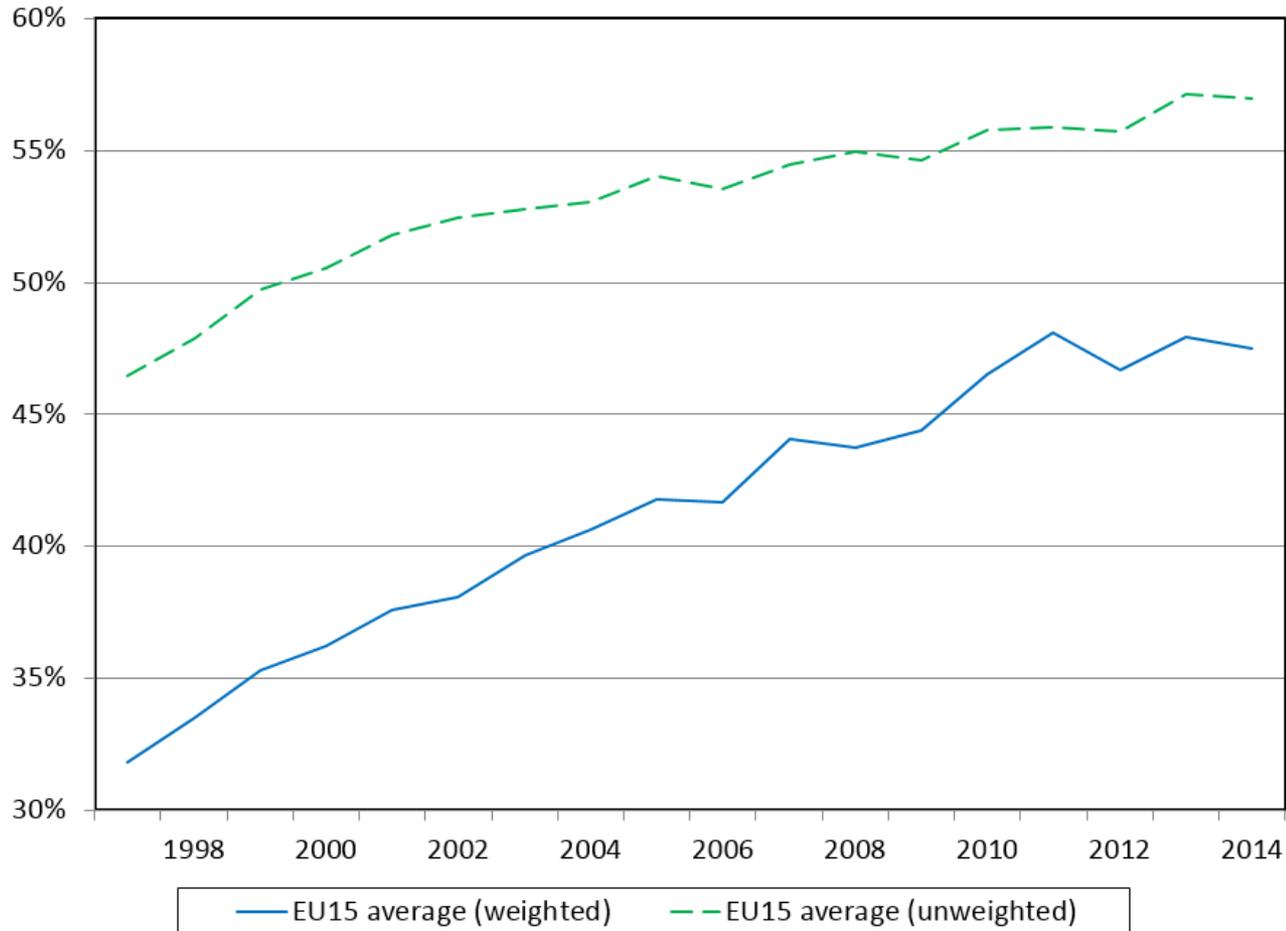
# US CR5 ratio

Market share of the five largest depository institutions (% of total assets)



Source: FDIC and Federal Reserve.

# EU-15 CR5 ratio as a % of total assets



Source: ECB, EU Structural Financial Indicators.

# Top 5 in Eurozone and USA (2013)

## Eurozone (assets ranking)

Germany	France	Italy	Spain	Netherlands	Belgium
Deutsche Bank	BNP Paribas	Unicredit	CaixaBank	ING Bank	BNP Paribas Fortis
Commerzbank	Credit Agricole	Intesa Sanpaolo	BBVA	Rabobank	KBC Group
DZ Bank	Societe Generale	Monte dei Paschi	Santander	ABN Amro	Belfius
LBBW	Groupe BPCE	Banco Popolare	Bankia	BNG Bank	ING Bank Belgium
Bayern LB	Credit Mutuel	UBI	Sabadell	SNS Bank	AXA

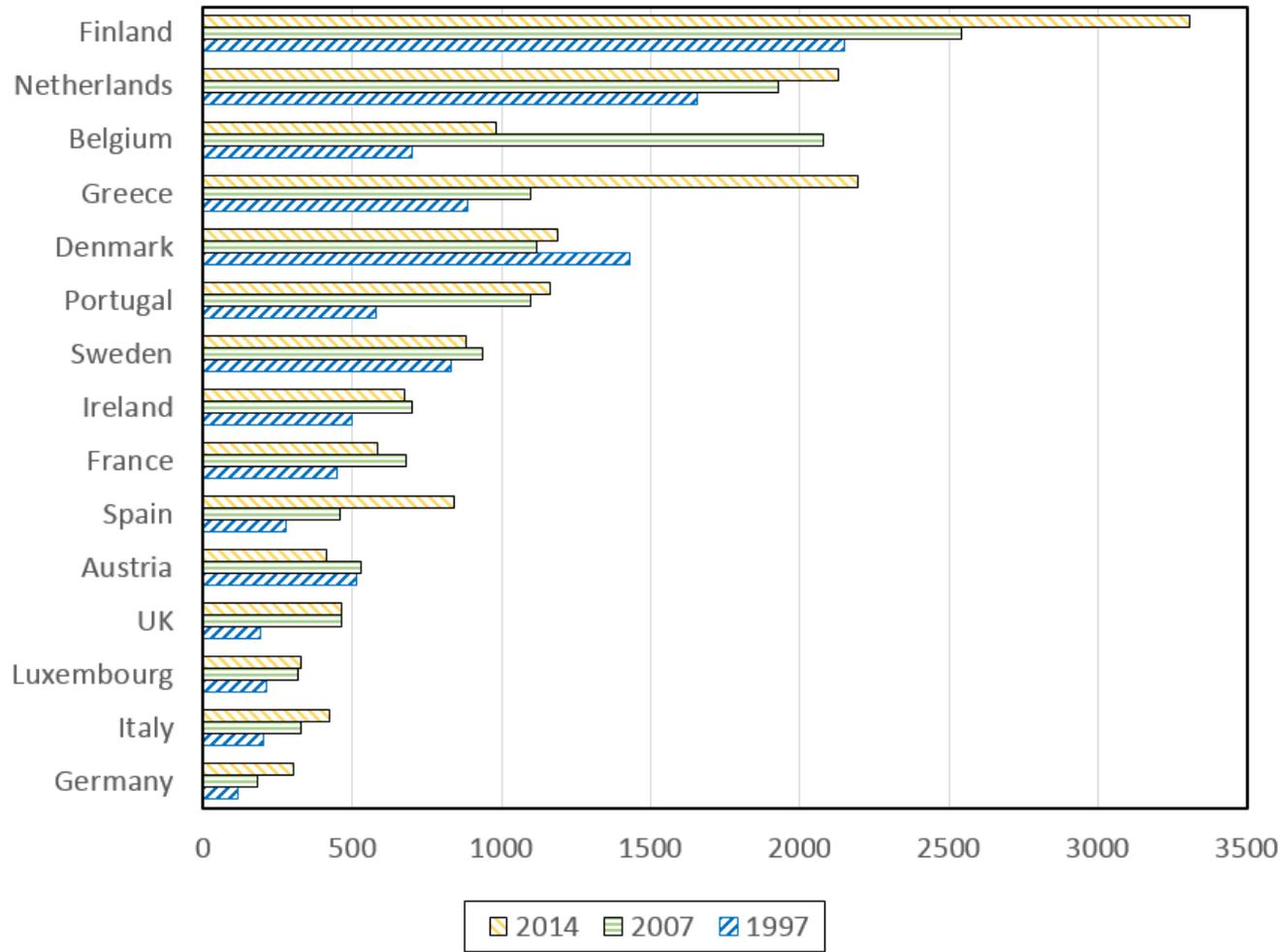
## USA (deposits ranking)

California	Texas	NY	Florida	Illinois	Pennsyl.
Bank of America	JP Morgan	JP Morgan	Bank of America	JP Morgan	PNC Bank
Wells Fargo	Bank of America	Bank of N. Y. Mellon	Wells Fargo	BMO Harris	Wells Fargo
JP Morgan	Wells Fargo	Citibank	Sun Trust	Bank of America	Citizens
Union Bank	USAA Federal	Bank of America	Regions Bank	Northern Trust	TD
Citibank	Compass	HSBC	JP Morgan	PNC Bank	M&T Bank

Source: ECB and FDIC

# HHI index in EU countries

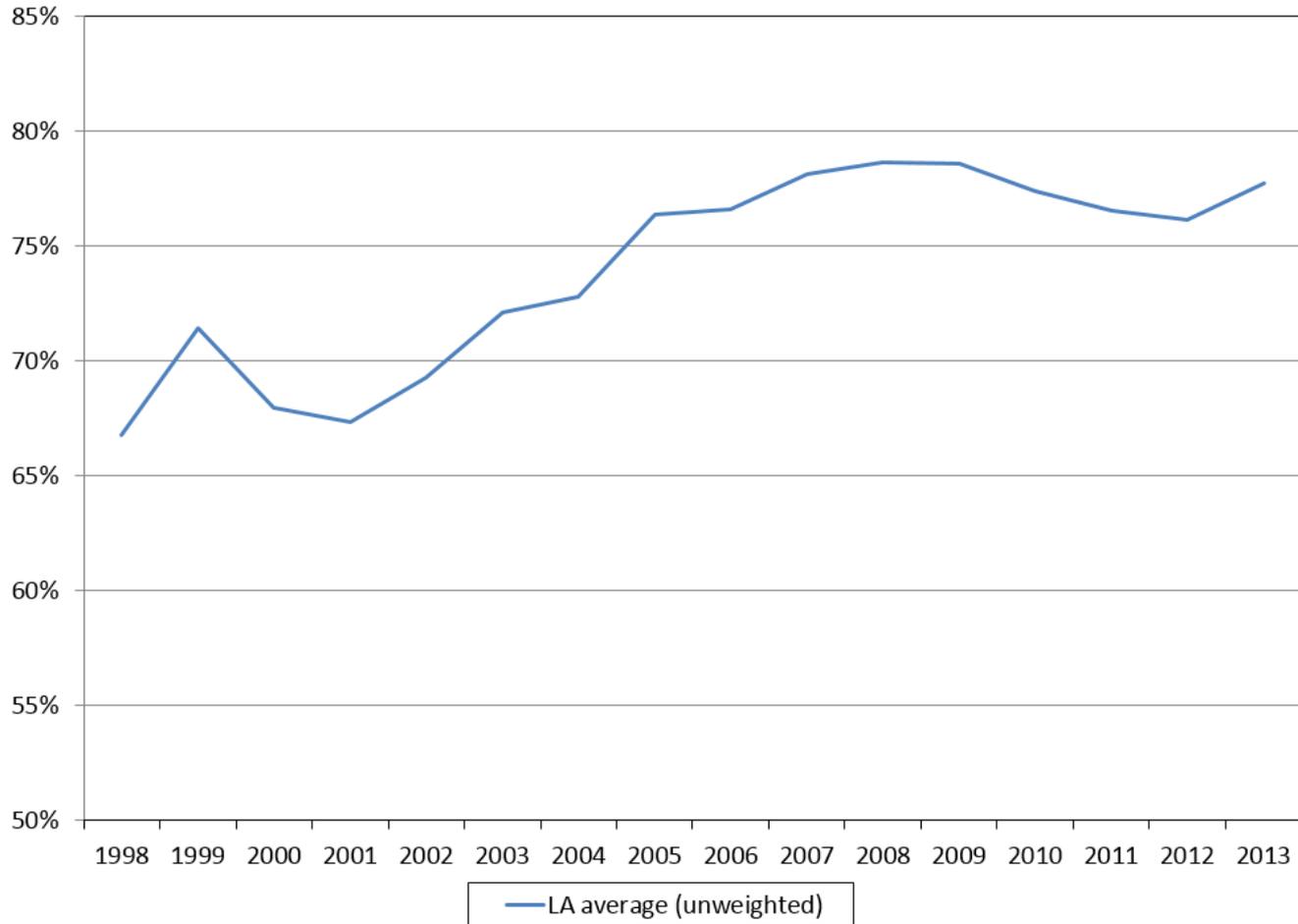
More countries up than down post crisis (“program” countries in particular)



Source: ECB, EU Structural Financial Indicators.

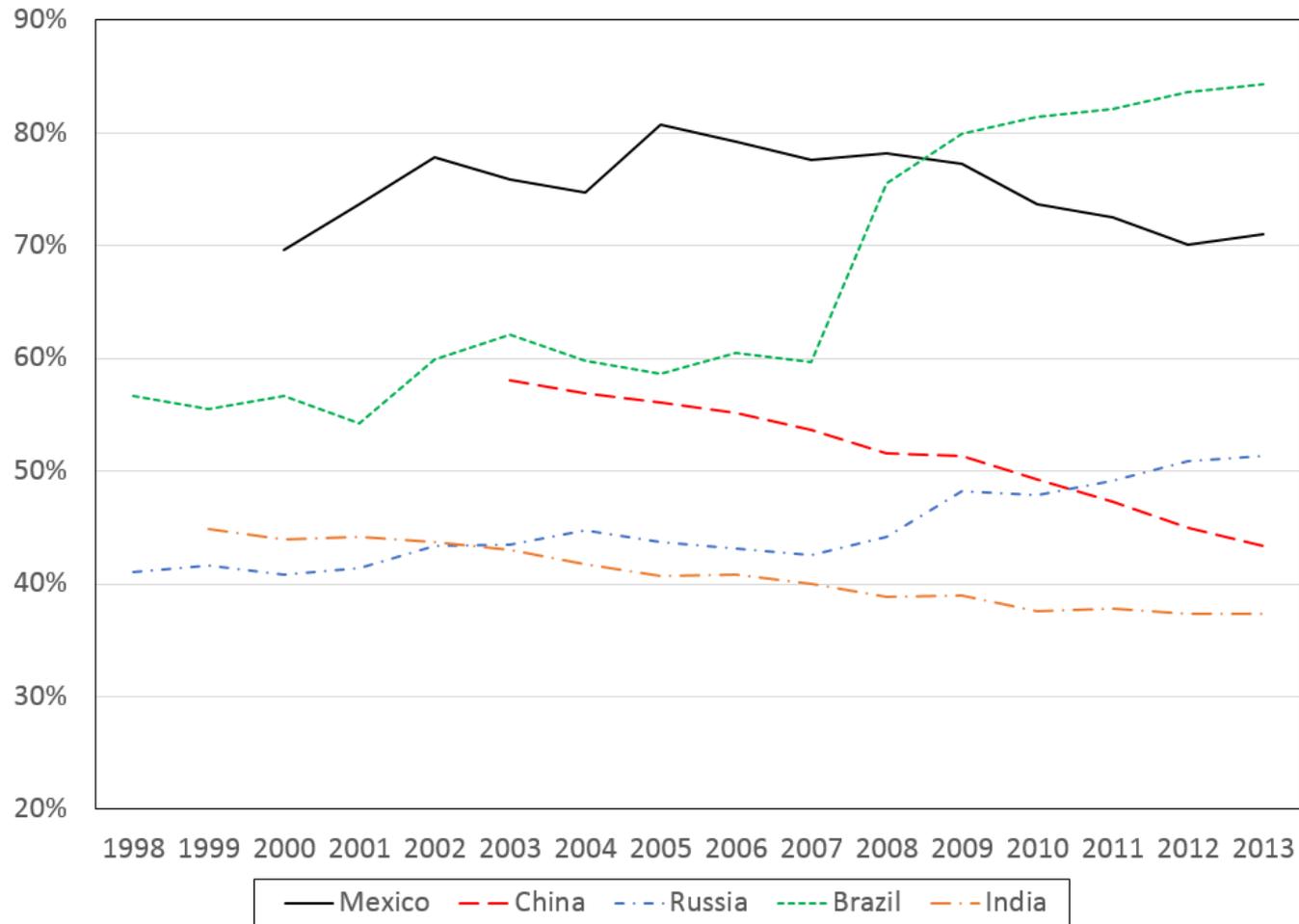
# Latin America CR5 ratio

Share of the five largest depository institutions as % of total commercial banking assets



Source: World Bank, Global Financial Development Database

# Selected emerging markets CR5



Source: Central Bank of Brazil, Central Bank of Russian Federation, China Banking Regulatory Commission, Reserve Bank of India, and Mexican National Banking and Securities Commission

# Effects of concentration and market power on prices

- Higher concentration (HHI) in *relevant deposit and loan markets* leads to worse terms for customers with variable magnitude of the impact according to samples and specifications (Degryse and Ongena (2008)).
  - **Loan rates** – positive effects of varying degrees
    - increase in HHI of 1000 points yields increases of a few basis points in Norway or Belgium to more than 55 in US or Italy
    - Hannan and Praeger (2004)
  - **Time and savings deposit rates** – negative effects of varying degrees, ranging from nil to more than 25 basis points.
    - Berger (1995) and Hannan (1997)
  - However, influence of concentration is not very robust over time when controlling for bank or market characteristics
    - Corvoiser and Gropp (2002)

# Overlapping ownership

- Common and cross-ownership is important and growing in banking (as well as in other sectors).
- Does overlapping ownership augment the effect of relevant market concentration on prices and fees for customers?

# Top 5 owners of the largest US banks (2Q 2013)

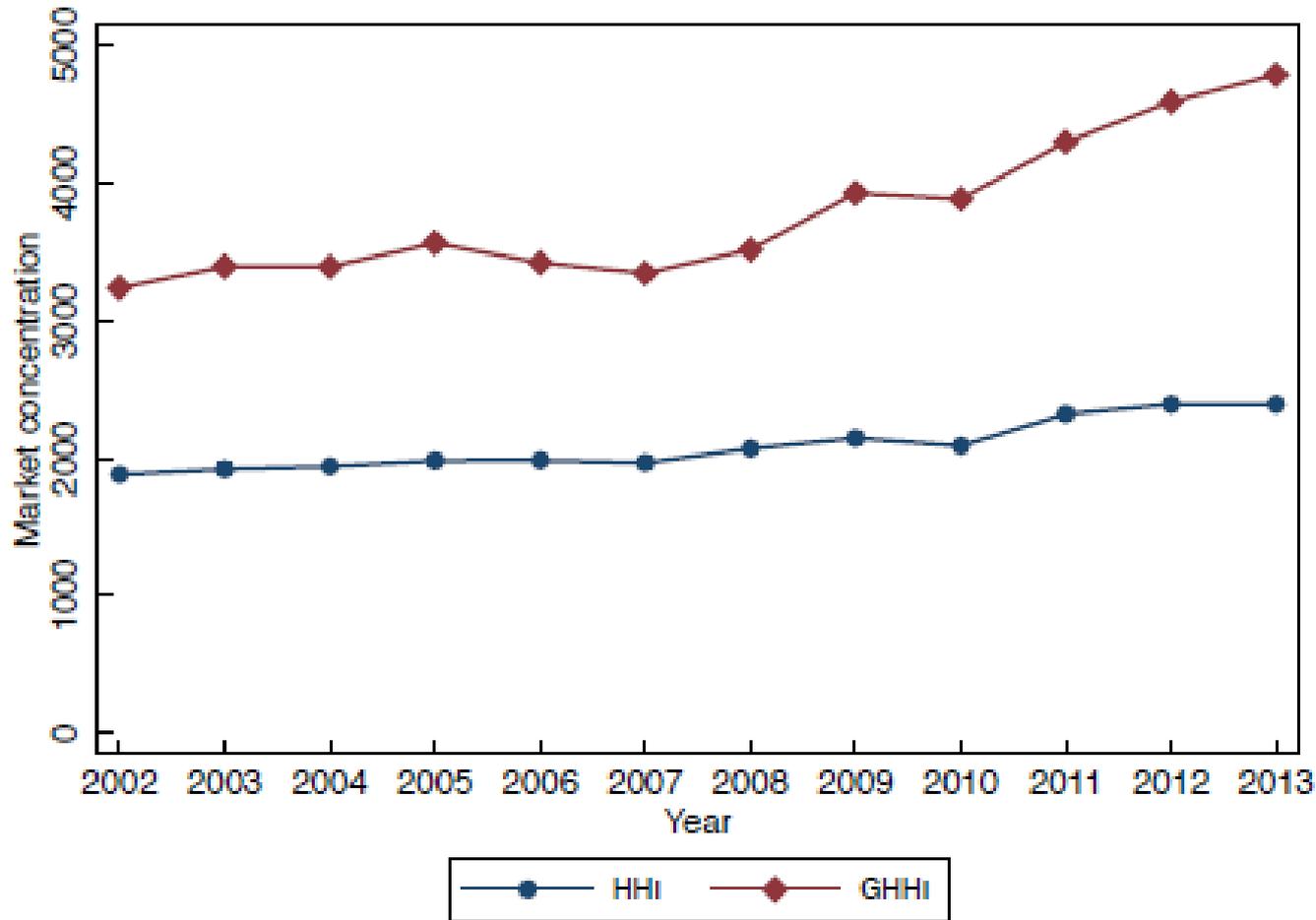
<i>JP Morgan Chase</i>	<i>[%]</i>	<i>Bank of America</i>	<i>[%]</i>	<i>Citigroup</i>	<i>[%]</i>
BlackRock	6.4	Berkshire Hathaway*	6.9	BlackRock	6.1
Vanguard	4.7	BlackRock	5.3	Vanguard	4.4
State Street	4.5	Vanguard	4.5	State Street	4.2
Fidelity	2.7	State Street	4.3	Fidelity	3.6
Wellington	2.5	Fidelity	2.1	Capital World Investors	2.4
<i>Wells Fargo</i>	<i>[%]</i>	<i>U.S. Bank</i>	<i>[%]</i>	<i>PNC Bank</i>	<i>[%]</i>
Berkshire Hathaway	8.8	BlackRock	7.4	Wellington	8.0
BlackRock	5.4	Vanguard	4.5	BlackRock	4.7
Vanguard	4.5	Fidelity	4.4	Vanguard	4.6
State Street	4.0	State Street	4.4	State Street	4.6
Fidelity	3.5	Berkshire Hathaway	4.3	Barrow Hanley	4.0

\* Warrants without voting rights.

Data from Thomson institutional ownership data and proxy statements in the second quarter of 2013.

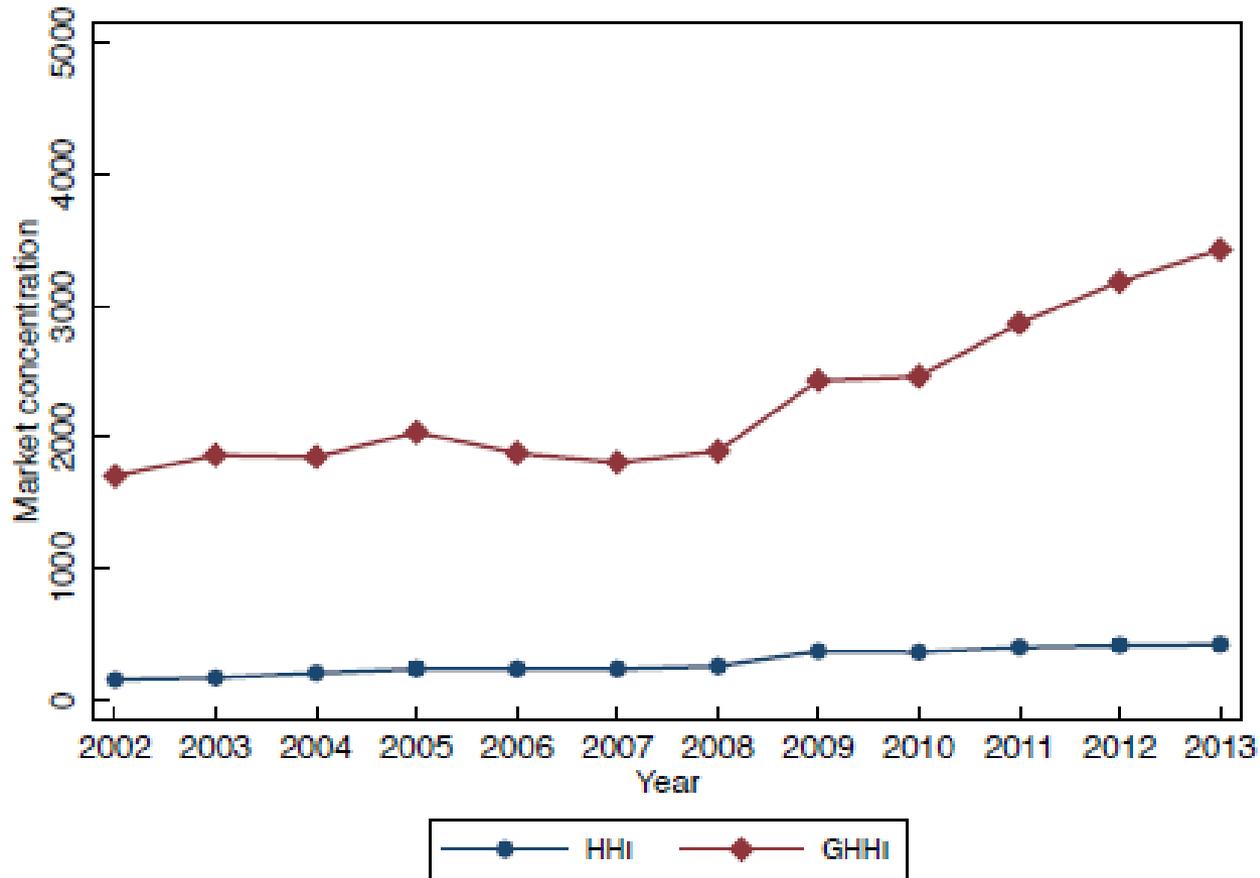
Source: Azar, Raina & Schmalz, 2016.

# US county-level bank concentration, 2002-2013.



Source: Azar, Raina & Schmalz, 2016.

# US national-level bank concentration, 2002-2013.



Source: Azar, Raina & Schmalz, 2016.

# Effects of common ownership and market power on prices

- Azar et al. (2016) with bank data from the US find a strong correlation of a generalized HHI (GHHI), which accounts for common and cross ownership in banking, with higher deposit rate spreads and maintenance fees in the period 2002-2013.
  - Caveat: GHHI is endogenous, better link directly degree of profit internalization among banks with prices or margins (Gramlich and Grundl (2017)).

# NEIO – Measuring competition (I)

- **Statistic (H):** sum of the elasticities of the total revenue of the banks with respect to input prices (Panzar and Rosse (1987));
  - it measures the extent to which a change in input prices is reflected in revenues The larger the transmission of cost changes into prices, the more competitive the market is.
- Evidence:
  - Claessens and Laeven (2004) in a sample of fifty countries in the period 1994-2001 show that most banking markets are monopolistically competitive with H between 0.6 and 0.8
    - What determines competition is not concentration, but rather entry barriers, which have been relaxed over the past years
    - Also, competition in banking is associated with faster development of bank-dependent industries (Claessens and Laeven (2005))
  - Panzar-Rose methodology: most studies find monopolistically competitive markets, including emerging economies

# NEIO – Measuring competition (II)

- Different measures of competition (HHI, Lerner Index, Panzar-Rosse H-statistic...) are *weakly* correlated, providing different results about market power within and across countries over time
  - Lerner index suggests less competitive behavior in European banking during the 1990s, which seems at odds with the perception of increasing competition from other sources (ECB reports)
  - Carbó et al. (2009) find that the different measures consistently identify the most and least competitive banking markets, among the fourteen studied EU countries.
    - Authors suggest that NIMTA may be good indicator for traditional banking, but Lerner index better for overall evolution of broader banking activity

# NEIO – Pricing models (I)

- Assessing competition with conjectural variations as a reduced form model
  - This implies estimating a parameter that is directly related to the intensity of competition
    - Not much evidence of market power in Europe (exception: Neven and Roeller (1999))
- Structural models posit a theoretical model and provide estimates
  - Dick (2008) using 1990s US data for 1993-1999, finds that the price-cost margin in deposits was 10% and for service fees 25%, and that during the period of deregulation (Riegle-Neale Act) consumer welfare increased in most markets.
- Competition in several intermediation markets has been found to be weak, with high markups, even though products were fairly homogeneous and with many competitors.
  - Credit card market with many card-issuing banks
  - Mutual fund market with competitors in the hundreds

# NEIO – Pricing models (II)

- **Horizontal and vertical differentiation** in both competition on the liability side (for deposits) and on the asset side (for loans) of the balance sheet of banks:
  - Dick (2007) shows that **market expansions** do not change the number of dominant banks but do **increase product quality**.
  - Cohen and Mazzeo (2007, 2010) with structural model in US banking markets find evidence that **competition is more intense between institutions of the same type**.
  - Hannan and Prager (2004) find that a **larger presence of multimarket banks makes single-market banks less aggressive competitors**.
  - Berger and Dick (2007) study entry into US local banking markets for the period 1972-2002 and find an **early-mover advantage in terms of market share** that may be up to 15 percentage points for very early entrants.
  - Kim et al. (2005) find that **banks vertically differentiate themselves** with the level of loan—loss provisions in Norway, using a panel data for the period 1993-1998.

# NEIO – Network effects

- Knittel and Stango (2009):
  - Depositors are willing to pay more at banks with larger ATM networks.
  - Partial incompatibility (via ATM surcharge) of networks induces
    - a more positive relationship between deposit account pricing and availability of bank's own ATMs and a more negative relationship between deposit account pricing and competitors' ATMs
    - A positive-level effect on deposit account fees
- Gowrisankaran and Krainer (2011):
  - They estimate a structural model of entry and pricing in the ATM market in Iowa and Minnesota
  - Surcharge ban reduces ATM entry moderately (11-13%), increases consumer welfare and decreases firms' profits
- Akerberg and Gowrisankaran (2006):
  - They build an equilibrium model of customer and bank adoption of the automated clearing house (ACH) electronic payments system developed by the US Federal Reserve
  - Large fixed costs of adoption by customers are an obstacle to the expansion ACH

# The impact of deregulation on competition (I)

- Much of the literature finds that **regulation interferes with competition**
- Regulation generates rents for banks (Degryse and Ongena (2008)).
- Spiller and Favaro (1984) find that the relaxation of entry controls in 1978 in Uruguay produced a less competitive outcome.
- Gual (1999) studies effect of deregulation in the market structure of European banking in the period 1981-1995 and finds that *concentration increases notably with deregulation*.
- Angelini and Cetorelli (2003) study the period 1983-1997 in Italy and find that competition increases (a lower Lerner index) after 1993 and that a substantial portion of the change can be attributed to the Second European Banking Directive.
- Knittel and Stango (2003) reveal a potential perverse effect of price regulation with data from the US credit card market, finding that tacit collusion at nonbinding state-level ceilings was predominant during the early 1980s, but that by the end of the decade the integration of the market at the national level reduced the sustainability of the tacit collusion.

# The impact of deregulation on competition (II)

- Quiet-life hypothesis (market power induces inefficiency)
  - Positive effect of competition on cost-and-profit efficiency.
  - Koetter et al. (2012) test quiet life hypothesis – do not find evidence of cost inefficiency but find that accounting for profit inefficiency, Lerner indices are about 30% larger than conventional ones (and increasing over time).
    - Market power increases over the sample period but is dissipated by quiet life.
- Dick (2006) studies the impact of the liberalization of interstate banking with the Riegle-Neal Act of 1994, comparing markets in 1993 and 1999, and finds that while market concentration at the regional level increased, the market structure at the local-market level remained unchanged.
- Aguirregabiria et al. (2015) find that while the Riegle-Neal Act expanded geographic risk diversification possibilities in small states, few banks took advantage.

# The impact of deregulation on competition (III)

- Effect of deregulation on small firms and on innovation:
  - Rice and Strahan (2010) find that in states that had fewer restrictions, small firms borrow at lower interest rates and credit supply expands, but this expanded supply does not translate into more borrowing
    - This goes in line with theoretical results set out earlier – entry can worsen adverse selection and declines in market power may harm relationship banking
  - Cornaggia et al. (2015) find that competition after the Riegle-Neal Act reduced state-level innovation by quoted corporations with headquarters within deregulating states but increased innovation among private firms that are more dependent on external finance and that have limited access to credit from local banks.

# Asymmetric information and relationship banking (I)

- Shaffer (1998) finds evidence of *adverse selection in the loan market* in terms of competition worsening the loan-loss rates of banks (data from US banks from the period 1986-1995).
- There is evidence of the value of *firm-bank relationship* (which also provides evidence of *switching costs* in loan markets)
  - Firms perform worse in the long run after their relationship with a distressed bank is affected.
    - Continental Illinois (James (1987), Slovin et al. (1993)) as well as evidence for Japanese firms in Kang and Stulz (2000).
  - Differences found between countries about duration of the firm-bank relationship.
  - Differences in switching costs depending on customers: rich people switch less often (higher opportunity cost of time) while poor people do not have the information.

# Asymmetric information and relationship banking (II)

- Effect of competition on relationship lending is ambiguous
  - Berlin and Mester (1999) find that banks with cheaper funding are able to provide more intertemporal insurance to firms.
  - Petersen and Rajan (1995) find that young firms are negatively affected by more competition since it induces less incentives to invest in relationships.
  - Black and Strahan (2002) find that deregulation of branching restrictions augments new business incorporations.
  - Elsas (2005) finds that a firm is more likely to have a single bank relationship in more competitive markets.
  - Degryse and Ongena (2007) find that bank branches that face more competition engage more in relationship lending (Belgian data).

# Asymmetric information and relationship banking (III)

- Relationship banking and location
  - Petersen and Rajan (2002) find that *nearby borrowers pay a higher loan rate*.
  - Degryse and Ongena (2008) explain that the distance effect disappears introducing measures of relationship banking, and that the rate paid increases with the distance to the closest competitors.
    - This result is consistent with the spatial price discrimination competition literature based on transportation costs.
  - Petersen and Rajan (2002) find that the *distance of the firm from lending bank branch has increased* in the period 1973-1993.
    - Communication between borrowers and lenders is less and less in person due to improvements in communication technology that obtains hard information about borrower.
  - Relationship lending to SMEs is typically offered by small banks, which have an advantage in gathering soft information (Berger et al (2004) and Berger and Udell (2006)).
  - Impact of distance is different depending on products (mortgage vs. deposit, for example).
- Competition may induce banking services to be more transaction-based instead of relationship-based and work to the disadvantage of more opaque (small) borrowers.

# Mergers (I)

*No clear consensus on the effects of merges in the banking industry*

- Literature with US data up to the 1990s had found that consolidation in banking tended to increase market power but not necessarily to increase efficiency gains (Berger et al. 1999).
- Several previous studies also concluded that consolidation leads to market power:
  - Prager and Hannan (1998) on deposits.
  - Kahn et al. (2005) on personal loan rates.
  - Garmaise and Moskowitz (2006) on real estate loan rates.
  - Sapienza (2002) on loans when the target has a large local market share.
- However, Cerasi et al. (2012) find that a merger that increases concentration may increase competition if it creates a bank capable of competing with incumbent banks that enjoy local niches of market power.

# Mergers (II)

*Effects of consolidation on efficiency are controverted*

- Carbó and Humphrey (2004) find cost-reducing effects of mergers.
- Barros et al. (2014) find that mergers lowered lending rates, increasing firms' access to credit but decreasing it to households.
- Park and Pennacchi (2009) find theoretically that market-extension mergers by the multimarket banks increase competition in loan markets but decrease it in retail deposit markets.
- Evanoff and Ors (2010) find that increased competition under the pressure of deregulation leads to increased productive efficiency of the incumbent non-merging banks confronted with new entry in their local markets.

# Mergers (III)

- *Trade-off between market power and efficiency gains in mergers*
  - Akkus et al. (2015) find that merger value comes from cost efficiencies in overlapping markets and the relaxation of regulation. Market power (HHI) also contributes to value of mergers, and no misvaluation or private-benefits motives are found in the data.
    - Costs of having distinct chartering regulators – merger value is greater when there is more overlap between acquirer and target markets and for banks regulated by the same agency before the merger
  - Hannan and Pilloff (2009) show that differences in the HHI in the market of the acquirer and of the acquired play an important role in determining which M&As happen and which don't.

# Mergers (IV)

- Focarelli and Panetta (2003) find with that consolidation generates short-term adverse price effects but also long-term efficiency gains that dominate the market-power effect, leading to more favorable prices for consumers (using Italian data (1990-1998)).
- Craig and Dinger (2009) find no positive long-term effect on deposit interest rates using US data.
- Erel (2011) with US data from the 1990s looks at the effects of mergers on borrowers and finds also that mergers can increase or decrease loan spreads depending on whether market power or efficiency gains dominate.

# Mergers (V)

- *Mixed evidence about the potential effect of large bank mergers on credit availability to small businesses*
  - Berger et al (1998), Black and Strahan (2002), Sapienza (2002), Degryse et al. (2011), and Bonaccorsi di Patti and Gobbi (2007).
- Evidence that the level of competition depends not only on number of competitors but also on the level of switching costs.
  - Sapienza (2002) finds that
    - mergers that involve acquiring small banks generate efficiency gains over their market power effect on borrowers, but the opposite happens with the acquisition of a large market share bank.
    - the effect of a merger on a borrower depends on how many banking relationships he has.
- Analysis of banking mergers should take into account solvency and liquidity
  - Mergers between troubled institutions need not produce a stronger institution, although larger institutions may find it easier to access capital markets.
  - Evidence that large banks tend to reduce the amount of liquid reserves they hold as a buffer and may contribute to liquidity shortages (Berger and Bouwman (2009) and Erel (2011)).

# Empirical studies - summary

- Results are often mixed due to methodological problems, data availability and differences in samples.
- Traditional SCP paradigm is generally supported with higher concentration leading to higher loan and lower deposit rates.
- Evidence supports existence of economies of scale for small banks and of financing economies of scale (up to very large banks, with controversy over effect of TBTF).
- Evidence of horizontal and vertical differentiation elements.
- There tends to be less competition between institutions that are different.
- Evidence of network effects
  - ATM networks affect deposit pricing.
- Regulation generates rents for banks
  - impact of deregulation is significant, including reduction in X-inefficiency.
- Relationship banking
  - Value of the firm-bank relationship, suggesting that switching costs exist.
  - However, effect of competition on relationship lending is ambiguous.
- Mergers – evidence of effects is ambiguous

# Behavioral Industrial Organization and Banking - Overview

- Individuals are usually treated as rational decision makers in economic models but insights from psychology suggest that individuals often do not act in a fully rational way.
- This can also be observed when people are acting in markets.
- Behavioral Economics tries to identify
  - in which way individuals' behavior differs from what rational choice models predict;
  - regularities in these deviations (e.g. procrastination of decisions or actions).
- Some insights of behavioral economics got integrated into models of Industrial Organization (Ellison 2006, Spiegel 2011)

# Behavioral Industrial Organization and Banking - Overview

- Behavioral biases have been documented in financial markets.
  - They have a special incidence in banking.
- In everyday life, human beings often take decision
  - without considering all available information and/or
  - without calculating every consequence of their choices.
- Actual decisions may be driven by: emotion, intuition, habits.
- Kahneman (2011) distinguishes intuition (*fast thinking*) from reasoning (*slow thinking*).

# Behavioral biases and impact on consumer behavior

- DellaVigna (2009) categorizes the deviations of individual (biases) into three groups:
- **Preferences** influenced by emotions and psychological experiences
  - Preferences may be dynamically inconsistent.
  - Examples: present bias, reference dependence and loss aversion, regret and other emotions
- **Beliefs** may be biased because of overconfidence, as well as naïveté and cognitive limitations of consumers.
  - Also over-extrapolation and projections bias
- **Decision-making** short-cuts when assessing available information
  - Framing, salience and limited attention
  - Mental accounting and narrow framing
  - Rules of dumb
  - Persuasion and social influence

# Behavioural biases and impact on consumer behavior

- *Overborrowing*
  - Different biases can lead to attitudes that yield the same economic outcome.
  - **Preferences:** under present-biased preferences consumer overvalues present gratification and spends too much on his credit card or takes a pay-day loan. Later she will regret this choice (time-inconsistency).
  - **Beliefs:** because of overconfidence about future self-control a consumer may not expect to pay penalties for delayed payments overestimating the value of an credit card or mortgage contract.
  - **Decision-making:** problems with computing or understanding compound interest may lead to an underestimation of real costs of borrowing.
  - *Consumers are often unaware of their biases adding naïveté to any combination of biases.*

# Biases in financial markets

- The existence of consumer biases provides incentives to financial institutions to design contracts tailored to exploit these biases.
- We examine the consequences for financial contracting and competition of
  - the lack of self-control,
  - overconfidence and limited attention of consumers, and
  - degree of financial literacy.
- *Naïve Consumers with present-biased preferences* (Heidhues and Koszegi, 2010)
  - These consumers have a taste for immediate gratification and are not fully aware of it.
  - Banks design contracts, which offer cheap credit when payed back quickly but introduce large penalties if not.
  - Because of time-inconsistent preferences and lack of anticipation consumers incur in the penalties and pay more than foreseen.
  - The effects are large even if unawareness is small and banks do not know preferences/beliefs.

# Overconfident consumers

- Make systematic forecast errors, e.g. with regard to use or lack of use of services because they are overoptimistic about own abilities in terms of precision of information, memory, attention, or self control.
- Examples: Attention to overdraft fees or credit card limit.
- *Exploitation:*
  - Contracts seem attractive with regard to terms consumers are aware of they will have to pay (e.g. low interest).
  - But firms try to capture revenue from terms, which a consumer does not believe to have to pay for when signing the contract (e.g. contingent charges).

# Overconfidence and welfare (I)

- Overconfidence can lead to both, over- and undervaluation of contracts (Heidhues and Koszegi (2015), Grubb (2015))

## EXAMPLES

Car insurance:

Driver is overconfident about his abilities to drive.

He underestimates the probability to cause an accident.

He undervalues the benefits of an insurance contract.

Bank account:

Customer is overconfident about his ability to track financial movements.

She underestimates the probability to overdraw her account while shopping, and the respective costs.

She overvalues account's benefits.

# Overconfidence and welfare (II)

- *Overvaluation* leads to a higher willingness to pay.
  - More surplus can be achieved by firms.
  - This hurts consumers and society.
  - This happens in competitive market setting:
    - At the intensive margin: exploiting consumers buying the product under all circumstances.
    - At the extensive margin: attracting consumers into the market, which is excessive if contracts are overvalued.
  - In the presence of market power, overvaluation may increase total welfare (participation), albeit at consumers' expense.

# Overconfidence and welfare (III)

- *Undervaluation* leads to a lower willingness to pay.
  - Society and firms are hurt but some consumers may benefit in a competitive market setting:
    - At the intensive margin: consumers buying the product under all circumstances may profit from lower prices due to depressed demand.
    - At the extensive margin: too few customers participate in the market.

# Welfare consequences of fiercer competition are ambiguous

- Competition does not eliminate incentives to exploit biases.
  - It may only decrease fixed fees while exploitation takes place through penalties or other contingent charges.
- E.g. Credit cards with teaser rates will attract naive and sophisticated consumers, because
  - Naive consumers do not pay attention to other charges and sophisticated may be able to avoid them.
- Competition
  - when there is full market coverage benefits consumers (all inframarginal / lower prices); and limits price increases due to overvaluation if cost pass-through rate increases.
  - when not all the market is covered lower prices will harm marginal consumers who overvalue contracts and are lured into the market (distributional consequences).

# Why do banks offer complex contracts (even in an competitive environment)?

Complex schemes are robust to fierce competition.

- If customers would be aware of their bias or would not be overconfident, they would rather face simpler contracts.
- Sophisticated consumer may even profit from exploiting naïve ones if they are charged lower fees.
- Thus banks have no incentive to provide easier contracts, as they will not attract more customers and earn less.
- Increased product variety offer may add to complexity
  - This may be an instrument to capture surplus by banks.
  - It may also lead to procrastination or rejection of purchase by customers because of choice and information overload.

# The case of overdraft fees

- They are an important source to finance bank accounts (Stango and Zinman (2009), Armstrong and Vickers (2012)).
- Many consumers are naive:
  - Do not check their account regularly.
  - Do not pay attention to those fees, or overestimate ability to stay in credit.
  - Do not switch to better offer (when they exist) of alternative suppliers to avoid repeated payment.

## Distributional consequences:

- Low income depositors are most often affected.
- Mechanism:
  - If all consumer are naive, under perfect competition annual fees are set below cost exactly for the same amount of the overdraft fees.
  - However, if there is a proportion of sophisticated consumers – that do not incur overdraft fees – banks pass back all revenue from overdraft fees, but equally to naive and sophisticated consumers.
    - This means sophisticated consumers, who do not incur overdraft fees, get a subsidy from the naïve (i.e. they exert a negative externality on naive consumers).

# Financial literacy and advice (I)

- Financial product purchases are normally not part of everyday life.
- People are more unexperienced than in other markets.  
→ less aware of their biases.
- In many cases learning is quite impossible (mortgage, pensions) because of non frequent decisions.
- In case of shrouded fees and penalties consumers will learn slowly from their fallibility.  
→ this situation makes financial education important.
- A lack of financial literacy and understanding (e.g. of compound interest) can lead to undersaving/overborrowing:  
→ high share of loan defaults and foreclosures (social costs).

# Financial literacy and advice (II)

- Lack of literacy and complexity make customers rely on advertising and advice.
- This may lead to an conflict of interest between financial firms (financing advertising and advise) and customers.
  - Banks will propose profitable products instead of the best option for the customer.
- In the case of broker advisors: contingent commissions provide incentives to act in banks interest instead in the interest of customers
  - Advice may be biased.

# Financial literacy and advice (III)

Contingent commissions for brokers (Inderst and Ottaviani (2012))

- If consumers are aware of this potential conflict, contingent commissions are able to provide incentives to advisors to find the most suitable product for the customer.
- However, if consumers are naïve, ignore the conflict of interest, high product prices and commissions are the outcome.
- Competition may protect naïve customers to some extent, but advice remains biased.
- Disclosure of commissions may increase the share of sophisticated customers, while capping commissions may have the adverse effect of lowering the incentives to acquire information by the advisor.



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# COMPETITION AND STABILITY IN BANKING

THE ROLE OF REGULATION AND  
COMPETITION POLICY



XAVIER VIVES

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