

Did Two Banks Form a Herd? JP Morgan and the Bank of America

Tobias F. Rötheli¹

Abstract

We study the competitive behavior of the two largest US Banks before and after the financial crisis that started in 2007. The analysis documents that JP Morgan Chase, the initially smaller of the two rivals, followed a competitive strategy aiming to expand its lending to catch up with the leading private lender, the Bank of America. By contrast, the latter bank did not engage in an expansionary push to keep its quantitative advantage. Instead, it opted to diversify its lending portfolio and to invest in technological advances. This assessment is supported by econometric estimates and counterfactual simulations. With its strategy of quality over quantity the Bank of America refrained from engaging in herd behavior which could have led to a new upswing of the credit cycle.

JEL classification numbers: D22, E32, E7, G21.

Keywords: Herd Behavior, US Banks, Competitive Rivalry, Credit Cycle.

¹ Department of Economics, University of Erfurt, Germany.

1. Introduction

The financial crisis that started in 2007 has led to a renewed interest in the notion of the credit cycle. Explanations of this crisis drew on various mechanisms already documented in the literature (Asea and Blomberg, 1998, Berger and Udell, 2004). Analyses in the behavioral economics tradition focused on the dynamics of over-optimism in times of economic expansion feeding excessive lending. Even when only some banks act on overly optimistic views of default risks, an aggregate credit boom can arise through herding behavior. Competitors likely do not want to be left behind by an aggressively expanding player and thus intensify the expansion. In the downturn credit losses lead to over-pessimism among banks and an excessive reduction in lending. For classic and older contributions in this tradition see Juglar (1862), Mills (1867), Kindleberger (1978), and Eckstein and Sinai (1986).

This view of herding at the center of credit books differs from the perspective that banks' lending is primarily determined by estimates of default expectations. This notion of bank behavior correlates with newer perspectives in the field of industrial organization with its focus on strategic price setting behavior (see Tirole, 1988 and Cabral, 2018). Several studies have documented banks' herding behavior in various countries: Jain and Gupta (1987) show that smaller US banks during the excesses in international lending from 1982 to 1984 almost blindly replicated the lending policies of larger competitors. This asks for an analysis of the behavior of lending by large banks.² Rötheli (2001) presents econometric estimates documenting how the lending of the largest three Swiss Banks reacted to changes in the lending decisions of their competitors up to the early 1990s, a period that ended in large losses on defaulting loans. Nakagawa et al. (2012) document the same phenomenon for Japan. Fang et al. (2021) show this sort of lending behavior among Taiwanese banks in more recent times. McCauley et al. (2021) study the role of competition for market share discussing booms in international lending that ended in financial crises. Finally, Wang et al. (2023) cover banks' herding in a wider range of economies.

When addressing interactions among individual banks in the US, we face the problem that the Federal Reserve does not publish series of individual banks' lending. In this situation, we focus attention on the two leading private lenders, JP Morgan and the Bank of America, and collect quarterly data from public sources. The paper is organized as follows. Section 2 offers a descriptive account of the interaction between the two leading institutions in US banking. Section 3 offers a formal model that captures rivals' behavior for the purpose of simulations and as

² The focus on large players here does not deny the possibility that a credit boom may be co-driven by one or several smaller banks. In fact, there are historical examples for this. One such case is Fortis, a Belgian-Dutch bank, that in before its dramatic expansion was a rather modest player. In the beginning 2000s it pursued an aggressive growth strategy through expansion and takeovers. Eventually, collapse came after the acquisition – together with other banks – of ABN AMRO, which was at the time the largest bank acquisition ever. Further, Tamirisa and Igan (2008) report that in the buildup to the financial crisis of 2007, weaker Eastern and Central European Banks expanded at least as quickly and strongly than stronger banks.

guidance for the econometric estimates. Section 4 presents estimates of individual lending equations that document similarities and differences between the competitive focus of the two banks. The findings document that the proposition “two’s a herd” does not hold for the period studied. We attribute this fact to the cautious behavior of the Bank of America. This bank did not let itself be drawn into a competitive struggle for the size of the loan book by JP Morgan. Section 5 concludes this article.

2. Two Leading US Banks and their Lending Rivalry

We start this section with a description of qualitative aspects. Here we focus on lending by the two largest US American banks, i.e., the Bank of America (BoFA) and JP Morgan (JPM). Taken together, loans by these two banks make up close to 20 percent of total bank lending in the United States. Clearly, over the period analyzed BoFA and JPM differed in their approaches and priorities regarding various areas of banking. JPM key initiatives were in investment banking and global lending. By contrast, BoFA was more focused on consumer banking and wealth management. However, both banking institutions show a strong appetite for risk and willingness to expand. To explain how JPM managed to surpass BoFA in lending, analysts point to its strategic position in corporate lending. With its strength in investment banking, JPM particularly thrived in the highly profitable field of syndicated loans.³ Its internationally diversified portfolio of loans and assets may have given JPM further room for more risk taking in US lending compared to the BoFA.

While JPM can be seen as the more aggressive of the two banks, it should also be noted that BoFA has taken important steps to remain competitive. These initiatives concern the refining of its strategic approach, digital innovations like mobile banking, that resulted in a strengthening of the bank’s core business.⁴ Its major fields of competence are in consumer lending, the credit card business, auto loans, as well as small business lending. Its lending initiatives in recent years have included securities-based loans and customized lending solutions. BoFA has not particularly competed with JPM in large-scale investment banking loans but has grown its regional clients among mid-sized borrowers with specialized lending products e.g. in the field of healthcare and renewable energy. Overall, BoFA has taken a more conservative approach to loan expansion, presumably putting quality over quantity. One key difference is the more cautious policy of BoFA in setting its lending standards (see Gillenwater, 2012).

³ Schneider et al. (2024) document magnitudes of syndicated loans across US banks.

⁴ Van Loo (2018) discusses how „fintech” innovations in the competitive influence various banks’ competitive position.

As quantitative measures we use quarterly data published by the two institutions.⁵ Figure 1 shows the paths of total loans for the two banks for the period 2004Q4 to 2024Q2. The sample starts with the final quarter of 2004 because in that year JP Morgan purchased Bank One for 58 billion Dollars and Bank of America purchased FleetBoston Financial for 47 billion dollars. These acquisitions took place in different quarters of 2004 and markedly increased the banks' lending positions. By the fourth quarter of 2004 these adjustments had run their course. In the years after these major takeovers, our two banks applied the usual instruments of financing lending growth: increases in deposits, additional capital primarily through retained earnings, as well as increasing debt in the form of bonds. Furthermore, acquisitions continued to be instrumental in this process: JPM took over Bear Stearns and Washington Mutual in 2008 and thereby expanded its mortgage and investment banking segments. Among the several acquisitions of BofA, the takeover of Countrywide stands out as a step to growing lending and mortgage services.⁶ Figure 1 makes clear that at the beginning of the period studied here, BofA dominated JPM in the lending business. This leadership only strengthened in the years before the financial crisis. While BofA held total lending stable for the decade that followed, it was JPM that expanded its lending after the financial crisis. This expansion also shows in the time paths of total assets of the two banks as shown in Figure 2.

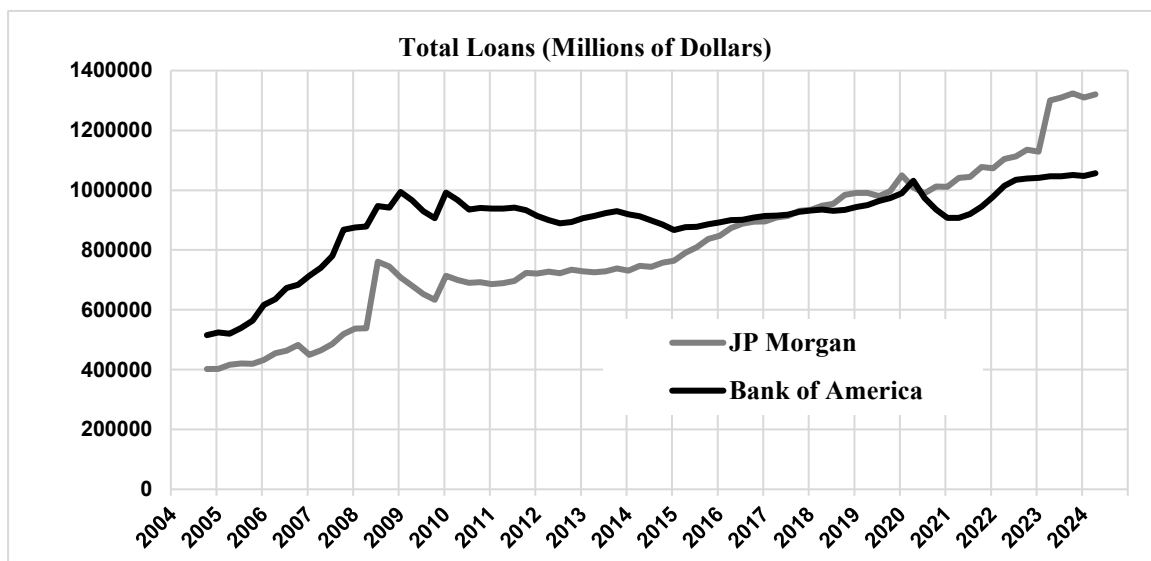


Figure 1: Lending by the Bank of America and JP Morgan

⁵ This data is published as a required by US securities law, banking regulations, and exchange listing requirements. For JPM there exists a company website documenting quarterly financial data (<https://www.jpmorganchase.com/ir/quarterly-earnings>). For the BofA we draw on SEC data (<https://www.sec.gov/Archives/edgar/data/70858/000119312505039878/d10k.htm>) in the form of K-10 files. Notably, the JP Morgan quarterly data are end of period data, while the BofA data refer to average balance sheet data.

⁶ Kress (2020) discusses the background and effects of bank mergers during the financial crisis.

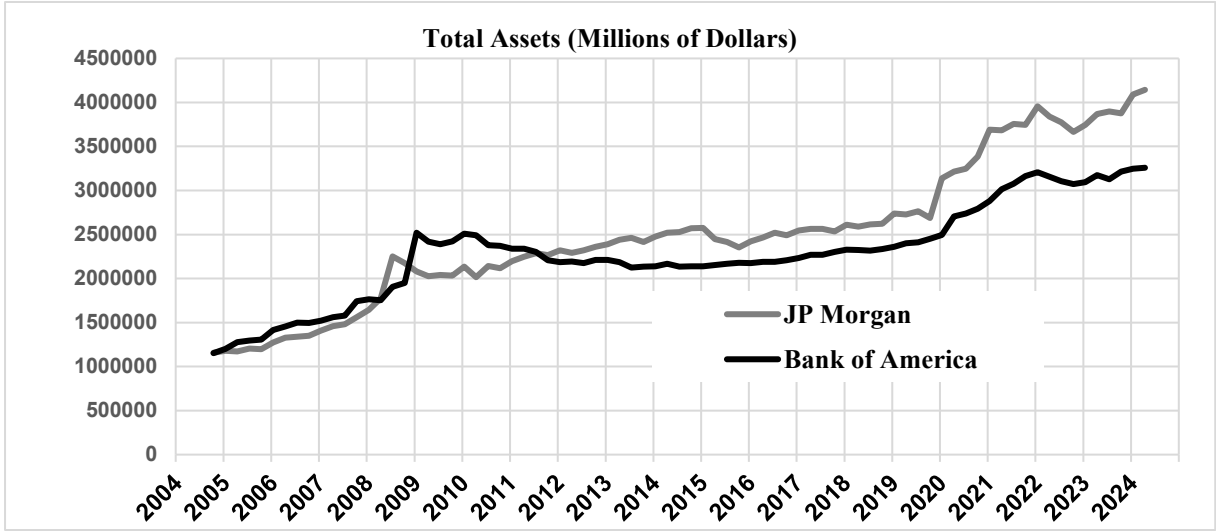


Figure 2: Total assets of the Bank of America and JP Morgan

3. A Simple Model

In this section we model the competitive behavior just described for the purpose of simulations and as guidance for the econometric estimates that follow. The model consists of the following two equations:

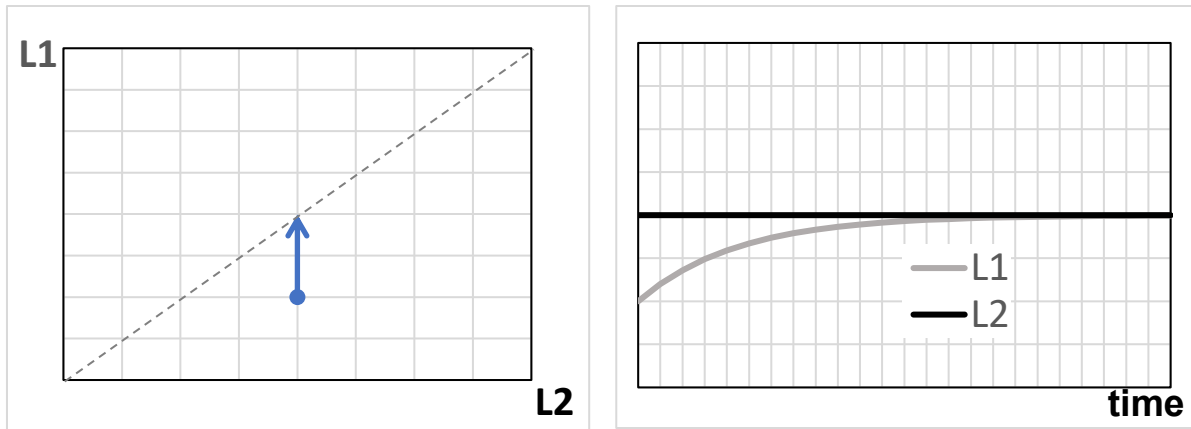
$$\Delta l_t^1 = \mu_1 + \lambda_1(\theta_1 l_{t-1}^2 - l_{t-1}^1) \quad \text{where } \mu_1 > 0, \lambda_1 \geq 0, \theta_1 \geq 1 \quad (1)$$

$$\Delta l_t^2 = \mu_2 + \lambda_2(\theta_2 l_{t-1}^1 - l_{t-1}^2) \quad \text{where } \mu_2 > 0, \lambda_2 \geq 0, \theta_2 \geq 1 \quad (2)$$

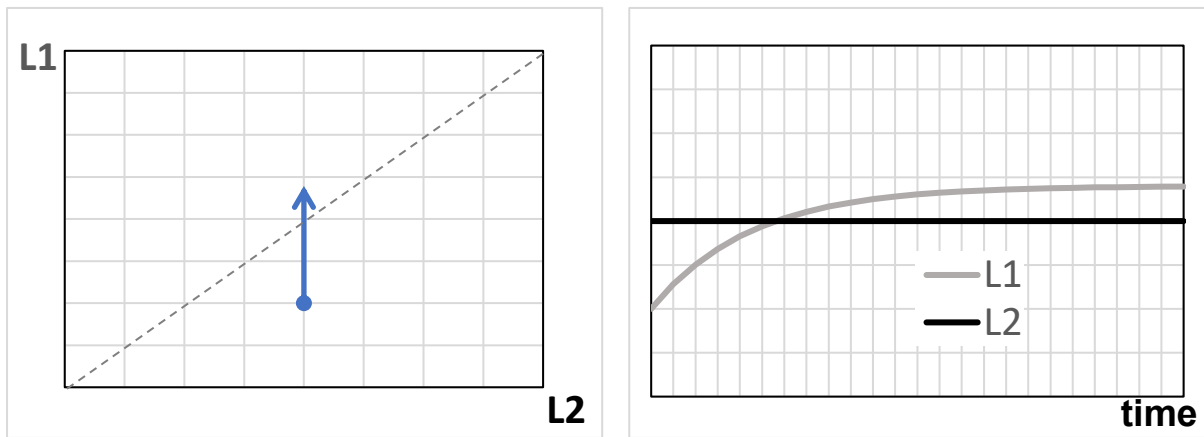
Here, l_t^1 and l_t^2 are the natural logs of the lending totals of bank 1 and bank 2, respectively, and hence Δl_t^1 and Δl_t^2 are the corresponding growth rates. The superscripts indicate the individual bank, denoted as bank 1 and bank 2. The formulation is quite general. We model the reactions to the other players' actions by a term capturing the size difference between them. The λ -parameters denote the respective adjustment speeds. The values of these parameters are either positive or zero (in the no-response case). Finally, the θ -parameters capture the possibility that a bank holds a quantitative target to gain (or keep) a lead over its competitor. If θ is one this means a competitor works to catch up with, or stay ahead of, its competitor. If θ is larger than one this means that a bank aims at surpassing, or staying ahead of, the competition.

In the next step, we present exemplary scenarios within the outlined framework of how the dynamics between two competing banks can evolve. The discussion focuses on three interesting cases. In all cases shown, bank 1 is the initially smaller player. While the left-hand side of Figure 3 shows how the system of the two lending quantities evolves, the right-hand side displays the time paths of the two lending variables. Figure 3 a) documents the case where bank 1 is working to close in on the larger bank 2. This first case assumes that the latter player in this case remains passive. Figure 3 b) documents the case where bank 1 expands aiming to surpass bank 2. This is the case with $\theta_1 > 1$. Again, bank 2 is assumed to remain passive. Finally, the case shown in Figure 3 c) captures the dynamics when bank 2 reacts to the challenge of bank 1. As we can see, it is this case where a cumulative process

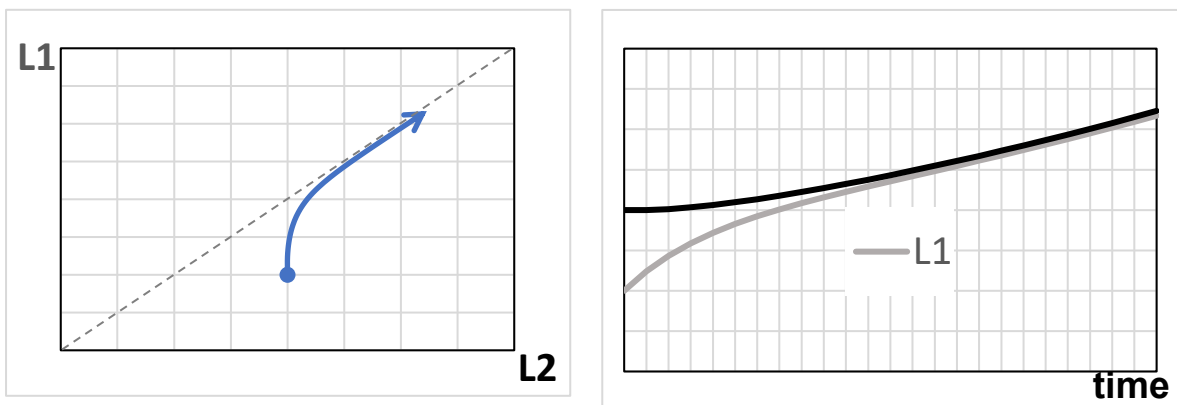
occurs with the two competitors driving each other in a continuing growth process. For sure, there are further scenarios possible.



a) Bank 1 catches up while bank 2 remains passive



b) Bank 1 aims to surpass the passive bank 2



c) Bank 1 catches up with bank 2 responding.

Figure 3: Examples of dynamics of competitive struggle

Figure 4 shows the implications for the total of the two banks' lending for the three scenarios just discussed. It becomes clear that it is the interplay of the smaller bank pursuing the leader combined with the latter's determination to preserve its lead (i.e., scenario c) that has the strongest potential for an extended credit boom. In this case we could indeed state "two's a herd". If the two largest banks drive each other in such a way, this can plausibly shape the aggregate credit supply. Even the two banks alone – with just a fifth of total domestic bank lending – could thus generate a credit boom. Clearly, the boom can be amplified if further banks are pulled into this expansionary process.

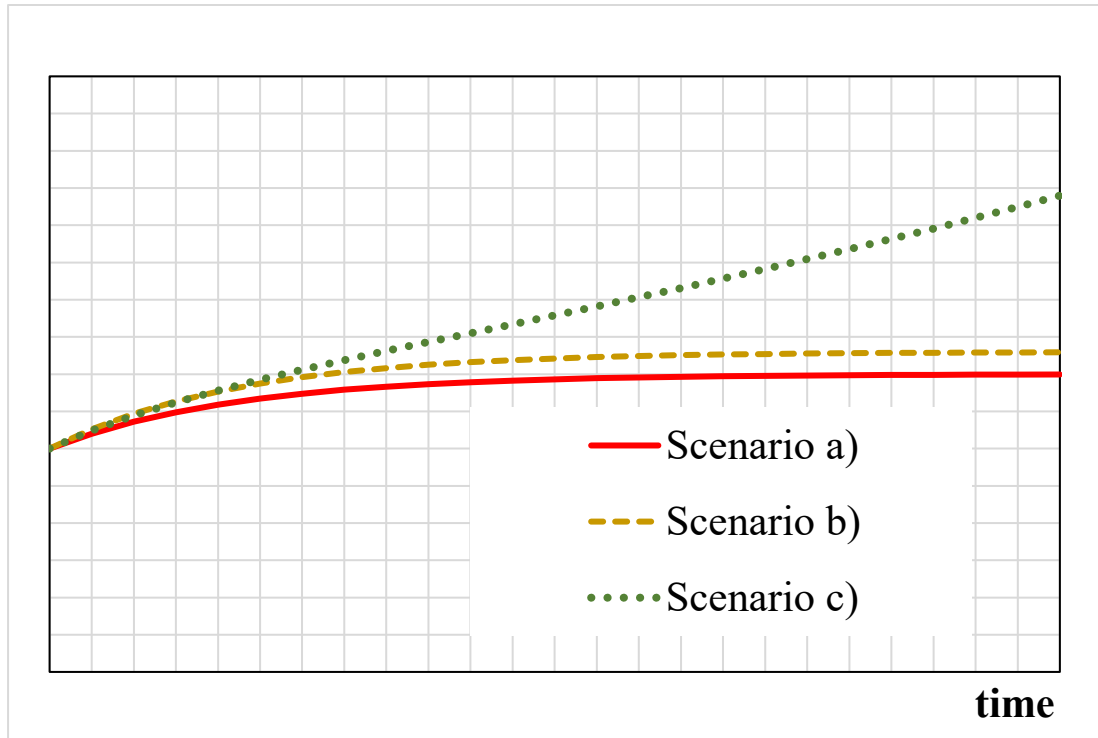


Figure 4: Aggregate of two banks' lending under different scenarios

4. Econometric Estimates

The estimation procedure used here starts with the equations of the model described before. In addition to the elements already described we add two explanatory variables, namely the lagged endogenous variable and the growth rate of nominal GDP (Δy_t) as a scale variable. We estimate the following equations formulated in natural logs of total loans:⁷

$$\Delta l_t^{JPM} = \alpha_{1,1} + \alpha_{1,2} \Delta l_{t-1}^{JPM} + \alpha_{1,3} \Delta y_t + \lambda_1 (\theta_1 l_{t-1}^{BofA} - l_{t-1}^{JPM}) \quad (3)$$

$$\Delta l_t^{BofA} = \alpha_{2,1} + \alpha_{2,2} \Delta l_{t-1}^{BofA} + \alpha_{2,3} \Delta y_t + \lambda_2 (\theta_2 l_{t-1}^{JPM} - l_{t-1}^{BofA}) \quad (4)$$

Econometrically, the last term in the two equations is a cointegration term. The specification described is estimated over periods of various lengths. The starting point of all estimates is 2004Q4 as indicated above. The shortest sample runs through 2010Q4. We further show estimates of the same specification with different endpoints, namely 2011Q4 and 2012Q4. Tests are conducted and reject the hypotheses that either of the two banks aimed at surpassing the other or preserving a quantitative advantage. The associated parameter restrictions that both θ_1 and θ_2 are equal to one are supported by the data, as indicated by Wald tests. Table 1 shows the results of our estimates for the growth of total lending by JP Morgan. Table 2 presents the estimates for the growth rate of lending of the Bank of America as an endogenous variable.

The estimates for JPM document a clear and systematic influence of the $l_{t-1}^{BofA} - l_{t-1}^{JPM}$ term. The coefficient λ_1 is positive and significantly different from zero in all three sample periods. By contrast, in none of the estimates for BofA do we find a significant λ_2 -coefficient. The term $l_{t-1}^{JPM} - l_{t-1}^{BofA}$ does not add explanatory power to the estimate as assessed by a Wald test. Hence, BofA has not systematically acted to counter its shrinking quantitative lead. Instead, it remained largely passive to this quantitative challenge.⁸ Tests show no significant heteroscedasticity and autocorrelation in the residuals of these estimates as reported by the respective p -values. When alternatively using the difference between the two banks' total assets (instead of lending) the estimate in both cases turns up no significant λ -coefficients and a markedly lower \bar{R}^2 .

⁷ The estimates for JPM includes dummies to account for significant effects on lending in quarters with the acquisitions of Kohl's Corporation in 2006 and Bear Stearns and Washington Mutual in 2008. The estimates for BofA includes three such dummies in 2006 and 2008 to account for effects from the acquisitions of the MBNA Corporation and Countrywide.

⁸ A slightly different interpretation – given that the λ_2 -coefficient is indeed positive – would be that there was a BofA response but that it was quantitatively too weak to show up in a statistically significant way.

Table 1: Econometric estimates for JP Morgan Lending, Equation (3)

Sample Period Variables, Statistics	2004Q4-2010Q4	2004Q4-2011Q4	2004Q4-2012Q4
Constant	-0.068* (0.028)	-0.063* (0.022)	-0.048* (0.018)
Δl_{t-1}^{JPM}	0.033 (0.042)	0.022 (0.039)	0.008 (0.034)
Δy_t	1.225* (0.482)	1.265** (0.482)	1.184* (0.461)
$l_{t-1}^{BoFA} - l_{t-1}^{JPM}$	0.184* (0.075)	0.173** (0.058)	0.138* (0.052)
\bar{R}^2	0.699	0.712	0.716
Heteroscedasticity (Breusch-Pagan-Godfrey)	0.775	0.782	0.755
Residual autocorrelation (Breusch-Godfrey)	0.412	0.380	0.439

The significance of estimated coefficient is documented as follows: * indicates significance at the five percent and ** at the one percent level of significance.

Table 2: Econometric estimates for Bank of America Lending, Equation (4)

Sample Period Variables, Statistics	2004Q4-2010Q4	2004Q4-2011Q4	2004Q4-2012Q4
Constant	-0.026 (0.031)	-0.025 (0.026)	-0.026 (0.020)
Δl_{t-1}^{BoFA}	- 0.107 (0.145)	- 0.118 (0.115)	- 0.142 (0.110)
Δy_t	0.352 (0.656)	0.382 (0.612)	0.173 (0.653)
$l_{t-1}^{JPM} - l_{t-1}^{BoFA}$	0.074 (0.099)	0.069 (0.084)	0.073 (0.071)
\bar{R}^2	0.137	0.207	0.259
Heteroscedasticity (Breusch-Pagan-Godfrey)	0.148	0.197	0.173
Residual autocorrelation (Breusch-Godfrey)	0.241	0.229	0.178

The significance of estimated coefficient is documented as follows: * indicates significance at the five percent and ** at the one percent level of significance.

The financial crisis starting in 2007 could have affected the rivalry just documented. Arguably, JP Morgan could have abated its push for leadership in the lending business. This hypothesis is already addressed by the estimates with different historical endpoints in Table 1. Here, comparing row two with row one indicates little evidence that JP Morgan relented in its effort at catching up in the lending business. Row three – with the endpoint of the estimate at the end of 2012 – shows more of a tendency of the effect to weaken. However, rolling estimates of the λ_1 -parameter offers a better way to assess whether JP Morgan's strategy changed as the financial crisis unfolded. Figure 5 presents the result of this estimation exercise. The result is straightforward: rather than a weakening in the urge to close the gap with respect to the leader, we see that JP Morgan doubled down on its strategy during these crisis years. In fact, the reported effect indicates that the difference between the two banks' loan book kept driving JP Morgan's lending growth through 2014.⁹ In terms of our three scenarios of section 3, the evidence presented here clearly singles out scenario shown in Figure 3a) as the empirically relevant one. The Bank of America did not let itself be drawn into a competitive struggle for the size of the loan book.

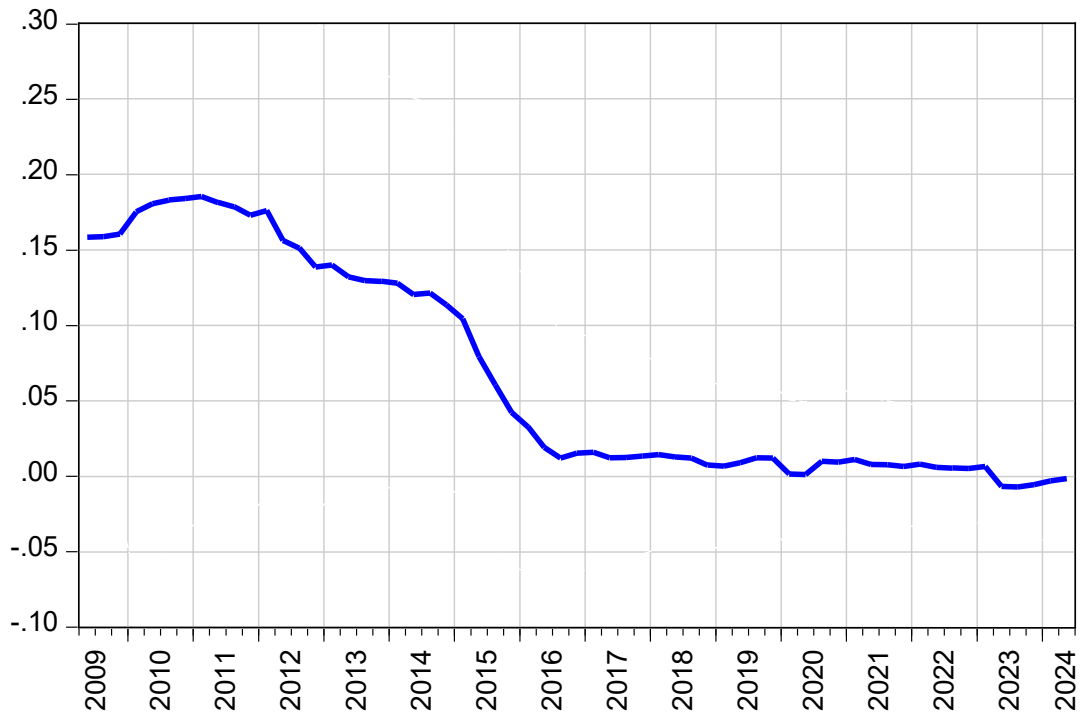


Figure 5: Recursive estimate of coefficient of $l_{t-1}^{BoFA} - l_{t-1}^{JPM}$ in Equation (3)

⁹ Yelne (2019) offers an interesting assessment of the various strategic instruments applied by banks in the decade after the financial crisis.

5. Summary and Conclusions

To answer the question in the title: No, the two (large) banks did not form a herd in the period at hand. The second largest bank, JP Morgan, chased the largest competitor, the Bank of America. Hence, one important element of herd dynamics can be documented for the US in the years before and after the financial crisis. Yet, the largest bank in turn did not react to the challenge by trying to keep its quantitative edge in the lending business. As a result, no acceleration of lending among the major banks occurred. This in turn did not pull other banks into a new phase of possibly strong credit growth. Arguably, some commentators, including policy makers, would have preferred such accelerated credit growth.¹⁰ A critical perspective that considers the bounded rationality of banks suggests a different reading: The cautious behavior of the Bank of America was helpful in that it did not spark herd behavior and a renewed credit boom. If the Bank of America had not pursued its cautious strategy, the US could have experienced a credit boom not long after the end of the last major financial crisis.

Acknowledgements

I would like to thank participants of the 2025 conference of the Society for the Advancement of Behavioral Economics in Trento for helpful comments.

¹⁰ See Bernanke (2012), then the Chairman of the FED, in his speech “Banks and Bank Lending: The State of Play”.

References

- [1] Asea Patrick K. and Brock S. Blomberg (1998), Lending Cycles. *Journal of Econometrics*, 83(1-2), pp. 89-128.
- [2] Berger, Alan N. and G. F. Udell (2004), The Institutional Memory Hypothesis and the Procyclicality of Bank Lending Behavior, *Journal of Financial Intermediation* 13 (4), pp. 458-495.
- [3] Bernanke, Ben S. (2012) Banks and Bank Lending: The State of Play, Speech by the Chairman of the Federal Reserve.
<https://www.federalreserve.gov/newsevents/speech/files/bernanke20120510a.pdf>
- [4] Cabral, Luis (2018), We're Number 1: Price Wars for Market Share Leadership. *Management Science* 64 (5), pp. 2013-2030.
- [5] Eckstein Otto and Alan Sinai (1986), The Mechanics of the Business Cycle in the Postwar Era, in *The American Business Cycle: Continuity and Change*, ed. R. J. Gordon, NBER, Chicago.
- [6] Fanga, Hao, Yang-Cheng Lub, Joseph.C.P. Shiehc, and Yen-Hsien Leed, (2021), The Existence and Motivations of Irrational Loan Herding and its Impact on Bank Performance when Considering Different Market Periods, *International Review of Economics and Finance*, 73 (C), pp. 420–443.
- [7] Gillenwater, Marty (2012), Bank of America: Is Bigger Always Better? Marshall University, Theses, Dissertations and Capstones. Paper 419.
- [8] Jain, Arvind K. and Satyadev Gupta (1987), Some Evidence on "Herding" Behavior of U. S. Banks, *Journal of Money, Credit and Banking*, 19 (1), pp. 78-89.
- [9] Kindleberger, Charles, (1978), *Manias, Panics, and Crashes: A History of Financial Crises*. New York.
- [10] Kress, Jeremy C. (2020), Modernizing Bank Merger Review, *Yale Journal on Regulation*, 37 (2), pp. 435-498.
- [11] Juglar, Clément (1862), *Des Crises Commerciales et de Leur Retour Périodique*. Paris, Guillaume et Cie.
- [12] McCauley, Robert, Patrick McGuire, and Philip Wooldridge (2021), Seven Decades of International Banking, *BIS Quarterly Review*, September Issue, pp. 61-75.
- [13] Mills, John (1867), On Credit Cycles and the Origin of Commercial Panics. *Transactions of the Manchester Statistical Society*.
- [14] Nakagawa Ryuichi, Hidekazu Oiwa, and Fumiko Takeda (2012), The Economic Impact of Herd Behavior in the Japanese Loan Market, *Pacific-Basin Finance Journal* 20 (May), pp. 600–613.
- [15] Rötheli, Tobias F. (2001), Competition, Herd Behavior, and Credit Cycles: Evidence from Major Swiss Banks, *Journal of Economics and Business*, 53 (6), pp. 585-592.

- [16] Schneider, Thomas, Philip E Strahan, Jun Yang (2024), Syndicated Lending, Competition, and Relative Performance Evaluation, *Review of Financial Studies*, 37 (12), pp. 3802–3834.
- [17] Tamirisa, Natalia and Deniz O. Igan, (2008), Are Weak Banks Leading Credit Booms? Evidence from Emerging Europe, *Comparative Economic Studies*, 50 (4), pp. 599–619.
- [18] Tirole, Jean (1988), *The Theory of Industrial Organization*. Cambridge, MA, The MIT Press.
- [19] Van Loo, Rory (2018), Making Innovation More Competitive: The Case of Fintech, *U.C.L.A. Law Review*, 65 (232), pp. 233-279.
- [20] Wang, Peiwen, Minghua Chen, Ji Wu, and Yuanyun Yan (2023), Do Peer Effects Matter in Bank Risk? Some Cross-Country Evidence, *Journal of International Financial Markets, Institutions and Money*, 88 (October), 101844.
- [21] Yelne, Tejal (2019), *Banking and Finance: Ten Years after the 2007-2008 Financial Crisis*, Chetana's Institute of Management & Research, 11 (1), pp. 71 – 77.