ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ

UNIVERSITY OF PIRAEUS

UNIVERSITY OF PIRAEUS

SCHOOL OF ECONOMICS, BUSINESS AND INTERNATIONAL STUDIES

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THE IMPACT OF MERGERS AND ACQUISITIONS (M&A) ON FINANCIAL INSTITUTIONS

Ph.D. Thesis

Ioannis K. Thanos

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ΣΧΟΛΗ ΟΙΚΟΝΟΜΙΚΩΝ, ΕΠΙΧΕΙΡΗΜΑΤΙΚΩΝ ΚΑΙ ΔΙΕΘΝΩΝ ΣΠΟΥΔΩΝ

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Διδακτορική Διατριβή

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Η ΔΙΑΤΡΙΒΗ ΥΠΟΒΑΛΛΕΤΑΙ
ΣΤΟ ΤΜΗΜΑ ΟΙΚΟΝΟΜΙΚΗΣ ΕΠΙΣΤΗΜΗΣ
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Abstract

The European financial sector has experienced significant changes over the last two decades, mostly posing challenges on the operations of financial institutions rather than being the source of opportunities.

Key factors driving these upheavals included the failures or near-failures of UK and Continental European banks, which were heavily exposed to U.S. mortgage-backed securities that triggered the 2007-2008 Global Financial Crisis (GFC). The crisis was compounded by a liquidity shortage, as many of European banks relied on short-term funding from the U.S. dollar market, which dried-up as U.S. banks curtailed cross-border lending. In addition, interbank lending collapsed as European banks became increasingly wary of lending to each other, leading to a severe credit crunch with sharply restricted lending to businesses and households. The credit crunch was further exacerbated by the 2010-2012 sovereign debt crisis, and a sharp rise in non-performing loans, as the financial and sovereign crises escalated into a severe economic downturn across Europe (Bremus and Fratzscher (2015); Bhimjee et al. (2016); Iwanicz-Drozdowska et al. (2016)).

Following the outbreak of the European credit crisis, and amid widespread accusations that financial institutions had largely caused it, the European Central Bank (ECB) implemented a new supervisory framework. The ECB, as the main supervisory authority, aimed to enhance the resilience of banking institutions by initially assuming oversight of systemically important institutions from National Supervisory Authorities (NSAs). Through the newly established Single Supervisory Mechanism (SSM), the ECB imposed uniform regulations to reduce the heterogeneity that existed between the different national supervisory authorities, which were much stricter than before[1] (Fiordelisi et al. (2017); Abad et al. (2020); Avgeri et al. (2021)). As a result, banks under direct supervision bore the additional burdens introduced by these regulatory changes.

A prominent factor attributed to the GFC and the subsequent credit crunch in Europe—or, at the very least, one that left financial institutions vulnerable—was weak corporate governance, especially within the board of directors (Kirkpatrick 2009; Francis et al.

[1] For more details see https://www.bankingsupervision.europa.eu/about/thessm/html/index.en.html

(2012); de Haan and Vlahu (2016); Fernandes et al. (2018)). In response, supervisory authorities around the world began to monitor more closely the governance structures of the institutions in their jurisdiction. They also reassessed the effectiveness of these governance structures, issuing revised corporate governance guidelines (e. g., the Walker Report (2009) in the UK; the European Commission Green paper (2010); the Federal Reserve Board (2013); and various Basel Committee on Banking Supervision guidelines (2006), (2008), (2010), (2015)). As a result, financial institutions faced the challenge of rethinking and reshaping their governance structures and practices where they were deemed inadequate.

Another factor driving profound changes in the financial sector was the rapid development of technology, and in particular the financial technology (Fintech). The start-ups that pioneered these technologies disrupted the previously dominant traditional financial institutions by offering similar services in a more user friendly, faster and direct way, while at the same time maintaining smaller and more flexible business structures. Consequently, traditional institutions, already dealing with other significant challenges, now faced the dilemma of adapting to these technological changes or risk gradually losing their competitive edge.

One section of traditional financial institutions that was particularly affected by the crisis was their investments in Mergers and Acquisitions (M&A). With profitability and liquidity at significantly low levels, these institutions lacked surplus needed to proceed with such expansions. Also, the stricter supervisory rules imposed by the Single Supervisory Mechanism, which enforced stricter criteria for realizing potential M&A transactions, further limited these activities. However, even smaller in number, M&A deals still occurred during this period, albeit mainly involving smaller domestic deals or forced acquisitions of failing institutions.

Despite the strict stance towards M&As, supervisors began to see that such agreements could lead to further improvement of the financial system by enabling more efficient institutions to absorb those that were superfluous to the industry and by enhancing the performance of systemic banks. Given this potential, it is therefore important to explore whether M&As could serve as an effective strategy to help European financial institutions address, or even transform, the challenges by the events mentioned above into opportunities. To this end, this thesis is presented in three essays. The first essay

examines the relationship between M&As, capital levels and banks' financial performance. The second essay explores the relationship between M&As, the quality of governance, and the financial performance of banks. The third essay investigates the relationship between M&As or any cooperation with fintech companies, market power and the financial performance of banks.

Specifically, the first essay investigates the impact of M&A transactions on capital levels and, either directly or indirectly through the merger induced change in capital levels, on the profitability, and value of European banks by also considering the effects that any changes in capitalization may have first on their systematic risk (as they become safer) and then on their cost of capital (if they are deemed safer it is expected to decrease). Using reputable econometric methods and alternate measures for the examined variables, we offer new empirical evidence using a more recent sample of European banks from 14 countries (namely Belgium, Germany, Ireland, Greece, Spain, France, Italy, Cyprus, Lithuania, Malta, Netherlands, Austria, Portugal, Finland) for the period 2008-2020. In addition, we contribute to the existing literature by exploring how M&As affect significant measures of banks that were influenced by the advent of the Single Supervisory Mechanism which to our knowledge has not yet been examined in literature. Our analysis also considers the impact of SSM’s introduction on all tested measures by also taking into consideration the separation that it imposed to significant and less significant institutions.

Another innovation of this study is the more comprehensive investigation of the impact of M&As on European banks through a multilevel and sequential analysis which is not evident to our knowledge in the relevant literature. Specifically, we perform our analysis in two steps which are interconnected, and the merger effect of the first step is examined on the second one in order to capture the indirect long-term effect that may be created.

To conduct our econometric analysis, we employ the Generalized Method of Moments (GMM), specifically the two-step system GMM estimator approach, proposed by Arellano and Bover (1995) and Blundell and Bond (1998), to address any potential endogeneity issues that may arise in dynamic panel data models. The results primarily show that M&As have a significant impact on both the capital levels and profitability of banks. In particular, we find that institutions that attempt M&A deals experience an

increase in their capital levels, both for the whole sample and specifically for directly supervised institutions. While there is also an increase in their accounting profitability, a decrease in market capitalization is observed for the whole sample, though the reverse is true for directly supervised institutions. However, when we examine the effects of multiple annual M&As and prior accumulated experience on such deals, saturation effects appear. The impact of M&As becomes insignificant or, in some cases, reversed, especially for directly supervised institutions.

Furthermore, the analysis of the indirect relationship between M&As and financial performance through increased capital ratios yields negative results. These results suggest that although the priorities of financial institutions in Europe have changed, with capital increases now motivating M&As, this focus on capital adequacy may constrain their ability to generate profits from core activities (such as issuing loans). In other words, while increasing capital can make institutions more secure, it may also limit their profit-making potential.

The second essay investigates the impact of M&As, first, on the quality of governance, and then either directly or through changes in the quality of governance induced by the merger, on banks' financial performance. Using robust econometric methods, as along with alternative measures of governance and bank performance, we offer new empirical results using a more current sample of European banks from 21 countries (namely Belgium, Germany, Ireland, Greece, Spain, France, Italy, Cyprus, Netherlands, Austria, Portugal, Finland, UK, Switzerland, Sweeden, Poland, Denmark, Hungary, Czech Rep., Norway, Russia) for the period 2008-2020. By employing a more comprehensive corporate governance indicator, combined with a multi-level and sequential examination, we provide a more thorough analysis of the impact of M&As. As in the previous essay, we use the two-step system GMM estimator approach for our econometric estimations.

The findings clearly demonstrate that M&As have a significant impact. Specifically, we observe a significant and positive effect of the M&As on the corporate governance of the acquiring banks. However, this effect seems to diminish significantly, potentially due to saturation, when M&As are not used strategically. Regarding the direct effect of M&As on banks' financial performance, both book profitability and market

capitalization initially show positive results, but again, previous experience with M&As appears to lead to a saturation effect, diminishing the impact.

Regarding the indirect effect through change in the quality of governance, the results are more complex, leaning more towards the negative, as any positive impact on governance seems to bring more negative effects. While improved governance structures are generally seen as enhancing firm value, they do not seem to be positively perceived by investors. This could be explained by the possibility that investors do not prioritize governance structures, or if they do, the criteria for what constitutes "good" governance may not be clear or well-defined. As a result, increases in financial performance appear to be driven more directly by the M&A transactions themselves, rather than through improvements in governance structures, which may take time to translate into financial benefits.

The third essay examines the impact of M&As or any other kind of cooperation a bank may have with a fintech company, initially on the bank's market power, and then either directly or through the merger induced effects, on its financial performance. The aim of this essay is to offer new insights to the relatively scarce literature on partnerships between banks and fintech companies. In particular, this is the first to my knowledge study to investigate the impact of these partnerships on banks' market power, and through a multi-level and sequential analysis to provide a more comprehensive understanding of their overall impact, along with a possible pathway to achieving them. Our sample includes data from European banks from 21 countries (namely Belgium, Germany, Ireland, Greece, Spain, France, Italy, Cyprus, Netherlands, Austria, Portugal, Finland, UK, Switzerland, Sweeden, Poland, Denmark, Hungary, Czech Rep., Norway, Russia) for the period 2008-2020. As in the previous essays we use the two-step system GMM estimator to estimate the coefficients of our main models.

The results initially show a negative impact of M&As on banks' market power. However, when we test for multiple collaborations in a single year and examine the effects of prior experience with such deals, we find a clear positive result when multiple deals occur in one year. Conversely, when there are a large number of previous accumulated deals, the result turns again negative. The positive effect on market power appears to stem from long-term improvements such as increased efficiency and reduced labor costs, which can emerge from these partnerships.

The direct effect on performance, appears to be more complex. While there is an initially positive effect, this turns negative as the number of yearly deals and prior experience with similar collaborations increase. Combined with the indirect effect associated with the positive relationship with market power and the results of the previous steps, these findings indicate either that achieving synergies through such partnerships is a complex process. Thay may also indicate that while synergies may not materialize immediately, they can be realized over time through the organizational changes brought about by these partnerships.

These results imply that collaborations with fintechs are challenging and involve significant integration hurdles. To achieve beneficial results from such deals, the incumbent banks need to invest appropriate time and effort into transitioning to more efficient and agile business structures, at least like those of fintechs which seem to be key to realizing the sought-after synergies.

Περίληψη

Ο ευρωπαϊκός χρηματοπιστωτικός τομέας γνώρισε τεράστιες αλλαγές τις τελευταίες δύο δεκαετίες, οι οποίες ως επί το πλείστον θέτουν προκλήσεις στις δραστηριότητες των χρηματοπιστωτικών ιδρυμάτων αντί να αποτελούν πηγή ευκαιριών.

Οι βασικοί παράγοντες που οδήγησαν σε αυτές τις αναταραχές περιλάμβαναν τις αποτυχίες ή τις παρ' ολίγον πτωχεύσεις των τραπεζών του Ηνωμένου Βασιλείου και της ηπειρωτικής Ευρώπης, οι οποίες ήταν σε μεγάλο βαθμό εκτεθειμένες σε τίτλους εξασφαλισμένους με ενυπόθηκα δάνεια των ΗΠΑ που πυροδότησαν την παγκόσμια χρηματοπιστωτική κρίση (GFC) του 2007-2008. Η κρίση επιδεινώθηκε από την έλλειψη ρευστότητας, καθώς πολλές από αυτές τις Ευρωπαϊκές τράπεζες βασίστηκαν σε βραχυπρόθεσμη χρηματοδότηση από την αγορά δολαρίου ΗΠΑ, η οποία στέρεψε καθώς οι τράπεζες των ΗΠΑ περιόρισαν τον διασυνοριακό δανεισμό. Επιπλέον, ο διατραπεζικός δανεισμός κατέρρευσε, καθώς οι ευρωπαϊκές τράπεζες γίνονταν όλο και πιο επιφυλακτικές όσον αφορά τον δανεισμό μεταξύ τους, οδηγώντας σε σοβαρή πιστωτική ασφυξία με έντονα περιορισμένο δανεισμό προς επιχειρήσεις και νοικοκυριά. Η πιστωτική ασφυξία επιδεινώθηκε περαιτέρω από την κρίση δημόσιου χρέους του 2010-2012 και την απότομη αύξηση των μη εξυπηρετούμενων δανείων, καθώς η χρηματοπιστωτική κρίση και η κρίση δημόσιου χρέους κλιμακώθηκαν σε σοβαρή οικονομική ύφεση σε ολόκληρη την Ευρώπη (Bremus and Fratzscher (2015); Bhimjee et al. (2016); Iwanicz-Drozdowska et al. (2016)).

Μετά το ξέσπασμα της Ευρωπαϊκής πιστωτικής κρίσης και εν μέσω εκτεταμένων κατηγοριών ότι τα χρηματοπιστωτικά ιδρύματα την προκάλεσαν σε μεγάλο βαθμό, η Ευρωπαϊκή Κεντρική Τράπεζα (ΕΚΤ) εφάρμοσε νέο εποπτικό πλαίσιο. Η ΕΚΤ, ως η κύρια εποπτική αρχή, είχε ως στόχο να ενισχύσει την ανθεκτικότητα των τραπεζικών ιδρυμάτων αναλαμβάνοντας αρχικά την εποπτεία των συστημικά σημαντικών ιδρυμάτων από τις Εθνικές Εποπτικές Αρχές (ΕΕΑ). Μέσω του νεοσυσταθέντος Ενιαίου Εποπτικού Μηχανισμού (ΕΕΜ), η ΕΚΤ επέβαλε ενιαίους κανονισμούς για τη μείωση της ετερογένειας που υπήρχε μεταξύ των διαφόρων εθνικών εποπτικών αρχών, οι οποίοι ήταν πολύ αυστηρότεροι από ό,τι στο παρελθόν[2] (Fiordelisi κ.ά. (2017)· Abad

[2] Για περισσότερες λεπτομέρειες δείτε
https://www.bankingsupervision.europa.eu/about/thessm/html/index.en.html

κ.ά. (2020)· Avgeri et al. (2021)). Ως αποτέλεσμα, οι τράπεζες υπό άμεση εποπτεία επωμίστηκαν τις πρόσθετες επιβαρύνσεις που εισήγαγαν αυτές οι κανονιστικές αλλαγές.

Ένας εξέχων παράγοντας που συνέβαλε στην παγκόσμια οικονομική κρίση (GFC) και την επακόλουθη πιστωτική κρίση στην Ευρώπη - ή, τουλάχιστον, ένας που άφησε τα χρηματοπιστωτικά ιδρύματα ευάλωτα - ήταν η αδύναμη εταιρική διακυβέρνηση, ειδικά εντός του διοικητικού συμβουλίου (Kirkpatrick 2009; Francis et al. (2012); de Haan και Vlahu (2016)· Fernandes et al. (2018)). Ανταποκρινόμενες σε αυτό, οι εποπτικές αρχές σε όλο τον κόσμο άρχισαν να παρακολουθούν στενότερα τις δομές διακυβέρνησης των ιδρυμάτων στη δικαιοδοσία τους. Επαναξιολόγησαν επίσης την αποτελεσματικότητα αυτών των δομών διακυβέρνησης, εκδίδοντας αναθεωρημένες κατευθυντήριες γραμμές εταιρικής διακυβέρνησης (π.χ. η έκθεση Walker (2009) στο Ηνωμένο Βασίλειο· την Πράσινη Βίβλο της Ευρωπαϊκής Επιτροπής (2010)· το Federal Reserve Board (Ομοσπονδιακή Τράπεζα των ΗΠΑ) (2013)· και διάφορες κατευθυντήριες γραμμές της Επιτροπής της Βασιλείας για την τραπεζική εποπτεία (2006), (2008), (2010), (2015)). Ως αποτέλεσμα, τα χρηματοπιστωτικά ιδρύματα αντιμετώπισαν την πρόκληση να επανεξετάσουν και να αναδιαμορφώσουν τις δομές και τις πρακτικές διακυβέρνησής τους, όπου κρίθηκαν ανεπαρκείς.

Ένας άλλος παράγοντας που οδήγησε σε βαθιές αλλαγές στον χρηματοπιστωτικό τομέα ήταν η ταχεία ανάπτυξη της τεχνολογίας, και ιδίως της χρηματοοικονομικής τεχνολογίας (Fintech). Οι νεοφυείς επιχειρήσεις που πρωτοστάτησαν σε αυτές τις τεχνολογίες διατάραξαν τα μέχρι πρότινος κυρίαρχα παραδοσιακά χρηματοπιστωτικά ιδρύματα, προσφέροντας παρόμοιες υπηρεσίες με πιο φιλικό προς τον χρήστη, ταχύτερο και άμεσο τρόπο, διατηρώντας ταυτόχρονα μικρότερες και πιο ευέλικτες επιχειρηματικές δομές. Κατά συνέπεια, τα παραδοσιακά θεσμικά όργανα, που ήδη αντιμετώπιζαν άλλες σημαντικές προκλήσεις, αντιμετώπιζαν τώρα το δίλημμα της προσαρμογής σε αυτές τις τεχνολογικές αλλαγές ή του να κινδυνεύσουν να χάσουν σταδιακά το ανταγωνιστικό τους πλεονέκτημα.

Ένα τμήμα των παραδοσιακών χρηματοπιστωτικών ιδρυμάτων που επηρεάστηκε ιδιαίτερα από την κρίση ήταν οι επενδύσεις τους σε συγχωνεύσεις και εξαγορές (M&A). Με την κερδοφορία και τη ρευστότητα σε σημαντικά χαμηλά επίπεδα, τα ιδρύματα αυτά δεν διέθεταν το πλεόνασμα που απαιτείται για να προχωρήσουν σε

τέτοιες επεκτάσεις. Επίσης, οι αυστηρότεροι εποπτικοί κανόνες που επέβαλε ο Ενιαίος Εποπτικός Μηχανισμός, ο οποίος επέβαλε αυστηρότερα κριτήρια για την πραγματοποίηση πιθανών συναλλαγών συγχωνεύσεων και εξαγορών, περιόρισαν περαιτέρω αυτές τις δραστηριότητες. Ωστόσο, ακόμη μικρότερες σε αριθμό, συμφωνίες συγχωνεύσεων και εξαγορών εξακολουθούσαν να πραγματοποιούνται κατά τη διάρκεια αυτής της περιόδου, αν και αφορούσαν κυρίως μικρότερες εγχώριες συμφωνίες ή αναγκαστικές εξαγορές προβληματικών ιδρυμάτων.

Παρά την αυστηρή στάση απέναντι στις συγχωνεύσεις και εξαγορές, οι εποπτικές αρχές άρχισαν να βλέπουν ότι τέτοιες συμφωνίες θα μπορούσαν να οδηγήσουν σε περαιτέρω βελτίωση του χρηματοπιστωτικού συστήματος, επιτρέποντας στα πιο αποτελεσματικά ιδρύματα να απορροφούν εκείνα που ήταν περιττά για τον κλάδο και ενισχύοντας τις επιδόσεις των συστημικών τραπεζών. Δεδομένης αυτής της δυνατότητας, είναι επομένως σημαντικό να διερευνηθεί κατά πόσον οι συγχωνεύσεις και εξαγορές θα μπορούσαν να χρησιμεύσουν ως αποτελεσματική στρατηγική για να βοηθήσουν τα ευρωπαϊκά χρηματοπιστωτικά ιδρύματα να αντιμετωπίσουν, ή ακόμη και να μετατρέψουν, τις προκλήσεις των προαναφερθέντων γεγονότων σε ευκαιρίες. Για το σκοπό αυτό, η παρούσα διατριβή παρουσιάζεται σε τρία δοκίμια. Το πρώτο δοκίμιο εξετάζει τη σχέση μεταξύ συγχωνεύσεων και εξαγορών, επιπέδων κεφαλαίου και χρηματοοικονομικών επιδόσεων των τραπεζών. Το δεύτερο δοκίμιο διερευνά τη σχέση μεταξύ συγχωνεύσεων και εξαγορών, την ποιότητα της διακυβέρνησης και τις οικονομικές επιδόσεις των τραπεζών. Το τρίτο δοκίμιο διερευνά τη σχέση μεταξύ συγχωνεύσεων και εξαγορών ή οποιασδήποτε συνεργασίας με εταιρείες fintech, την ισχύ στην αγορά και τις οικονομικές επιδόσεις των τραπεζών.

Συγκεκριμένα, το πρώτο δοκίμιο διερευνά την επίδραση των συναλλαγών συγχωνεύσεων και εξαγορών στα επίπεδα κεφαλαίου και, είτε άμεσα είτε έμμεσα μέσω της μεταβολής των επιπέδων κεφαλαίου που προκαλείται από τις συγχωνεύσεις, στην κερδοφορία και την αξία των ευρωπαϊκών τραπεζών, εξετάζοντας επίσης τις επιπτώσεις που μπορεί να έχουν τυχόν αλλαγές στην κεφαλαιοποίηση πρώτα στον συστηματικό τους κίνδυνο (καθώς γίνονται ασφαλέστερες) και στη συνέχεια στο κόστος κεφαλαίου τους (εάν κριθούν ασφαλέστερες αναμένεται να μειωθούν).Χρησιμοποιώντας αξιόπιστες οικονομετρικές μεθόδους και εναλλακτικά μέτρα για τις εξεταζόμενες μεταβλητές, προσφέρουμε νέα εμπειρικά στοιχεία χρησιμοποιώντας ένα πιο πρόσφατο δείγμα ευρωπαϊκών τραπεζών από 14 χώρες (συγκεκριμένα το Βέλγιο, τη Γερμανία,

την Ιρλανδία, την Ελλάδα, την Ισπανία, τη Γαλλία, την Ιταλία, την Κύπρο, τη Λιθουανία, τη Μάλτα, την Ολλανδία, την Αυστρία, την Πορτογαλία, τη Φινλανδία) για την περίοδο 2008-2020. Επιπλέον, συμβάλλουμε στην υπάρχουσα βιβλιογραφία διερευνώντας τον τρόπο με τον οποίο οι συγχωνεύσεις και εξαγορές επηρεάζουν σημαντικούς δείκτες των τραπεζών που επηρεάστηκαν από την έλευση του Ενιαίου Εποπτικού Μηχανισμού κάτι που με βάση τα όσα γνωρίζουμε ως τώρα δεν έχει εξεταστεί στην βιβλιογραφία. Η ανάλυσή μας εξετάζει επίσης τον αντίκτυπο της εισαγωγής του ΕΕΜ σε όλα τα μέτρα που χρησιμοποιούμε στον έλεγχο, λαμβάνοντας επίσης υπόψη τον διαχωρισμό που επέβαλε στα σημαντικά και τα λιγότερο σημαντικά ιδρύματα.

Μια άλλη καινοτομία αυτής της μελέτης είναι η πληρέστερη διερεύνηση των επιπτώσεων των συγχωνεύσεων και εξαγορών στις ευρωπαϊκές τράπεζες μέσω μιας πολυεπίπεδης και διαδοχικής ανάλυσης. Για τη διεξαγωγή της οικονομετρικής μας ανάλυσης, χρησιμοποιούμε τη Γενικευμένη Μέθοδο Ροπών (GMM), συγκεκριμένα την προσέγγιση εκτιμητή GMM συστήματος δύο σταδίων, που προτάθηκε από τους Arellano και Bover (1995) και Blundell και Bond (1998), για την αντιμετώπιση πιθανών ζητημάτων ενδογένειας που μπορεί να προκύψουν σε δυναμικά μοντέλα δεδομένων πάνελ. Τα αποτελέσματα δείχνουν κυρίως ότι οι συγχωνεύσεις και εξαγορές έχουν σημαντικό αντίκτυπο τόσο στα επίπεδα κεφαλαίου όσο και στην κερδοφορία των τραπεζών. Ειδικότερα, διαπιστώνουμε ότι τα ιδρύματα που επιχειρούν συμφωνίες συγχωνεύσεων και εξαγορών παρουσιάζουν αύξηση των επιπέδων κεφαλαίου τους, τόσο για το σύνολο του δείγματος όσο και ειδικά για τα άμεσα εποπτευόμενα ιδρύματα. Ενώ παρατηρείται επίσης αύξηση της λογιστικής κερδοφορίας τους, παρατηρείται μείωση της χρηματιστηριακής αξίας για το σύνολο του δείγματος, αν και το αντίστροφο ισχύει για τα άμεσα εποπτευόμενα ιδρύματα. Ωστόσο, όταν εξετάζουμε τις επιπτώσεις πολλαπλών ετήσιων συγχωνεύσεων και εξαγορών και προηγούμενης συσσωρευμένης εμπειρίας σε τέτοιες συμφωνίες, εμφανίζονται φαινόμενα κορεσμού. Ο αντίκτυπος των συγχωνεύσεων και εξαγορών καθίσταται ασήμαντος ή, σε ορισμένες περιπτώσεις, αντιστρέφεται, ιδίως για τα άμεσα εποπτευόμενα ιδρύματα.

Επιπλέον, η ανάλυση της έμμεσης σχέσης μεταξύ συγχωνεύσεων και εξαγορών και χρηματοοικονομικών επιδόσεων μέσω αυξημένων κεφαλαιακών δεικτών αποδίδει αρνητικά αποτελέσματα. Τα αποτελέσματα αυτά υποδηλώνουν ότι, αν και οι προτεραιότητες των χρηματοπιστωτικών ιδρυμάτων στην Ευρώπη έχουν αλλάξει, με

τις αυξήσεις κεφαλαίου να αποτελούν πλέον κίνητρο για συγχωνεύσεις και εξαγορές, αυτή η εστίαση στην κεφαλαιακή επάρκεια μπορεί να περιορίσει την ικανότητά τους να παράγουν κέρδη από βασικές δραστηριότητες (όπως η έκδοση δανείων). Με άλλα λόγια, ενώ η αύξηση του κεφαλαίου μπορεί να καταστήσει τα ιδρύματα ασφαλέστερα, μπορεί επίσης να περιορίσει τις δυνατότητες κερδοφορίας τους.

Το δεύτερο δοκίμιο διερευνά τον αντίκτυπο των συγχωνεύσεων και εξαγορών, πρώτον, στην ποιότητα της διακυβέρνησης και, στη συνέχεια, είτε άμεσα είτε μέσω αλλαγών στην ποιότητα διακυβέρνησης που προκαλούνται από τη συγχώνευση, στις οικονομικές επιδόσεις των τραπεζών. Χρησιμοποιώντας εύρωστες οικονομετρικές μεθόδους, καθώς και εναλλακτικά μέτρα διακυβέρνησης και τραπεζικής απόδοσης, προσφέρουμε νέα εμπειρικά αποτελέσματα χρησιμοποιώντας ένα πιο πρόσφατο δείγμα ευρωπαϊκών τραπεζών από 21 χώρες (συγκεκριμένα το Βέλγιο, τη Γερμανία, την Ιρλανδία, την Ελλάδα, την Ισπανία, τη Γαλλία, την Ιταλία, την Κύπρο, την Ολλανδία, την Αυστρία, την Πορτογαλία, τη Φινλανδία, το Ηνωμένο Βασίλειο, την Ελβετία, τη Σουηδία, την Πολωνία, τη Δανία, την Ουγγαρία, την Τσεχική Δημ., τη Νορβηγία, τη Ρωσία) για την περίοδο 2008-2020. Χρησιμοποιώντας έναν πιο ολοκληρωμένο δείκτη εταιρικής διακυβέρνησης, σε συνδυασμό με μια πολυεπίπεδη και διαδοχική εξέταση, παρέχουμε μια πιο εμπεριστατωμένη ανάλυση των επιπτώσεων των συγχωνεύσεων και εξαγορών. Όπως και στο προηγούμενο δοκίμιο, χρησιμοποιούμε την προσέγγιση εκτιμητή GMM συστήματος δύο βημάτων για τις οικονομετρικές εκτιμήσεις μας.

Τα ευρήματα καταδεικνύουν σαφώς ότι οι συγχωνεύσεις και εξαγορές έχουν σημαντικό αντίκτυπο. Συγκεκριμένα, παρατηρούμε μια σημαντική και θετική επίδραση των Σ&Ε στην εταιρική διακυβέρνηση των αγοραστριών τραπεζών. Ωστόσο, αυτή η επίδραση φαίνεται να μειώνεται σημαντικά, ενδεχομένως λόγω κορεσμού, όταν οι συγχωνεύσεις και εξαγορές δεν χρησιμοποιούνται στρατηγικά. Όσον αφορά την άμεση επίδραση των συγχωνεύσεων και εξαγορών στις χρηματοοικονομικές επιδόσεις των τραπεζών, τόσο η λογιστική κερδοφορία όσο και η χρηματιστηριακή αξία τους παρουσιάζουν αρχικά θετικά αποτελέσματα, αλλά και πάλι, η προηγούμενη εμπειρία με συγχωνεύσεις και εξαγορές φαίνεται να οδηγεί σε φαινόμενα κορεσμού, μειώνοντας την επίδραση.

Όσον αφορά την έμμεση επίδραση μέσω της αλλαγής στην ποιότητα της διακυβέρνησης, τα αποτελέσματα είναι πιο περίπλοκα, κλίνουν περισσότερο προς τα αρνητικά, καθώς κάθε θετικός αντίκτυπος στη διακυβέρνηση φαίνεται να επιφέρει

περισσότερες αρνητικές επιπτώσεις. Ενώ οι βελτιωμένες δομές διακυβέρνησης θεωρούνται γενικά ότι ενισχύουν την αξία των επιχειρήσεων, δεν φαίνεται να γίνονται θετικά αντιληπτές από τους επενδυτές. Αυτό θα μπορούσε να εξηγηθεί από την πιθανότητα οι επενδυτές να μην δίνουν προτεραιότητα στις δομές διακυβέρνησης ή, εάν το κάνουν, τα κριτήρια για το τι συνιστά «χρηστή» διακυβέρνηση μπορεί να μην είναι σαφή ή σαφώς καθορισμένα. Ως αποτέλεσμα, η αύξηση των χρηματοοικονομικών επιδόσεων φαίνεται να οφείλεται πιο άμεσα στις ίδιες τις συναλλαγές Σ&Ε, παρά στη βελτίωση των δομών διακυβέρνησης, οι οποίες μπορεί να χρειαστούν χρόνο για να μεταφραστούν σε οικονομικά οφέλη.

Το τρίτο δοκίμιο εξετάζει τον αντίκτυπο των συγχωνεύσεων και εξαγορών ή οποιουδήποτε άλλου είδους συνεργασίας που μπορεί να έχει μια τράπεζα με μια εταιρεία χρηματοοικονομικής τεχνολογίας, αρχικά στην ισχύ της τράπεζας στην αγορά και, στη συνέχεια, είτε άμεσα είτε μέσω των επιπτώσεων που προκαλούνται από τη συγχώνευση, στις οικονομικές επιδόσεις της. Ο στόχος αυτού του δοκιμίου είναι να προσφέρει νέες γνώσεις στη σχετικά σπάνια βιβλιογραφία σχετικά με τις συνεργασίες μεταξύ τραπεζών και εταιρειών fintech. Ειδικότερα, αυτή είναι η πρώτη από όσο γνωρίζω μελέτη που διερευνά τον αντίκτυπο αυτών των συμπράξεων στην ισχύ των τραπεζών στην αγορά και, μέσω μιας πολυεπίπεδης και διαδοχικής ανάλυσης, παρέχει μια πιο ολοκληρωμένη κατανόηση του συνολικού αντικτύπου τους, μαζί με μια πιθανή πορεία για την επίτευξή τους. Το δείγμα μας περιλαμβάνει στοιχεία από ευρωπαϊκές τράπεζες από 21 χώρες (συγκεκριμένα από το Βέλγιο, τη Γερμανία, την Ιρλανδία, την Ελλάδα, την Ισπανία, τη Γαλλία, την Ιταλία, την Κύπρο, τις Κάτω Χώρες, την Αυστρία, την Πορτογαλία, τη Φινλανδία, το Ηνωμένο Βασίλειο, την Ελβετία, τη Σουηδία, την Πολωνία, τη Δανία, την Ουγγαρία, την Τσεχική Δημ., τη Νορβηγία, τη Ρωσία) για την περίοδο 2008-2020. Όπως και στα προηγούμενα δοκίμια, χρησιμοποιούμε τον εκτιμητή GMM συστήματος δύο βημάτων για να εκτιμήσουμε τους συντελεστές των κύριων μοντέλων μας.

Τα αποτελέσματα δείχνουν αρχικά αρνητικό αντίκτυπο των συγχωνεύσεων και εξαγορών στην ισχύ των τραπεζών στην αγορά. Ωστόσο, όταν δοκιμάζουμε πολλαπλές συνεργασίες σε ένα έτος και εξετάζουμε τις επιπτώσεις της προηγούμενης εμπειρίας με τέτοιες συμφωνίες, βρίσκουμε ένα σαφές θετικό αποτέλεσμα όταν προκύπτουν πολλαπλές συμφωνίες σε ένα έτος. Αντίθετα, όταν υπάρχει μεγάλος αριθμός προηγούμενων συσσωρευμένων συμφωνιών, το αποτέλεσμα γίνεται και πάλι αρνητικό.

Ο θετικός αντίκτυπος στην ισχύ στην αγορά φαίνεται να απορρέει από μακροπρόθεσμες βελτιώσεις, όπως η αυξημένη αποτελεσματικότητα και το μειωμένο κόστος εργασίας, οι οποίες μπορούν να προκύψουν από αυτές τις εταιρικές σχέσεις.

Η άμεση επίδραση στην χρηματοοικονομική απόδοση, φαίνεται να είναι πιο περίπλοκη. Ενώ υπάρχει αρχικά θετικό αποτέλεσμα, αυτό γίνεται αρνητικό καθώς αυξάνεται ο αριθμός των ετήσιων συμφωνιών και η προηγούμενη εμπειρία με παρόμοιες συνεργασίες. Σε συνδυασμό με την έμμεση επίδραση που συνδέεται με τη θετική σχέση με την ισχύ στην αγορά και τα αποτελέσματα των προηγούμενων βημάτων, τα ευρήματα αυτά δείχνουν είτε ότι η επίτευξη συνεργειών μέσω τέτοιων συμπράξεων είναι μια πολύπλοκη διαδικασία. Μπορεί επίσης να υποδεικνύουν ότι ενώ οι συνέργειες μπορεί να μην υλοποιηθούν αμέσως, μπορούν να πραγματοποιηθούν με την πάροδο του χρόνου μέσω των οργανωτικών αλλαγών που επιφέρουν αυτές οι συνεργασίες.

Αυτά τα αποτελέσματα υποδηλώνουν ότι οι συνεργασίες με fintechs αποτελούν πρόκληση και περιλαμβάνουν σημαντικά εμπόδια ολοκλήρωσης. Για να επιτευχθούν ευεργετικά αποτελέσματα από τέτοιες συμφωνίες, οι κατεστημένες τράπεζες πρέπει να επενδύσουν τον κατάλληλο χρόνο και προσπάθεια στη μετάβαση σε πιο αποτελεσματικές και ευέλικτες επιχειρηματικές δομές, τουλάχιστον όπως αυτές των fintechs που φαίνεται να είναι το κλειδί για την υλοποίηση των επιδιωκόμενων συνεργειών.

Table of contents

Essay 2 Are European bank Mergers and Acquisitions (M&A) effective strategies for the improvement of governance quality and performance?

Essay 3 Some lessons from the collaboration between FinTech firms and European banks

List of Tables

Essay 1: EU bank Mergers and Acquisitions (M&A) as a solution to the Single Supervisory Mechanism

Essay 2 Are European bank Mergers and Acquisitions (M&A) effective strategies for the improvement of governance quality and performance?

Essay 3 Some lessons from the collaboration between FinTech firms and European banks

List of Figures

Essay 1: EU bank Mergers and Acquisitions (M&A) as a solution to the Single Supervisory Mechanism

Essay 2 Are European bank Mergers and Acquisitions (M&A) effective strategies for the improvement of governance quality and performance?

Essay 3 Some lessons from the collaboration between FinTech firms and European banks

Introduction

The global financial services playfield has undergone several changes over the past couple of decades. These changes were mostly driven by globalization, credit crisis and advancements in digital technology that forced banks to rethink and transform their business models in order to catch up with these changes, while at the same time trying to recognize and seize all the benefits they could receive from these new circumstances. Another major change that happened in the sector that, in a way, led to historic events around the world, was the deregulation and the easing of restrictive legislation. Until the 1980's the European financial services sector experienced significant institutional and regulatory restrictions on their activities as there was a considerable level of government pervasiveness (Casu and Girardone (2009)). However, since then the process of deregulation began gradually and varied across different member countries (Flier et al. (2001)). Although, such regulatory reforms do not solely happen in Europe and many other regions like the US experienced them. These regulatory changes can be divided into three categories: 1) less restrictions on domestic competition, 2) less limits on the scale and scope activities of banks and 3) better external competitive position of banks (Gual (1999); Flier et al. (2001)). Such examples of deregulation involved the Riegle–Neal Interstate Banking and Branching Efficiency Act of 1994 in the US and the European Union banking directive of 1993 (Maastricht Treaty) which basically allowed banks to operate freely and branch across different states and nations (Berger et al. (1999); Casu and Girardone (2009); Kroszner and Strahan (2014)). This flexibility in the way they conducted their operations, was introduced as a measure to enhance competition in the industry and consequently lower the cost of borrowing for individuals and businesses. Even though, the intentions were for the greater good, they have been a main causal factor for the global financial crisis of 2007-2009.

Driven by the changes arising from deregulation, globalization and digital technology, a successive wave of mergers that started in the 1990's and continued ever since but in different forms[3], has reshaped the industry. According to statistics published by the

[3] e.g. Starting from the 90s and continuing until the advent of the GFC, M&As were mostly performed for the purposes of expansion to other regions and the further growth of institutions (mostly driven by deregulation and globalization). Then ever since the crisis financial institutions in Europe began to pull out from some of their investments abroad, as their limited capital and liquidity forced them to become more conservative, which did not happen with the domestic deals who increased even though most of them involved the rescue of troubled local banks (Andreeva et al. (2019); Maragopoulos (2021);

Institute for Mergers, Acquisitions and Alliances (IMAA) on its official website, since 1985 111,000 deals have taken place worldwide in the financial sector, which places it third in the overall ranking among other industries, but first in terms of the total value of deals, where its sum according to the same source reached to 10,800bil USD. Particularly in the EU the number of institutions has dropped from 8162 to 5263 during the period 2008 - 2021 (EBF, 2022), showing the magnitude of consolidation in the sector.

The main reasons for a financial institution to engage in M&A deals are divided into three categories: the synergy, hubris and agency motives (Pasiouras et al. (2011)).

Concerning the synergy motive two entities combine forces or one acquires another expecting that their integration could offer more profits than just the sum of the individual firms in the deal[4]. Counting on those synergies the firms are willing to bear the costs of the M&A process as well as pay premiums to targets (Gaughan (2015)). Synergies can be divided to operating and financial. The operating ones can be derived by revenue and/or cost enhancements following the deal. First, the revenue-enhancing ones can be derived from greater market power, meaning an increased ability to set higher prices, the expanding to new markets and the integration of functional strengths of the entities. The cost decreasing ones, that are more common, mainly come from economies of scale, where the increase of the firm size can result to lower costs per unit. In addition to scale, operational synergies can also come from scope economies where, incorporating a variety of similar products and services to their own, can be more cost effective for a firm than producing less of a variety, or producing each good independently. Financial synergies on the other hand, come from increased cash flows and/or lower costs of capital following the deal.

The agency motive has its roots on the conflict of interest that exists between those who own the firm and those who manage it (Jensen (1986)). In that case the motivation of the decision-making managers is to establish greater power and status for themselves in their firms by increasing the size of those firms through M&As. However, these

Fernandez-Bollo et al, (2021); Figueiras et al. (2021)). While also as digital technologies advanced and new digital channels of financial services were created, the investment in firms which developed and offered these services digitally (FinTechs) started from the GFC and continued to grow exponentially (Murinde et al. (2022); Ruhland and Wiese (2023)).

[4] e.g. Ansoff's synergy concept 2+2=5 (Ansoff (1965)

decisions can be value destroying as they might not be chosen based on metrics such as the net present value they can offer, but for the aforementioned benefits they can give to managers.

The hubris motive, which resembles the agency one and goes in contrast with synergy, is a motive that could have negative outcomes for the firm. The hubris hypothesis (Roll (1986)) proposes that M&As can happen by decision makers who are driven by hubris. Where hubris has the meaning that managers driven by overconfidence in their own abilities might make mistakes in their choice of partners or targets. However, unlike the agency motive their intentions are to enhance the value of their firm.

In addition to the above, other motives can be also observed. One is the eagerness of banks to increase in size through M&As, in order to pass the "too big to fail" threshold and receive all the benefits from government safety nets as well as establish a more reputable brand image. Also, another motive that became more prevalent due to the advancements in digital technology is the acquisition of technology, talent and know how that other firms possess.

However, external effects had influenced the number as well as the kind of bank M&As. Specifically in Europe, before the global financial crisis, there was an increasing number of cross-border mergers (Heukmes and Guionnet, (2018)), but as a result of the crisis, that was evident in the sector approximately the period between 2010-2017, this trend stopped and their place took the domestic ones (Jackson (2018); Gardella et al. (2020)). This change made sense, as before the crisis the sector had less restrictions, thanks to deregulation, and globalization was on the rise. Hence, banks, in order to maximize their profits, survive the vast competition and diversify their portfolio to minimize localized risks, they broadened their operations to other niches and countries by acquiring local financial institutions that were already established in the targeted areas (Focarelli and Pozzolo (2001); Buch and DeLong (2004); ECB (2007); Pozzolo (2009); Lozano-Vivas and Weill (2012)).

On the other hand, these kinds of deals threaten the stability of the system as they spread risks across different markets, meaning there is greater risk of financial contagion (Gardella et al. (2020); Hassan and Giouvris (2021); Christopoulos et al. (2021)). Also, increasing consolidation might lead to ‘’too big to fail’’ firm problems when it creates

a market that consists of mostly large institutions and as a consequence increase systemic risk (Berger (2000); Molyneux et al. (2014); Christopoulos et al. (2021)). Thus, the ECB having those in mind, began to monitor more strictly M&As in order to decrease the possibility of such crises in the future.

Thus, following the credit crisis that affected EU financial institution in 2010, the ECB, in order to minimize the possibilities of such threats to systemic risk by big banks, it introduced the Single Supervisory Mechanism (Avgeri et al. (2021); Okolelova and Bikker (2022)). The main purpose of this mechanism is to integrate the supervision policy of financial institutions operating in its jurisdiction and pass the supervisory rights of systemically important institutions from the national authorities to the ECB (Fiordelisi et al. (2017); Avgeri et al. (2021)). The mechanism entailed for the directly supervised institutions, meaning the ones deemed to pose greater threat to systemic risk, stricter supervision in the matters of the financial institutions' business model, their internal governance and the amount of risk they are exposed as well as pose stricter directives on the required amount of capital and liquidity a supervised institution should have (Ferran and Babis (2013); Fiordelisi et al. (2017); Avgeri et al. (2021)). Especially, the matter of the amount of capital that financial institutions hold is of great essence as it can absorb the losses that may arrive at times of distress that may cause a bank to fail or enter a resolution scheme which may require funds coming from taxpayers' money (ECB (2019))[5].

So, the matter of improving the capital of a financial institution made regulators rethink their stance towards M&As and allow institutions, that under other circumstances could not have their scheduled M&A deals approved, to realize them or even use accounting tricks such as badwill that were not allowed to use before, in order to improve their results (Nouy (2017); Enria (2019); Andreeva et al. (2019); ECB (2020); Maragopoulos (2021); Fernandez-Bollo et al, (2021)).

Also, regulators saw that M&As can be a valuable tool with which to avoid banking firms' failures and costly bailouts for the governments themselves. The main idea behind it was that when a healthy bank acquires a troubled one it protects the economy from the full cost of the distressed bank's failure. This seems to be a better solution as

[5] For more details see https://www.bankingsupervision.europa.eu/about/thessm/html/index.en.html

the different countries' governments would not have to use public funds to bail out the troubled banks (Group of Thirty (2009); Beltratti and Paladino (2013); Nouy (2017)). Although, if the acquired bank is considered "too big to fail", then the merger could lead to a larger bank or the greater concentration could lead to less competition (Christopoulos et al. (2021)). So, this measure is not a panacea and for each case it should be investigated if the pros exceed the cons.

One aspect of the opinion why troubled banks should be saved by the healthier ones is that the latter, might have better governance mechanisms compared to the others. Most of the times the failure of a bank could be due to their poor governance as, wrong governance schemes could lead to bad decisions and worse management of resources that cause a bank to fail, even though there might be prosperous potential for it. Hence, banks that have certain characteristics, such as being larger and older, might be the most suitable acquirers for them (John et al. (2016); Srivastav and Hagendorff (2016); Berger et al. (2016); Fernandes et al. (2018)). Bigger and older banks most of the times have greater experience in the financial services business, since they might operate for longer time in the industry and as they say, ''with age comes wisdom''. Apart from that, compared to the smaller ones, they have better and more experienced workforce and executives which, in addition with the access to more and better information (information asymmetry), gives them the ability to better assess the risks, which leads to better investment choices (Minton et al. (2014); Kozubovska (2017); Biswas et al. (2017); Ruiz-Mallorquí and Aguiar-Díaz (2017); Tran et al. (2019)). So, it is more beneficial for the stability of the sector when a bank with poor governance is acquired by a more solid one, but also for the whole economy in general, as there is better management of monetary resources (BCBS (2015)).

However, M&As could have the opposite effect. When the bidder bank is the one with the bad governance, this could lead to two outcomes. If the target bank has better governance, the bidder bank might adopt its schemes and practices, and lead to a successful merger that eventually benefits everyone (Chu et al. (2016); Ellis et al. (2017); Hussain and Loureiro (2022); Hussain et al. (2023)). On the other path, if it does not change its governance and also if it even passes these inefficient practices to the acquired, it could lead to a failed merger and all problems that existed or were hidden and were about to appear, could be exacerbated (Chu et al. (2016); Ellis et al.

(2017); Liu et al. (2017); Hussain et al. (2023); Hussain et al. (2024)). Nevertheless, the ultimate purpose of the governance quality improvement is the increase in performance of the firm and as a result the increase of its value and the wealth transferred to shareholders.

Also, the recent advancements in digital technology and especially those in the financial technology (Fintech) have pathed the way to the further rising of the M&A volume in the industry, as traditional institutions tried through deals with Fintechs to adapt to their environment that keeps changing as a result of these advancements as well as seize the opportunity and adopt these changes to make themselves more efficient and profitable (Hornuf et al. (2021); Klus et al. (2019)). The entry of these tech savvy newcomers in the industry, has caused many problems to incumbent financial institutions who were forced to defend their positions. So, the partnership or the acquisition of fintechs is one of those defense tactics that may allow banks seize first these new ways of conducting their business, which appear to be more efficient and adapted to the current needs of their customers, but also take out of the game their new competitors or even make them their allies (Fonseca and Meneses (2020); Ruhland and Wiese (2023); Murinde et al. (2022); Huang and Wang (2023)). However, the integration of fintechs may not be always successful as the differences in the culture between them and the incumbents as well as the costs and time that are needed for the proper introduction of the new business lines to the ones currently operating by the incumbents may lead to more drawbacks than benefits (McKinsey (2019); EY (2022); Cappa et al. (2022)). As a result, these cons deriving from the partnership with FinTechs, suggest that the acquirers should be more cautious and meticulous when planning these kinds of deals is of essence.

Therefore, keeping in mind all the above significant events (credit crisis, increased supervision and advancements in financial technology) that affected the European financial services industry, we were motivated to examine whether M&As can be a useful tool for European financial institutions to find a solution or even deal more efficiently with the problems that these events have created. Theory and evidence so far have indicated that financial institutions can benefit from M&As by becoming more efficient and profitable when they are motivated by the right reasons (no agency or

hybris problems). However, their contribution to i) the improvement of capital levels[6], ii) the ability of becoming more resilient to crisis, iii) the effective transition to better corporate governance quality levels[7], iv) the ability to gain a competitive advantage by partnering with Fintech firms, v) and at the same time along with all the previous obtaining financial synergies has not been examined yet adequately in the literature. Hence, this thesis aims to fill these empirical gaps and offer insights to the complex and opaque functions of European financial institutions and the dynamics and effects of their M&As.

The first essay of this thesis investigates the matter of whether M&As can lead to increased capital levels at first stage, then if those deals lead to a direct or indirect decrease of systemic risk and if they further lead to a direct or indirect decrease in funding costs and at the final stage if they lead to a direct or indirect increase in the financial performance of the acquiring institutions and thus offering financial synergies.

The second essay discusses the matters of governance quality improvements for the acquirers following M&A deals. Specifically, it investigates the effect that M&A deals have on the governance structures of the acquiring institutions that lead them to better manage their resources and improve their profitability. So, again the next step of the analysis lies on the ability of M&A deals to offer directly or indirectly financial synergies.

And the third and final essay deals with the issue of the new tech savvy entrants in the financial industry. Specifically, it discusses whether M&As or any forms of collaborations with fintechs could lead to increased market power for financial

[6] Evidence coming from the statistics and reports published by the ECB suggests that Significant Institutions (Sis) that pose greater threat to the stability of the financial system, are significantly lower capitalized than their smaller and less significant counterparts in the industry which may limit their ability to seek further growth or make them less resilient to future events of crisis. Evidence on this matter can be accessed from the ECB's banking supervision official website https://www.bankingsupervision.europa.eu/home/html/index.en.html

[7] As the corporate governance of financial institutions has been blamed to be a contributing factor for the recent financial crisis (e.g. GFC and credit crisis in Europe), or that it make them more vulnerable when these crises struck, the relevant literature suggested on the restructuring of these institutions governance structures while supervising authorities issued certain policies and guidelines on the matter (e. g. in the UK the Walker Report (2009); in Europe, the European Commission Green paper (2010); in the US, the Federal Reserve Board (2013); worldwide, the Basel Committee on Banking Supervision (2006), (2008), (2010), (2015)).

institutions at first stage and then if these collaborations lead to financial synergies either directly or indirectly by the use of the increased market power.

There are important implications arising from our thesis. First, they show that M&As can be a significant tool for financial institutions to overcome obstacles posed by their environment such as crises and changes in regulations and supervision. Therefore, they can make regulators rethink their current guidelines for the examination of the ability of possible deals to be realized by better considering the pros and cons and even promoting them and not just be part of the screening process. While also, they can provide academics with further knowledge concerning bank M&As and their effects as well as assist bank executives in their decision-making process by acknowledging the capabilities of such deals and keeping better track of the benefits and drawbacks they can offer to their firms.

The remainder of the thesis is structured as follows: 1) Essay 1 investigates the role of EU financial institutions M&As in improving their capital levels and financial performance under the special regulatory regime of the Single Supervisory Mechanism (SSM), which is organized in the following sections. Section 2 reviews the literature and develops the hypotheses. Section 3 describes the data and methodology. Section 4 discusses the empirical results. Section 5 concludes the essay. 2) Essay 2 examines whether M&As can be beneficial for the governance quality of financial institutions and their financial performance and is organized in the following sections. Section 2 reviews the literature and develops the hypotheses. Section 3 describes the data and methodology. Section 4 discusses the empirical results. Section 5 concludes the essay. 3) Essay 3 seeks to find whether partnerships with Financial Technology (FinTech) firms can be a viable way for financial institutions to gain competitive advantages and increase their financial performance and is organized in the following sections. Section 2 reviews the literature and develops the hypotheses. Section 3 describes the data and methodology. Section 4 discusses the empirical results. Section 5 concludes the essay. And finally, we posit the general concluding remarks of the thesis.

Essay 1

EU bank Mergers and Acquisitions (M&A) as a solution to the Single Supervisory Mechanism

1.1. Introduction

The collapse of financial markets in 2008 and the credit crunch that followed in the EU a couple of years later, had a domino effect on the rest sectors of the economy as well as society in general. This unfortunate event surfaced a vicious circle that exists between the sovereigns and the financial services sectors, as a sovereign crisis can induce a crisis in the banking sector[8] and vice versa (Avgeri et al. (2021)). The EU's main regulatory authorities, by seeing these chain effects that a crisis initiated from the banking sector can induce, as well as the interconnectedness between banking sectors across different countries, that allow for the quick spread of problems in the financial sector, and the fragility of numerous banks in the Eurozone, they proceeded to the creation of the European Banking Union (EBU) which was initiated in 2012 (Fiordelisi et al. (2017); Avgeri et al. (2021)). The purpose of the EBU is to make banks more transparent, unified and safer and relies on two pillars, the Single Supervisory Mechanism (SSM) and the Single Resolution Mechanism (SRM)[9].

The SSM, which was launched on 4th November 2014, has as its main aims to: a) ensure the safety and soundness of the European banking system, b) increase financial integration and stability and c) ensure consistent supervision. To fulfill these aims the mechanism supervises and set limits, along with the help of National Supervisors, to the amount of bank's capital, depending on its risk and exposures, to the amount of its leverage, to the business model followed by the bank and the quality of its governance. Also, as the direct supervision of all financial institutions in the industry is not possible by the mechanism, the SSM divides institutions to significant institutions (Sis) which

[8] as a result of the high exposure that banks have on them and the increase in the number of default borrowers

[9] See ECB, Banking Supervision official website. Banking union https://www.bankingsupervision.europa.eu/about/bankingunion/html/index.en.html

directly supervises and less significant institutions (LSIs) which are directly supervised by the national supervisory authorities (NSAs) under the guidelines of the mechanism[10].

The mechanism however, even though it aims at the preservation of the financial system's stability, it causes a headache for directly supervised financial institutions who face an increased burden from the stricter requirements for capital, liquidity etc. which can limit their ability to generate profits. Over the last few years, a solution to this problem was deemed to be the further consolidation of the banking sector through M&As[11]. For this reason, the mechanism began to loosen its restrictions on M&A agreements while in addition promoting such deals by enabling certain actions such as the recognition of badwill[12].

The purpose of this study is to examine whether M&As are a good way for financial institutions, first, to lighten the burden of increased capital requirements and which then can increase their profitability and value in the process by reducing their exposure to risks which can drive down their total funding costs. Specifically, by focusing on a sample of EU directly and indirectly supervised financial institutions, we study the direct as well as the indirect impact of M&As, under the special regulatory environment of the SSM, first on their capital levels and then on their profitability and value, while controlling for bank-specific and macro-level characteristics.

A way that M&As can affect the above measures (capital levels and financial performance) is by the direct effect they impose on them. Although, if M&As happen as a potential solution to the increased requirements and supervision, they can eventually achieve an increase in the profitability and value for the merged firm by the following chain reaction: if capital is increased, the institution will be less risky (Mehran and Thakor (2011); Miles et al. (2013)), if less risky, the beta should be lower (De Jonghe (2010); Baker and Wurgler (2015)), if beta is lower, the cost of funding should be lower (Baker and Wurgler (2015)) and eventually the lower cost of funding would lead to synergies by increasing profitability and value (Belkhir et al., (2021); Dick-Nielsen et al. (2022)).

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[10] See ECB, Banking Supervision official website. Single Supervisory Mechanism https://www.bankingsupervision.europa.eu/about/thessm/html/index.en.html

[11] Maragopoulos (2021); Fernandez-Bollo et al, (2021); Andreeva et al. (2019)

[12] For more details see European Central Bank Banking Supervision (2020) Guide on the supervisory approach to consolidation in the banking sector.

The research includes panel data on a sample of EU directly and indirectly supervised financial institutions from 14 countries (namely Belgium, Germany, Ireland, Greece, Spain, France, Italy, Cyprus, Lithuania, Malta, Netherlands, Austria, Portugal, Finland) for the period 2008-2020. To investigate the effects of M&As on the capitalization and financial performance of our sample institutions, we use dynamical panel data models, which are regressed with the use of the 2-step system GMM methodology.

Our main findings indicate that even though M&As have served the purposes of the SSM by improving the capital levels of the banks, unlike the effect found coming from the SSM itself, they seem to fail the main aims for banks, as they appear to be reducing their value and give rather unclear results on their profitability. However, by conducting extra tests for the presence of effects coming from multiple deals in one year and that of the previous accumulated M&A experience for the tested period, the results rather turn mostly insignificant or even inverse, indicating that any effect that might exist from the engagement of a financial institution in a merger deal might become saturated or reversed if this tactic is used often.

As a result, our analysis failed to confirm that using M&As to make banks safer by increasing their capital and reduce their risk, is going to serve the ultimate purpose of increasing profitability and value. This means that as the new more stringent regulatory environment is forcing banks to seek only those deals that are deemed to be making the institutions safer; by doing so they can actually suppress their ability to generate profitable synergies from their investments as the concentration of more equity on these kinds of firms is a source of increased cost as compared to the cheaper funding coming from deposits.

This paper contributes to the existing M&A and banking union related literature in three ways. First, it fills an important gap in the existing EU banking union research, as, to our knowledge, there is not another relevant study that examines the effects of M&As on EU financial institutions under the regulatory environment of the SSM. Taking this effect in consideration is of essence. The reason is that if it is found that M&As can significantly improve the capitalization of supervised financial institutions then a considerable knowledge can be offered to the EU regulatory authorities to not only consider changing their strict stance towards M&As to reduce the number of less effective institutions and increase the industry’s uniformity, but also use these deals

strategically, to aid them in their strive towards a safer and more resilient banking system. Second, we extend the previous limited and outdated literature on the effects of bank M&As on post-merger capital. Even though the matter of capitalization became more important ever since the recent credit crisis, the use of this solution as a fix that could have a lasting effect in the future through the synergies that may arise is not taken into consideration yet. Third, unlike previous relevant studies we use a novel approach and examine the effects of M&As individually as well as in a sequential connection, to obtain a more complete view on the benefits that M&As can offer to the financial institutions and industry in general under the special regulatory environment of the SSM.

The remainder of this study is organized as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 describes the data and methodology. Section 4 discusses the empirical results. Section 5 concludes the essay.

1.2 Literature review

In spite of the large literature examining the implications and drivers of bank M&As, there is a lack of studies that try to investigate the effect of such deals under the new regulatory environment created by the introduction of the SSM. However, some recent ones suggested for the further consolidation of the EU banking industry (Andreeva et al. (2019); Maragopoulos (2021); Fernandez-Bollo et al, (2021)) in contradiction with the stricter merger requirements that were part of the stance that the mechanism used to have on M&As a few years earlier.

1.2.1 Bank M&As and post-merger capital

Even though, there is need for banks today to hold more capital as a safety cushion for periods of big losses[13] and there is clear intend by the EU authorities to promote the further consolidation of the financial services sector, the studies are mostly from previous decades or not that current.

[13] Refer to European Central Bank Banking Supervision (2019) Why do banks need to hold capital? https://www.bankingsupervision.europa.eu/about/ssmexplained/html/hold_capital.en.html

Concerning the matter whether bank M&As improve or worsen the amount of post-merger equity, either for the bidder, target or both, the results are ambiguous. Some studies found that post-merger equity increases at least for one of the parties of the deal (Cornett et al., (2006); Hagendorff and Keasey, (2009); Brune et al., (2015); Papadimitri et al. (2019); Carletti et al. (2021)). One reason why these results hold in the case of acquirers, might be in most cases that acquired targets had high capital ratios or just higher compared to them. As a consequence, by absorbing the better capital quality of the target the respective ratios of the bidder improve. Another reason might be the increased profitability and efficiency of the combined entity after the merger. This can be achieved through the creation of economies of scale, cost reductions, increased market shares and better stock performance. These benefits are all part of the so-called synergies that banks in the deal seek in order to consider it successful. As a consequence, this increased profitability exerted from these synergies, if large part of the profits are retained and not distributed to investors, they can raise the level of equity (Rappaport (1986); Damodaran (2005); Cohen (2013)).

On the other hand, some found results against the increased post-merger capital levels (Williams et al., (2008); Altunbas and Marqués-Ibáñez (2008); Hagendorff and Nieto (2015); Bielstein et al. (2018); Shirasu (2018)). According to most studies, between 70 and 90 percent of acquisitions fail (Harvard Business Review (2011), (2020)). The most renowned of them come from the banking sector like the acquisition of Countrywide Financial by Bank of America for 2.5 Bil. dollars in 2008 and in Europe the acquisition of the brokerage Donaldson, Lufkin & Jenrette (DLJ) by Credit Suisse for 11.5 Bil. in 2000 and that of Bankers Trust by Deutsche Bank for 10.1 Bil. in 1999 who all failed impressively to offer their promised value. In those cases, the main indexes of success were profitability ratios and stock-based variables. So, even if a merger does not lead to reduced level of capital at that point, it may in the future, if it results in lower profitability. Apart from reduced post-merger profitability, there are cases where banks seek to reduce the level of equity through M&A deals. To do so, they choose to free their excess capital by buying targets preferably with high leverage. This choice is based on the notion that equity is considered more costly for the bank than debt as, investors require higher returns than debtors, along with the fact that debt is tax deductible.

Regarding the evidence of post-merger capital improvements, Brune et al. (2015), on a sample of 348 acquirers involved in transactions between 1990 and 2008, found that capital constrained banks, continue to increase their risk-based capital ratio for up to two years after the acquisition. While analogous results were found by Carletti et al. (2021), who by examining the impacts of stricter merger legislation on European bank M&As between 1986-2007, reported that the leverage of the merging banks decreases after the merger from around 7.5 to 6.2. On the other hand, evidence also exists against the increased post-merger capital levels. Hagendorff and Nieto (2015) when studying the impact of European bank mergers on changes in key safety and soundness measures, they find no statistically significant impact of M&As on the acquirer's capital, liquidity or earnings in absolute terms for their sample of mergers that took place between 1997 and 2007. Relative results but on the negative side were reported by Bielstein et al. (2018). Examining the benefits of diversification by analyzing mergers and acquisitions in the US over the period 1985 to 2014, they find an increase in leverage after the deals which, however, they argue that it is based to the fact that debt is often used to finance a takeover. On that matter, Beccalli and Frantz (2013) support that greater leverage is associated with increased M&A activity, as skillful managers are able to operate successfully with higher leverage and be more profitable. Although mixed results were found by Shirasu (2018) in their study on Asian bank mergers between 2000-2011. By testing the one-year and three-year change in the total capital and tier 1 ratio for merging and non-merging banks they report a decrease in both ratios for both groups in the first year, while in the third year the results reversed for the merging banks, which they argue comes from the enhancement of equity by loan accumulation of the merged banks.

This discussion about whether bank M&As could have a positive/negative effect on the post-merger bank equity levels would normally allow us to use those previous results and extend them in order to make assumptions for the period that includes the period of SSM application. However, we do not have clear and enough past evidence to make a first safe prediction of what we might find for that period.

Nevertheless, by taking into account the above arguments in the literature we make the following hypotheses:

Hypothesis 1.1: M&As have a positive effect on the banks' capital levels.

1.2.2 Relationship between post M&A change in capitalization and the effects on value

The direct effects of banks' M&As on their performance is extensively examined in the literature with evidence found for every possible outcome (positive, negative or non-existent relationship). However, those that take also into account the post-merger changes in capitalization and the consequent effects on performance through the chain effects coming from those changes in the bank's risks and total funding costs is rather significantly more limited.

An increased cost of equity, thanks to a perceived higher systemic risk, could harm the value of the bank as it can impede the profit creation. When banks' profitability outlook is not enough to at least cover the cost of equity, it may be more difficult for them to attract new capital. That in turn may negatively affect their ability to generate profits through their most basic activity, which is issuing credit, as, not being able to gather the appropriate amount of capital, limits that activity (Boucinha et al. (2017); Altavilla et al. (2018); Girotti and Horny, (2020); Altavilla et al. (2021)).

Specifically, Belkhir et al., (2021) find for their sample of publicly listed banks from 62 countries over the 1991-2017 period, that increases in capital lower the banks' cost of equity, while they also find a connection between lower costs of equity and increased value for the banks. They argue that this result comes from the more preferable perception of investors towards banks with better equity position who are considered less risky than the others. Similar results were also found by Baker and Wurgler (2015), who on a sample of US bank returns and capital structure data from 1971-2011, find evidence of the ''low risk anomaly'' as their reported reduction in systemic risk on better capitalized banks has led to higher stock returns.

Regarding data from bank M&As, Brune et al. (2015) used a sample of 348 acquirers engaged in transactions between 1990 and 2008 and discovered that banks with capital constraints not only improved their equity levels but also saw improvements in their financial performance when compared to banks without capital constraints. They contend that this stems from the necessity for those who are constrained to make better purchasing choices in order to better address their difficulty in locating new sources of

funding so they may fulfill their commitments. Their findings concur with those of Hagendorff and Keasey (2009), who examined European and US bank mergers and acquisitions from 1996 to 2004 and discovered that post-merger performance improvements were more significant for the European banks.

On the other hand, if investors believe that this reduction in cost of equity by reducing leverage, is going to offer less returns to them, then the traditional view of financial theory for investments might hold, and less risky investments that have less expected returns, could lead to less value for the bank[14].

In particular, Hassen et al. (2018) used the two-step system GMM method to study European bank mergers and acquisitions for the years 2005–2013. While they found that post-merger performance increased, they also found that higher equity levels were associated with lower merger accounting-based performance. These findings were consistent with Cui and Leung's (2020) later findings for US firm mergers as well as the theoretical presumptions of DeAngelo and Stulz (2015), who also rule in favor of high leverage for banks' value creation.

Also, Dick-Nielsen et al. (2022) found in their study on US banks for the period 1984 to 2016, that even though increases in capital are linked with lower costs of both equity and debt financing, they decrease significantly bank value which result they attribute to the reduction of government subsidies that are positively corelated with leverage. While Trigeorgis and Lambertides (2014), on a sample of US traded firms over the 1983–2010 period, they fail to find any significant effect of market risk, as measured by betas, on stock returns, however, they find a positive one for leverage and as a result lower capitalized firms were linked to higher firm value.

All the above arguments in literature lead us to the following hypotheses:

Hypothesis 1.2: M&As have a positive effect on the banks' financial performance.

[14] In a relevant saying of Berger and Bouwman (2013), "Banks often argue that imposing tighter capital requirements will lead to a decrease in banking performance". Therefore, it is possible that even though the increased capital requirements are intended for the right reasons, they might consequently impede performance and value creation.

Hypothesis 1.3: Capital levels have a positive effect on the banks' financial performance.

1.3 Data and methodology

In this section we present an analysis of the data sample used in our empirical analysis, we offer a description of the variables used and we describe the regression models that were constructed for the analysis.

1.3.1 Data sample

The prime source of M&A transactions as well as of other firm- level measures, coming from accounting reports and market related data examined in the present study, is the LSEG Eikon database. The country and macroeconomic specific data were obtained from the World Bank's Global Financial Development databank, ECB's SDW database and ESRB.

As we want to analyze the effect of M&As on European banks' capital the financial institutions included in our study presented the following criteria: i) be based and operating in an EU country for the whole period 2008-2020, ii) they have to be publicly listed, iii) they have to be on the list of ECB's supervised entities, either as SI or as LSIs. After considering those criteria, we finally come up with a sample of 60 EU publicly listed financial institution which consist of 34 Significant Institutions (Sis) and 26 Less Significant Institutions (LSIs) from 14 countries namely Belgium, Germany, Ireland, Greece, Spain, France, Italy, Cyprus, Lithuania, Malta, Netherlands, Austria, Portugal, Finland.

From the final sample's 60 institutions we obtain data for their M&A transactions from LSEG Eikon's M&A database. In order for a M&A transaction to be included in the sample we pose the following additional conditions: i) the institution in the sample must be the acquirer, ii) the deals must be completed between the period 2008-2020, iii) the M&A transaction must result to the acquisition of a majority stake, meaning more than 50% of the target. Also, we exclude transactions which are leveraged buyouts, spinoffs, recapitalizations, self-tenders, repurchases, minority stake purchases, acquisitions of

remaining interest, and privatizations because they are relatively special cases of M&As, and it is not possible to identify the connections between acquirers' and targets' firms as well as those between their CEOs and directors.

After excluding all the deals that do not conform with the above criteria, we end up with a total of 991 M&A deals. Furthermore, after checking for errors and inconsistencies, we end up with a balanced panel of 780 bank-year observations.

1.3.2 Empirical models, methodology and variable description

To address any problems of endogeneity that might occur in the regressions of the panel data econometric analysis we use the Generalized Method of Moments (GMM) and specifically the two-step system GMM estimator approach, proposed by Arellano and Bover (1995) and Blundell and Bond (1998). Also, to test the validity of the multiple lags as instruments, that are suggested by Arellano και Bond (1991), and the reliability of our regressions, we calculate the Hansen/Sargan test.

We then present the models to be estimated with the GMM methodology. We construct two strands of models for the purposes of our research. The first strand is constructed for the purposes of examining the effect of mergers that might exist on the capitalization of banks. And the second strand is constructed in order to test, at the first level, the direct effects of M&As on the banks' financial performance and at the second level indirectly through the changes M&As are found in the previous models to induce on capitalization and consequently through the induced adjustments on systemic risk and costs of capital.

Starting with the testing of the relationship between mergers and equity levels the first models have the following form.

Bank capitalization models

$$CAPIT_{it} = a_0 + a_1 CAPIT_{i(t-1)} + a_2 M\&A_{it} + a_3 M\&AxTREATED_{it} + a_4 SSM_{it} + a_5 TREATED_{it} + a_6 X_{it} + a_7 M_{it} + \varepsilon_{it} \quad (1.1\alpha)$$

$$\Delta CAPIT_{it} = a_0 + a_1 \Delta CAPIT_{i(t-1)} + a_2 M\&A_{it} + a_3 M\&AxTREATED_{it} + a_4 SSM_{it} + a_5 TREATED_{it} + a_6 X_{it} + a_7 M_{it} + \varepsilon_{it} \quad (1.1b)$$

$CAPIT_{it}$ represents the equity levels of our sample's financial institutions followed the definition given by Hagendorff and Nieto (2015) and Shirasu (2018) and is proxied by the measures TIER1 and EQTA for bank i and year t, as described in Table 1.1.

$CAPIT_{i(t-1)}$ represents the first lag of the dependent variables and is used in order to test the significance of considering its past values. Considering the past values of the dependent is important as there is the possibility that they could be affecting the current ones, while also the coefficient a_1 represents the pace at which the dependent converges in the future. The capital levels can be significantly affected by their previous values as lower capitalization for the year t-1 may lead supervisors to force the bank who experiences that drop in its capital levels to improve them or if capital levels are too high the bank may reduce them in order to reduce its costs related with holding more equity (Hagendorff and Nieto (2015)). However, as Nickell (1981) discovered, the use of this lag introduces the problem of the endogeneity in our models as it is correlated with the error term. This endogeneity problem can be efficiently solved by the use of the 2-step system GMM method which can remove it by internally transforming the data (Roodman (2009); Ullah et al. (2018)).

Next, we transform model 1.1a into what is illustrated in model 1.1b, as in studies like Shirasu (2018), by replacing the dependent with their yearly changes, meaning the difference of the variables at year t and year t-1, in order to examine the effect of the dummy variable M&A described in Table 1.1, on the equity levels.

In both models 1.1a,b we use the variables of most interest in our analysis and which are presented in our models as $M\&A_{it}$ and $M\&AxTREATED_{it}$.

$M\&A_{it}$ stands for the merger and acquisitions activity of financial institution i at year t, and is proxied by $M\&A_{it}$, $M\&ANUM_{it}$ and $M\&AEXP_{it}$, described on Table 1.1, which are used interchangeably in the model.

SSM_{it} and $TREATED_{it}$ are SSM related dummy variables and are used to control for the effect of the supervisory mechanism's introduction, with the SSM_{it} taking the value of 1 for the years when the SSM is into force and 0 for the years before and $TREATED_{it}$

takes the value of 1 when the institution is under the direct supervision of the SSM and 0 otherwise.

$M\&AxTREATED_{it}$ stands for M&A activity by directly treated institutions and is proxied by the product of M&A (M&A, M&ANUM or M&AEXP) and TREATED ($M\&AxTREATED_{it}$, $M\&ANUMxTREATED_{it}$ or $M\&AEXPxTREATED_{it}$) and is used in order to account for the specific effect of M&A activity on the institutions directly supervised by the SSM.

X_{it} represents a vector containing variables that control for bank specific characteristics in accordance with studies like Brune et al., (2015) and Hagendorff and Nieto (2015). Namely it contains the variables, cost to income (CIR) ratio, net interest margin (NIM), loans to assets ratio (LOANSTA), loan growth (LOANGR) the natural log of total assets (LNSIZE), loan loss provision (LLP) and loans to deposits (LD).

While, M_{it} is a vector of variables that controls for country level and macroeconomic factors and specifically we use the annual growth of GDP (GDPANGR) as banks in faster growing economies might experience increased capitalization, thanks to increased retained earnings as a result of the increased profitability, as argued by Hagendorff and Nieto (2015), and a financial crisis dummy (CRISIS) in order to account for times of crisis in the institution's country where the expected reduction in profitability might inflict negatively the dependent.

Also, ε_{it} stands for the remaining disturbance term.

Then we present the last two models which are used to test the relationship between mergers and financial performance

Bank performance models

$$PERFORM_{it} = a_0 + a_1 PERFORM_{i(t-1)} + a_2 M\&A_{it} + a_3 M\&AxTREATED_{it} + a_4 SSM_{it} + a_5 TREATED_{it} + a_6 WACC_{it} + a_7 BETA_{it} + a_8 TIER1_{it} + a_9 X_{it} + a_{10} M_{it} + \varepsilon_{it} \quad (1.2\alpha)$$

$$\Delta PERFORM_{it} = a_0 + a_1 \Delta PERFORM_{i(t-1)} + a_2 M\&A_{it} + a_3 M\&AxTREATED_{it} + a_4 SSM_{it} + a_5 TREATED_{it} + a_6 WACC_{it} + a_7 BETA_{it} + a_8 TIER1_{it} + a_9 X_{it} + a_{10} M_{it} + \varepsilon_{it} \quad (1.2b)$$

$PERFORM_{it}$ represents the financial performance of our sample's financial institutions accounting for their book profitability as well as their market value followed the definition given by Brune et al., (2015), Hassen et al (2018) and Cui and Leung (2020) which is proxied first, by accounting based measures return on average equity (ROE), which is calculated on the average equity of the institutions at the beginning and the end of the year while and return on average assets (ROA) which is calculated on the average value of assets. The reason for using both these accounting-based measures is that the one takes the equity levels into consideration. Second, in order to also account for the effects on the institutions' market value apart from its book profitability, we proxy the dependent by its price to book ratio (PB), as described in Table 1.1, for bank i and year t.

$PERFORM_{i(t-1)}$ represents the first lag of the dependent variables and is used in order to test the significance of considering its past values. Considering the past values of the dependent is important as there is the possibility that they could be affecting the current ones, while also the coefficient a_1 represents the pace at which the dependent converges in the future. Also, again the problems of endogeneity that are introduced by this variable are again solved by the use of the 2-step system GMM.

Next, as in the previous models for capitalization, we transform model 1.2a into what is illustrated in model 1.2b by replacing the dependent with their yearly changes, meaning the difference of the variables at year t and year t-1, in order to examine the effect of the dummy variable M&A described in Table 1.1, on the performance levels.

In both models 1.2a,b we use the following variables.

Like the models constructed for the previous relationships, we also use the variables M&A, M&AxTREATED, SSM_{it} and $TREATED_{it}$.

For the purposes of examining the indirect effect of M&A activity on performance we add the Tier 1 ratio (TIER1), the banks' stock beta (BETA) and weighted average cost of capital (WACC) in accordance with previous studies (Baker and Wurgler (2015); Brune et al., (2015); Belkhir et al., (2021)) to find out whether the possible merger induced effect that can be found on the institutions' capitalization from equations 1.1a,b has a significant effect on performance and as a result whether there could be a post-

merger future effect that could be derived by chain and circular effects through improvements in risk and funding costs.

X_{it} as in models 1.1a,b, represents a vector containing variables that control for bank specific characteristics in accordance with studies like Hassen et al (2018), Belkhir et al., (2021) and Dick-Nielsen et al. (2022). Specifically, it contains the variables, cost to income (CIR) ratio, net interest margin (NIM), loans to assets ratio (LOANSTA), the natural log of total assets (LNSIZE), loan loss provision (LLP) and loans to deposits (LD).

And M_{it} is a vector of variables that control for country level and macroeconomic factors, specifically, the annual growth of GDP (GDPANGR) as institutions in countries with higher GDP growth are expected to make larger adjustments which could lead either way as while on the one hand they are expected to have higher income and thus increased profitability, on the other hand they might choose to sacrifice those profits to invest so that they might gain more in the future which can, increase its value thanks to the expected increased future profitability (Hagendorff and Nieto (2015)). And also, we use a financial crisis dummy (CRISIS) which takes the value of 1 at times of crisis and 0 otherwise and is used in order to control for the effect of a crisis in the institution's country which can have serious implications for its profitability and value.

Also, ε_{it} stands for the remaining disturbance term.

Table 1.1: Definition of variables and sources of data

VARIABLES	DEFINITION	SOURCES
DEPENDENT VARIABLES		
TIER1	Tier 1 capital ratio	LSEG Eikon
EQTA	Total equity to total assets ratio	LSEG Eikon
ROE	Return on average equity	LSEG Eikon
ROA	Return on average assets	LSEG Eikon
PB	Price to book ratio	LSEG Eikon
MAIN INDEPENDENT VARIABLES		
M&A	Dummy variable taking the value 1 if the bank has engaged as an acquirer in a M&A deal and 0 otherwise	LSEG Eikon
M&AxTREATED	Dummy variable taking the value 1 if the bank has engaged as an acquirer in a M&A deal and is also directly treated by the SSM and 0 otherwise	LSEG Eikon and ECB's

		Banking Supervision portal
M&ANUM	The annual number of mergers and acquisitions that the bank has engaged	LSEG Eikon
M&AEXP	The accumulated number of mergers and acquisitions up to a given year that the bank has engaged	LSEG Eikon
M&ANUMxTREATED	Variable showing the annual number that the bank has engaged if it is a directly treated institution by the SSM and 0 if it is not	LSEG Eikon and ECB's Banking Supervision portal
M&AEXPxTREATED	Variable showing the accumulated number of mergers and acquisitions up to a given year that the bank has engaged if it is a directly treated institution by the SSM and 0 if it is not	LSEG Eikon and ECB's Banking Supervision portal
CONTROL VARIABLES		
SSM	Dummy variable taking the value 1 for the years after the application of the SSM and 0 otherwise	ECB's Banking Supervision portal
TREATED	Dummy variable taking the value 1 if the bank in a given year is directly treated by the SSM and 0 otherwise	ECB's Banking Supervision portal
WACC	The bank's weighted average cost of capital is calculated by multiplying its cost of debt as well as its cost of equity by its relevant portion of assets and then adding those results together.	LSEG Eikon and own calculations
BETA	The beta of a bank's stock as a proxy of its systemic risk and derived as the beta coefficient of the calculations from its CAPM formula	LSEG Eikon and own calculations
CIR	Cost to income ratio	LSEG Eikon
NIM	Net Interest Margin	LSEG Eikon
LOANSTA	Loans to total assets	LSEG Eikon
LOANGR	Loan Growth	LSEG Eikon
LNSIZE	The natural log of banks' total assets	LSEG Eikon
LLP	Loan Loss Provision	LSEG Eikon
LD	Loans to deposits	LSEG Eikon

MACROECONOMIC VARIABLES		
GDPANGR	Gross domestic product annual growth	World Bank Global Financial Development
CRISIS	Dummy variable taking the value 1 if at a given year a country is under a crisis and 0 otherwise	ESRB

1.3.3 Summary statistics

Table 1.2 presents the statistics of the full sample of EU financial institutions between 2008-2020. Starting with Tier 1 ratio (TIER1) we observe that, even though, its results fluctuate over a rather large range, the mean of about 15% appears more realistic and stands well above the requirements set for banks. However, this result along with mean of 9.5% for equity to assets ratio (EQTA), are indicative of the high leverage appearing in the banking sector (DeAngelo and Stulz (2015)). Concerning the measure of systemic risk (BETA), the banks in our sample appear on average to have stock values fluctuating in accordance with the markets, while they present rather low mean costs of funding (WACC). Unfortunate results are reported for average profitability measures ROE and ROA which can be explained by the significant losses evidenced during the credit crisis. However, their market values (PB) appeared to endure as, on average, they remain (even slightly) over their book ones. For M&A deals (M&A) we can see that not even in the half of the observations there is at least one evident deal while also their average yearly number (M&ANUM) stands at about 1.3 deals, which is interesting for the financial services sector where such activities are often, but it can be explained by the crisis and the increase in supervision that limited their ability to proceed to such investments.

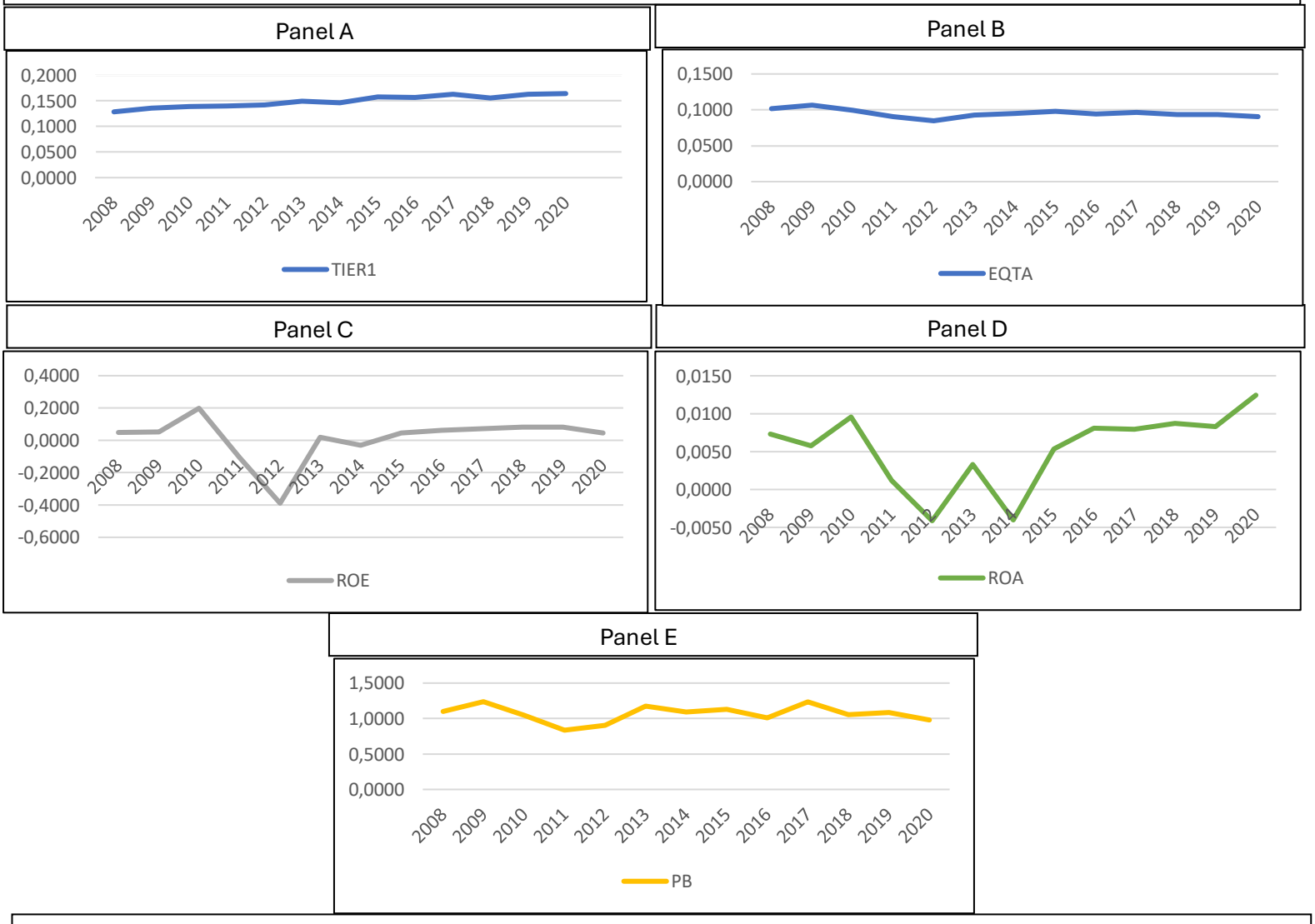
Table 1.2: Summary statistics of the full sample

VARIABLES	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
DEPENDENT VARIABLES						
TIER1	0.1493	0.1299	0.923	0.034	0.0996	780
EQTA	0.0951	0.0679	0.8849	-0.0420	0.1047	780
ROE	0.0143	0.0610	11.5038	-17.4089	0.9729	780

ROA	0.0053	0.0041	0.4472	-0.5552	0.0370	780
PB	1.0697	0.77	13.79	-2.1421	1.2182	780
MAIN INDEPENDENT VARIABLES						
M&A	0.3628	0	1	0	0.4811	780
M&AxTREATED	0.1641	0	1	0	0.3706	780
M&ANUM	1.2705	0	23	0	2.6614	780
M&AEXP	9.2128	2	122	0	18.5731	780
M&ANUMxTREATED	0.5820	0	14	0	1.8359	780
M&AEXPxTREATED	6.3128	0	122	0	17.8878	780
CONTROL VARIABLES						
SSM	0.5384	1	1	0	0.4988	780
TREATED	0.3102	0	1	0	0.4628	780
WACC	0.0149	0.0102	0.4073	-0.0376	0.0252	780
BETA	0.9781	1.0330	13.2808	-7.8478	0.8447	780
CIR	0.7257	0.697	3.615	-1.079	0.2852	780
NIM	0.0184	0.0160	0.5580	-0.0332	0.0267	780
LOANSTA	0.5393	0.5946	0.9158	0.0017	0.2055	780
LOANGR	0.2506	0.0289	135.0940	-0.788	4.8584	780
LNSIZE	10.3002	10.6359	14.7271	3.5234	2.5333	780
LLP	0.0169	0.0069	3.4906	-0.0667	0.1268	780
LD	1.6043	0.8822	4.725	0.0237	4.8199	780
MACROECONOMIC VARIABLES						
GDPANGR	0.3073	0.9561	24.3704	-14.8386	3.9647	780
CRISIS	0.4743	0	1	0	0.4996	780

Figure 1.1 shows the yearly advancements of the dependent variables for the tested period 2008-2020. Concerning equity levels (Panel A and B) a slight upwards trend is evident on the tier 1 ratio (TIER 1), but no disturbances on its trajectory coming from credit crisis and the launch of the SSM are observed. While, however, the effects of the crisis are evident on the common equity of the institutions in our sample, as the equity to assets ratio (EQTA) appears to have declined starting from 2009 thanks to the significant loses that were witnessed during those turbulent years. Although, the effects of the crisis are clearly more evident for profitability measures ROE and ROA (Panels C and D) and the market value one PB (Panel E) where a sudden drop is observed which is completely reversed the years after 2013 thanks to the measures taken by the central European authorities such as the recapitalization of banks, a series of longer-term refinancing operations (LTROs) which aided their liquidity, the significant lowering of interest rates and other monetary policy responses (Mongelli and Camba-Mendez (2018)).

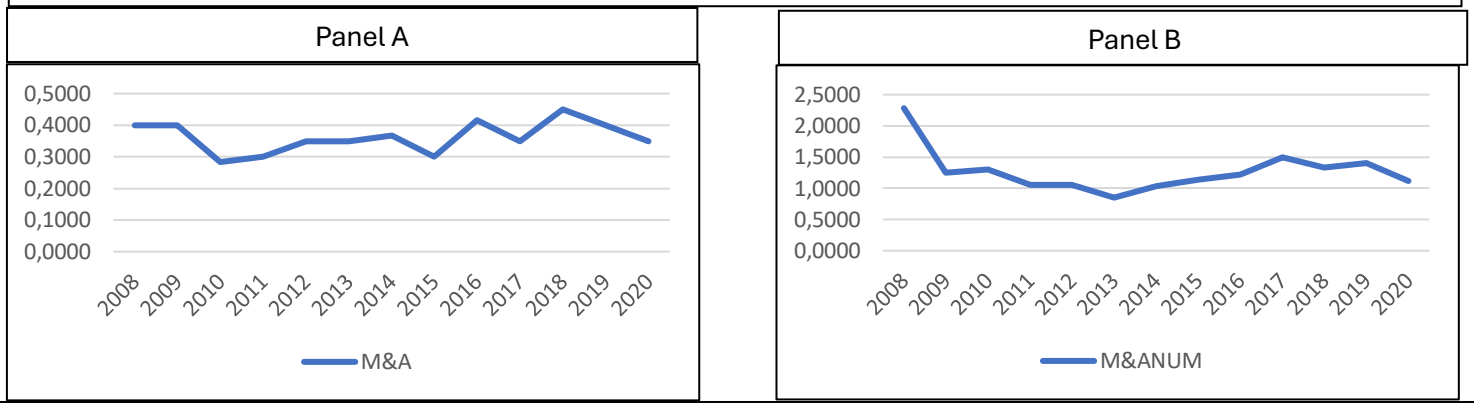
Figure 1.1: Mean of dependent variables per year



Source: Authors own calculations based on data obtained from LSEG Eikon database

Figure 1.2 shows the yearly evolution of M&A deals for the institutions in our sample between 2008-2020. The effect of crisis is evident on the merger activity as there is a clear decline and especially in the average number of deals as shown in Panel B which even though it started to peak up after the recovery started, it cannot get even close to the pre-crisis levels.

Figure 1.2: Mean of merger related variables per year



Source: Authors own calculations based on data obtained from LSEG Eikon deals screener database

1.4 Empirical results of the econometric analysis

1.4.1 Econometric analysis using the 2-step system GMM method for the relationship between M&A activity and capitalization

Table 1.3 shows the GMM estimation results on equations 1.1a.b that examine the relationship between M&A activity and capitalization. Starting with the dummy variable for M&A (M&A), we see that it is negatively associated with TIER1 as well as the dependent used for the robustness test, EQTA, with the results being significant at the 1% level. Therefore, the results are consistent with the findings like the ones found by Beccalli and Frantz (2013) who reported that banks with lower capitalization are more likely to be acquirers. However, when we control for deals by directly treated institutions (M&AxTREATED), the results are inversed. Although, this result is anticipated as, after the introduction of the SSM, the significant institutions were required to hold more loss absorbing capital in order to proceed to such investments.

Table 1.3: Empirical results for the effect on capitalization based on the 2-step system GMM method

VARIABLES	TIER1	EQTA	ΔTIER1	ΔEQTA
ΔTIER1(-1)			**-0.3029*****	
			(-54.0234)	
ΔEQTA(-1)				**-0.0218*****
				(-3.6039)
TIER1(-1)	**0.7550*****			
	(160.4564)			
EQTA(-1)		**0.6050*****		
		(164.4838)		
M&A	**-0.0153*****	**-0.0047*****	0.0026	**0.0015*****
	(-11.0862)	(-11.9199)	(1.2812)	(2.9631)
M&AxTREATED	**0.0122*****	0.0003	**0.0201*****	**0.0096*****
	(6.6022)	(0.3516)	(4.0634)	(6.8470)
SSM	**-0.0077*****	**0.0052*****	**-0.0062*****	**-0.0055*****
	(-5.5455)	(12.0291)	(-2.7156)	(-4.5921)
TREATED	2.38E-05	**-0.0025****	**-0.0166*****	**-0.0036***
	(0.0135)	(-2.1192)	(-5.2808)	(-1.7488)
CIR	**-0.0265*****	**-0.0521*****	**-0.0446*****	**-0.0557*****
	(-7.2770)	(-58.8201)	(-7.1192)	(-36.7560)
NIM	-0.0573	-0.0091	**-1.8402*****	**-3.1519*****
	(-0.6249)	(-0.2509)	(-8.3573)	(-24.4893)
LOANSTA	**-0.0274*****	**-0.0042****	-0.0034	**0.0279*****
	(-6.0281)	(-2.1245)	(-0.4322)	(4.7251)
LOANGR	**-0.0005****	**-0.0015*****	0.0003	**-0.0020*****
	(2.1431)	(-20.0748)	(0.5746)	(-8.5769)
LNSIZE	**0.0121*****	-0.0007	**0.0125*****	**0.0211*****
	(6.3129)	(-0.4679)	(3.6447)	(9.9022)
LLP	**-0.1189*****	**0.0375*****	**0.2040*****	**-0.2987*****
	(-7.6871)	(9.0024)	(6.7563)	(-16.9316)
LD	**0.0028*****	**0.0055*****	**0.0022*****	**0.0013*****
	(22.9985)	(116.1574)	(6.3798)	(11.3869)
GDPANGR	5.11E-05	**0.0006*****	**0.0008*****	**0.0005*****
	(0.6144)	(11.9817)	(2.9792)	(5.1025)
CRISIS	**-0.0040*****	**0.0006***	-0.0042	**0.0152****

	(-5.1494)	(1.8422)	(-1.6437)	(18.5556)
Observations	658	658	598	598
S.E. of regression	0.0288	0.0204	0.0308	0.0248
J-statistic	53.1403	51.5048	47.8343	48.2419
Prob(J-statistic)	(0.2183)	(0.3019)	(0.3981)	(0.3823)
Instrument rank	60	61	60	61

Note: This table reports regression results obtained with the 2SLS system GMM method. The dependent variable is bank capitalization which is proxied by Tier 1 (TIER1) and equity to total assets (EQTA) ratios. The definitions of all variables are provided in Table 1.1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. t-stats are reported in parentheses.

Proceeding with the next and probably most important step of this analysis, we examine what the effect of M&A activity might be on the changes in capital levels of financial institutions in the sample. To examine this, we substitute in the regressions the dependent variables with their yearly differences (ΔTIER1, ΔEQTA), as appearing in equation 1.1b. The results are also shown in Table 1.3.

The table clearly shows that institutions that presented at least one M&A deal in a given year (M&A) experienced a positive change in both their capital measures (ΔTIER1, ΔEQTA), even when we test for deals completed by directly treated institutions (M&AxTREATED), with the results being significant at the 1% level. Hence, based on this result we come to accept initially our Hypothesis 1.1 which posits that financial institutions and especially those directly supervised by the ECB, can enhance their capital levels by making M&A deals. Our results are in line with the previous studies of Brune et al. (2015) and Carletti et al. (2021) who also find evidence of post-merger capital improvements under stricter regulatory environments.

As a next step of this analysis, we replace the indicator variable M&A with the number of yearly deals (M&ANUM, M&ANUMxTREATED). The results presented on Table 1.4 show no significance for both equity levels measures (TIER1, EQTA) as well as for the general sample (M&ANUM) and when we control for the directly supervised ones (M&ANUMxTREATED). This means that the positive effect of M&A activity on equity levels that was found previously can become neutralized possibly thanks to a

saturation that may come on the acquired benefits when this tactic is used often during a single fiscal period.

Table 1.4: Empirical results for the effect on capitalization based on the 2-step system GMM method

VARIABLES	TIER1	EQTA	TIER1	EQTA
TIER1(-1)	**0.7489*** **		**0.7446*** **	
	(137.1207)		(167.7368)	
EQTA(-1)		**0.6055*** **		**0.5957*** **
		(218.4722)		(202.8621)
M&ANUM	0.0011	0.0002		
	(1.3243)	(0.7955)		
M&ANUMxTREATED	0.0008	-6.56E-05		
	(0.6157)	(-0.1630)		
M&AEXP			**0.0006** **	**0.0007*** **
			(2.6135)	(7.6320)
M&AEXPxTREATED			-0.0003	**-0.0004*** **
			(-1.5939)	(-5.7371)
SSM	**-0.0087*** **	**0.0051*** **	**-0.0089*** **	**0.0052*** **
	(-6.5048)	(12.4016)	(-7.1442)	(8.5555)
TREATED	0.0032	**-0.0021*** **	**0.0053***	-0.0013
	(1.0718)	(-2.8842)	(1.8760)	(-1.1090)
CIR	**-0.0329*** **	**-0.0519*** **	**-0.0369*** **	**-0.0516*** **
	(-9.2556)	(-51.1193)	(-16.3416)	(-48.8404)
NIM	**-0.2345*** **	-0.0382	**-0.1874*** **	-0.0152
	(-3.1534)	(-1.6379)	(-3.7118)	(-0.4154)
LOANSTA	**-0.0401*** **	-0.0030	**-0.0308*** **	**-0.0083*** **
	(-9.1186)	(-1.2629)	(-6.6905)	(-3.2289)
LOANGR	**0.0006*** **	**-0.0014*** **	**0.0008*** **	**-0.0015*** **
	(2.9648)	(-17.9981)	(3.6715)	(-20.4826)
LNSIZE	**0.0080*** **	-0.0021	**0.0084*** **	**-0.0034*** **
	(3.3864)	(-1.5997)	(4.4619)	(-3.2721)
LLP	**-0.1514*** **	**0.0332*** **	**-0.1296*** **	**0.0437*** **
	(-7.4192)	(8.3831)	(-7.4426)	(8.7814)
LD	**0.0030*** **	**0.0055*** **	**0.0030*** **	**0.0055*** **
	(32.2336)	(134.1786)	(35.7058)	(176.1466)

GDPANGR	4.01E-05	**0.0005*** **	0.0002	**0.0006*** **
	(0.3434)	(13.0582)	(1.6614)	(18.4293)
CRISIS	**-0.0057*** **	0.0004	**-0.0044*** **	**0.0014*** **
	(-5.8023)	(1.3578)	(-5.7896)	(2.9743)
Observations	658	658	658	658
S.E. of regression	0.0292	0.0201	0.0293	0.0203
J-statistic	48.8457	52.0823	51.6244	45.6114
Prob(J-statistic)	(0.3594)	(0.2827)	(0.2978)	(0.5301)
Instrument rank	61	62	61	60

Note: This table reports regression results obtained with the 2SLS system GMM method. The dependent variable is bank capitalization which is proxied by Tier 1 (TIER1) and equity to total assets (EQTA) ratios. The definitions of all variables are provided in Table 1.1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. p-values are reported in parentheses.

Proceeding with the analysis of the relationship, we next consider the effect of M&A experience as measured by the accumulated number of deals for the examined period (M&AEXP, M&AEXPxTREATED). By adding this factor in the analysis, we would be able to examine the effect of accumulated knowledge gained by previous M&A deals on the capital levels of the acquiring institutions. From the results derived by the regressions with TIER1 and EQTA as shown on Table 1.4, we observe that previous experience comes to further expand the beneficial effect of M&A deals on equity levels as positive and significant coefficients are evident for the main independent variable M&AEXP in both regressions. Thusly, the more the previous number of deals during the sample period the greater the rise in equity levels of these institutions. However, unlike the results for the general sample derived by M&AEXP, this outcome seems again to become saturated or even to inverse for directly treated institutions (M&AEXPxTREATED), as insignificance is observed in the relationship with TIER1, and a negative and significant coefficient appears with EQTA. Therefore, by keeping in mind that the directly supervised institutions engage in much more deals compared to the other institutions in the sample, we can say that again the number of deals is a crucial factor for the obtainment of equity level benefits for institutions in the sample as when that number accumulated over the years is high then all the previous deals may

possibly have given all they can give to those institutions and any extra one would not be able to provide even more.

Hence, concerning Hypothesis 1.1 we pose the condition that it can be accepted only when there is a limit in the number of deals in a year that directly treated institutions engage as well as when over the previous years these institutions had not engaged in great volume of deals.

As for the rest of the variables appearing in Tables 1.3 and 1.4, we observe that the SSM appears to have mostly failed its purpose and more importantly for directly treated institutions, concerning the aim to raise especially the tier1 ratio levels, as shown by the coefficients for the dummy variables SSM and TREATED.

Considering the other significant factors found for capitalization, we can see that higher efficiency (CIR) appears to improve capital levels, while there appears a higher dependence on deposits as compared to equity for the issuing of loans as shown from the results reported for LOANSTA, LOANGR and LD. However contradicting results are observed for the results reported for LLP which presents a negative sign for TIER1 and a positive for EQTA, but this may lie on the fact that this variable is mostly loan related and TIER1 is a risk related variable. The same contradiction is also evident for the macro variable CRISIS for which the same explanation may apply.

Specifically for these other significant factors found for capitalization, we observe a positive effect of efficiency, as the CIR appears with a negative coefficient. Thus, what this means is that institutions that use more efficiently their given resources are those who are also more capitalized. However, in contrast with the previous result, both LOANSTA and LOANGR appear to be negatively linked with capitalization. An explanation for this can be that the issuing of more loans in this situation has raised the risk of the institutions in the sample and as thanks to the debt crisis in Europe the number of NPLs has reached unprecedent levels, those who had more of these assets experienced the most losses.

The expectations for the risk variable LLP are fulfilled but only for TIER1 as the coefficient appears negative and significant. Although, an interesting difference is found, on that matter, between the regressions as a positive and significant connection is found between LLP and EQTA. This difference might lie on the fact that the Tier1

ratio takes into account the risk weighed assets and thus can catch any difference in the provisions for bad loans. This makes sense, as less provisions for bad loans are observed where better levels of risk-weighted capital exist. This result is also supported by the negative sign of the coefficient on CRISIS which indicates that at times of crisis in their countries, the institutions were found to have worse levels of higher quality capitalization. Also, the CRISIS variable follows the same path and gives contradicting results between the two regressions.

1.4.2 Econometric analysis using the 2-step system GMM method for the relationship between M&A activity, capitalization and financial synergies

In this part of the econometric analysis, we put to the test equations 1.2a,b with the results of the regressions appearing in Tables 1.5 and 1.6. On Table 1.5 we observe that even though M&A activity for the general sample, as measured by the dummy M&A, comes from institutions with better profitability levels, in accordance with previous results like those of Hassen et al. (2018), as appearing in the regression with ROE and ROA, the inverse appears for the market based measure PB and therefore keeping in line with what is reported by Cui and Leung (2020). However, when we control for deals coming from directly treated institutions (M&AxTREATED), the above results completely inverse. Hence, the above results give us different outcomes for accounting and market-based measures of performance.

Table 1.5: Empirical results for the effect on financial performance based on the 2-step system GMM method

VARIABLES	**ROE**	**ROA**	**PB**	**ΔROE**	**ΔROA**	**ΔPB**
ΔROE(-1)				**-0.3432*** **		
				(-350.3588)		
ΔROA(-1)					**-0.3660*** **	
					(-298.6519)	
ΔPB(-1)						**-0.1660*** **
						(-20.0486)
ROE(-1)	**0.1934*** **					
	(152.0646)					
ROA(-1)		**0.1119*** **				

		(68.8403)				
PB(-1)			**0.5226*** **			
			(66.2120)			
M&A	**0.9010*** **	**0.0075*** **	**-0.5444*** **	**2.5446*** **	**0.0348*** **	**-0.7941*** **
	(19.0946)	(12.7564)	(-13.9903)	(27.5435)	(33.7343)	(-13.8471)
M&AxTREATED	**-0.5499*** **	0.0031	**0.3635*** **	**-1.0542*** **	**0.0255*** **	**0.6751*** **
	(-11.3897)	(1.2301)	(7.5190)	(-11.1008)	(6.4524)	(10.3111)
TREATED	**0.5291*** **	**0.0514*** **	**-0.2446*** **	**0.3731*** **	**-0.0252*** **	**-0.5874*** **
	(11.1870)	(18.9213)	(-2.7584)	(3.9747)	(-8.0284)	(-10.0264)
SSM	**-0.3688*** **	**-0.0538*** **	**0.0903** **	**-0.4089*** **	**0.0047** **	**0.1941*** **
	(-29.4794)	(-38.9381)	(2.3214)	(-16.9305)	(2.1823)	(4.4441)
WACC	**-33.3557*** **	-0.0171	0.9434	**-25.9659*** **	**-0.3585*** **	**2.9454*** **
	(-38.1762)	(-0.4499)	(0.7857)	(-25.5280)	(-10.4852)	(2.8958)
BETA	**-0.2902*** **	-0.0006	-0.0118	**-0.3381*** **	**-0.0016*** **	**0.0698*** **
	(-37.5968)	(-1.1128)	(-0.9751)	(-42.8986)	(-4.0119)	(5.8109)
TIER1	**-6.7982*** **	**-0.2103*** **	**-3.7200*** **	**-0.6870*** **	**-0.1615*** **	0.0764
	(-28.4462)	(-55.0999)	(-13.8865)	(-3.4744)	(-35.6443)	(0.1464)
LNSIZE	**-0.0811*** **	**0.07500*** **	**0.1548*** **	**-0.0747** **	**-0.0060*** **	0.0680
	(-3.1370)	(35.1268)	(3.2691)	(-2.3490)	(-4.2490)	(0.9980)
NIM	**-9.9636*** **	**-0.5764*** **	**3.7314***	**-3.4502** **	**-4.5847*** **	**16.5448*** **
	(-7.5403)	(-8.1147)	(1.7233)	(-2.1836)	(-48.0436)	(5.0130)
LD	**0.1403*** **	**0.0030*** **	**-0.0185*** **	0.0454	**0.0042*** **	**-0.0557*** **
	(6.7157)	(102.3712)	(-5.9512)	(1.6578)	(96.7891)	(-11.6195)
LOANSTA	**-2.0170*** **	**-0.1082*** **	**-0.3700*** **	**-2.1672*** **	**0.0501*** **	**-0.5675*** **
	(-55.1073)	(-39.4453)	(-3.4747)	(-32.3512)	(9.5810)	(-3.4195)
CIR	**-0.2029*** **	**-0.0564*** **	**-0.6953*** **	**1.0401*** **	**-0.0692*** **	**-0.6611*** **
	(-5.6031)	(-19.6064)	(-11.4713)	(13.7018)	(-27.7553)	(-5.8473)
LLP	**-7.0409*** **	**-0.0926*** **	0.6808	**1.3226*** **	**-0.2036*** **	**-3.5294*** **
	(-60.2079)	(-9.3801)	(1.0817)	(5.5824)	(-10.0908)	(-4.5179)
CRISIS	**-0.2033*** **	**-0.0079*** **	**0.0597*** **	**-0.2724*** **	0.0009	**0.1667*** **
	(-19.7942)	(-11.6201)	(2.6796)	(-17.5750)	(0.7913)	(7.4639)
GDPANGR	**0.0106*** **	**0.0010*** **	**-0.0106*** **	**0.0301*** **	**0.0009*** **	-0.0028
	(15.3635)	(15.4648)	(-9.4652)	(23.2068)	(9.7747)	(-1.4502)
Observations	660	660	660	600	600	600
S.E. of regression	10241	0.0462	0.5139	1.4748	0.0467	0.5789
J-statistic	475645	478112	530568	45.5692	47.9414	51.7573

Prob(J-statistic)	(0.3296)	(0.3206)	(0.1644)	(0.4066)	(0.3160)	(0.1968)
Instrument rank	60	60	60	60	60	60

Note: This table reports regression results obtained with the 2-step system GMM method. The dependent variable is bank performance which is proxied by ROE, ROA and the market value of the institution to its book value (PB). The definitions of all variables are provided in Table 1.1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. t-stats are reported in parentheses.

But, in order to complete the analysis one final step is needed. For this reason, as in the previous analyses, we add in place of the former dependent variables their yearly differences (ΔROE, ΔROA, ΔPB) in order to gain a clearer picture of the relationships tested in this study. The results shown in Table 1.5 again vary for accounting and market-based measures. Indeed, while a positive coefficient is found for M&A in the regressions with ΔROE and ΔROA as in Hassen et al. (2018), a negative one is evident in ΔPB, resembling with the negative result found for this variable by Cui and Leung (2020). Hence, the effect of M&A activity on performance depends on the way we perceive performance. If we observe performance from the perspective of change in income reported by financial institutions, the effect of M&As appears to be positive but, if we see it from the change in market value the reverse stands. While when we control for directly treated institutions (M&AxTREATED) the results completely inverse, except for the regression with ΔROA, and hence, Hypothesis 1.2 cannot be fully accepted.

When adding the number of M&A deals (M&ANUM, M&ANUMxTREATED) as a main independent variable, the results on Table 1.6 for the general sample (M&ANUM) appear to be in accordance with what is found in the regressions with the performance measures ΔROE, ΔROA and ΔPB on Table 1.5. Therefore, the effect of M&A activity, either beneficial, destructive or neutral seems to mostly maintain and not get saturated or inversed when institutions engage in multiple deals in a year. However, when we control for the directly treated (M&ANUMxTREATED) the contrasting negative and positive results for the profitability measures ROE and ROA respectively become saturated as an insignificance appears in both regressions while the positive effect on market value remains (PB). Although the above saturation for the directly treated becomes negative when we test for the previous accumulated M&A experience (M&AEXPxTREATED) while for the general sample (M&AEXP) the effects mostly

maintain. Therefore, even though for the general sample M&As seem to have a beneficial effect for book profitability and a negative one for market value, with the results not being saturated or inversed by the excessive use of such transactions by institutions, the exact opposite in every test appears for the directly treated institutions. As a consequence, again thanks to the unclear results concerning the performance measures for M&ANUM and M&AEXP, Hypothesis 1.2 cannot be accepted with certainty.

So, from all the above, the main differences in the synergy effects of M&A activity between the general sample and the directly treated institutions, is that those coming from the directly treated are perceived well by the market, even though they fail to add to the profitability. This can have as an explanation that investors rather prefer to buy the post-merger stocks of institutions that are well established in the market, they have a respectable brandname and possess a considerable previous experience of such investments, which are characteristics that all systemic banks have. While the differences in the profitability may be attributed to the frequent use of such tactics by the larger institutions which may render these effects to be neutralized or even give the inverse effects, as the M&A deals seem to give declining results for each extra transaction taken, as well as they may be attributed to the adding of more costly equity that may suppress their profitability.

Table 1.6: Empirical results for the effect on financial performance based on the 2-step system GMM method

VARIABLES	**ROE**	**ROA**	**PB**	**ROE**	**ROA**	**PB**
ROE(-1)	**0.1903*** **			**0.1679*** **		
	(103.5692)			(185.2323)		
ROA(-1)		**0.0759*** **			**0.0780*** **	
		(41.9103)			(62.3998)	
PB(-1)			**0.5072*** **			**0.4864*** **
			(85.9395)			(98.9027)
M&ANUM	**0.4400*** **	**0.0048*** **	**-0.0861*** **			
	(8.7194)	(5.7832)	(-6.6112)			
M&ANUMxTREATED	-0.0584	-0.0014	**0.0561*** **			
	(-1.1248)	(-0.8490)	(3.1770)			
M&AEXP				0.0081	**0.0006*** **	**-0.0089** **

				(1.5599)	(4.4129)	(-2.1685)
M&AEXPxTREATED				**-0.0072***	**-0.0004*****	**0.0064***
				(-1.9143)	(-3.3346)	(1.9696)
TREATED	**0.3084*****	**0.0127*****	-0.1099	**0.2999*****	**0.0146*****	0.0139
	(4.1889)	(5.0074)	(-1.3594)	(20.7876)	(5.3950)	(0.1971)
SSM	**-0.4257*****	**-0.0182*****	0.0428	**-0.3256*****	**-0.0167*****	0.0070
	(-17.5990)	(-17.8211)	(1.4033)	(-25.1829)	(-22.000)	(0.3646)
WACC	**-33.6875*****	**-1.2960*****	0.9984	**-29.5328*****	**-1.1768*****	**1.4229****
	(-19.6484)	(-21.9683)	(0.8970)	(-51.1503)	(-62.2144)	(2.0583)
BETA	**-0.2915*****	**-0.0125*****	-0.0098	**-0.2978*****	**-0.0116*****	**-0.0189*****
	(-14.0562)	(-19.7346)	(-1.4845)	(-54.6053)	(-48.1571)	(-3.5997)
TIER1	**-7.2273*****	**-0.3073*****	**-3.3317*****	**-7.2583*****	**-0.3111*****	**-3.5934*****
	(-13.4602)	(-52.6449)	(-11.2240)	(-51.2120)	(-111.3463)	(-14.5106)
LNSIZE	**-0.3055*****	**0.0169*****	**0.1772*****	0.0065	**0.0162*****	**0.1590*****
	(-5.1774)	(8.4844)	(3.9906)	(0.2842)	(17.0900)	(4.4901)
NIM	**-17.0441*****	-0.0253	**4.8594****	**-9.3955*****	0.0029	1.7821
	(-7.4317)	(-0.3314)	(2.1038)	(-13.7048)	(0.0502)	(1.4101)
LD	**0.1555*****	**0.0032*****	**-0.0258*****	**0.1331*****	**0.0031*****	**-0.0247*****
	(3.8671)	(51.4289)	(-7.4579)	(8.4058)	(115.2518)	(-11.3714)
LOANSTA	**-2.6016*****	**-0.0432*****	**-0.2108***	**-2.0490*****	**-0.0409*****	**-0.1692****
	(-38.6776)	(-11.0055)	(-1.8182)	(-62.0079)	(-12.3641)	(-2.3702)
CIR	**-0.2233*****	**-0.0614*****	**-0.6478*****	**-0.4793*****	**-0.0607*****	**-0.5928*****
	(-4.5176)	(-24.0648)	(-15.3161)	(-24.1332)	(-46.1007)	(-20.0848)
LLP	**-8.3288*****	**-0.1777*****	0.3704	**-9.0750*****	**-0.1704*****	0.3597
	(-28.9861)	(-15.9168)	(0.7333)	(-81.4773)	(-16.7208)	(0.8358)
CRISIS	**-0.2806*****	**-0.0077*****	**0.0782*****	**-0.2018*****	**-0.0075*****	**0.0506*****
	(-12.0162)	(-7.5238)	(3.8525)	(-26.8457)	(-9.6839)	(3.9549)
GDPANGR	**0.0033***	-3.52E-05	**-0.0086*****	**0.0189*****	1.76E-05	**-0.0088*****
	(1.9903)	(-0.4384)	(-8.9168)	(51.1612)	(0.3440)	(-13.3640)
Observations	660	660	660	660	660	660
S,E, of regression	1.1567	0.0354	0.4990	1.0077	0.0345	0.4898
J-statistic	49.4136	46.6526	54.6330	54.8919	47,8112	56.2621
Prob(J-statistic)	(0.2658)	(0.3638)	(0.1307)	(0.1482)	(0.3863)	(0.1211)
Instrument rank	60	60	60	61	60	61

Note: This table reports regression results obtained with the 2-step system GMM method. The dependent variable is bank performance which is proxied by ROE, ROA and the market value of the institution to its book value (PB). The definitions of

all variables are provided in Table 1.1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. t-stats are reported in parentheses.

Concerning the results for the effect of the SSM launch appearing on Table 1.5 we can see again mixed findings. Specifically, even though the effect of the mechanism on the general sample (SSM) appears positive for returns on assets (ROA) and the market value measure (PB), a negative one is evident for returns on equity (ROE). However, for directly supervised institutions (TREATED) those results completely reverse and therefore, as in the analyses of the other relationships with capitalization and systemic risk, the introduction of the mechanism seems to have mostly hurt the directly supervised institutions.

Concerning the other important variables for the measurement of indirectly induced effects of M&As through, basically, changes in capitalization (TIER1, BETA and WACC) we can see that even though all three variables have negative coefficients with all performance measures ROE, ROA and PB, only in the regression with ROE the variables WACC and BETA appear to be significant, however capitalization as proxied by Tier 1 ratio (TIER1) appears negative on all measures and thus Hypothesis 1.3 is rejected. Hence, better capitalized institutions seem to perform worse than the rest. This result is in line with the previous findings of Dick-Nielsen et al., (2022) who found that a 10 % increase in equity funding will decrease bank value by 3.2% and DeAngelo and Stulz (2015) who also rule in favor of high leverage for value creation for banks, as they state that debt issuing is crucial for liquid-claim production which banks need to maximize value. However, combined with the coefficients found for the measurements of systematic risk (BETA) and funding costs (WACC), we can see that any improvement on these measures in the long run by better capital levels is able to increase the profitability of the institutions in our sample. While even though they can increase their returns, their values appear to be mostly unaffected. This result may lie on the fact that, as banks operate with higher leverage, the interests of the debtors are more heard compared to other types of firms which may lead to the increase of the possibility that their interests would clash with those of the shareholders who may require more risk to increase their returns. Therefore, as banks are becoming safer by increasing their equity, even though they are valued more by the debtholders, they lose

in the value of their stocks as the investors in the markets may render this change as an obstacle to profit creation.

Regarding the control variables, LOANSTA and CIR appear to have a negative relationship with performance, as their coefficients are negative in all three regressions with performance measures ROE, ROA and PB. However, even though the result for CIR makes sense, as more efficient institutions seem to perform better, for LOANSTA it means that higher loan levels are linked with lower performance. This seems illogical at first glance but, if we consider that the credit crisis of 2010 was caused by the sudden rise in NPLs, those who had the most loans in their assets were the more probable to take the greatest hit. This is also shown by the negative sign found for the coefficients of LLP in the regressions with ROE and ROA, which shows the significant impact that the rise in bad loans had on the performance of EU based institutions. For the rest of the control variables NIM and LD we can see different results for accounting and market-based measures. However, the most interesting is for NIM where a negative relationship appears with ROE and ROA. This result seems rather strange as profitability by the core activities of financial institutions is supposed to be linked to more returns by sources used.

As for the Macro variables, CRISIS and GDPANGR give the expected relationships with ROE and ROA as times of crisis are linked with worse performance and booms in the economy with better, but, inexplicably, the inverse stands according to the results found for these variables in the regression with PB, as the financial institutions in our sample seem to be linked with higher valuations at times of crisis in their home countries, but when their profits are expected to be higher, interestingly their valuations seem to go the other way.

1.5 Conclusion

In this paper we examined the impact of bank M&As on the capital levels and financial performance of EU financial institutions under the special regulatory regime of the Single Supervisory Mechanism, by using a sample of 60 EU publicly listed systemic and non-systemic acquiring financial institutions for the period 2008-2020. Particularly we proposed a new study to cover the gap that exists in the literature concerning the

consideration of bank M&As as important tools to be used towards the path to the recovery of the EU financial services sector and as a coping mechanism for banks to overcome the increased burden of the increased requirements posed by the SSM. In addition, we analyze the effect of M&As by separating the institutions in our sample to Significant Institutions (Sis) and Less Significant Institutions (LSIs) as well by additionally testing the effect of multiple yearly M&As and the experience obtained by previous deals over the examined period.

The empirical findings from the GMM regressions provided us with interesting, controversial as well as results that made us pose further questions. The positive results obtained for the testing of the relationship between M&A activity and capital levels, both for the general sample and directly treated institutions by the SSM, are a first sign that mergers can be a solution to the increased capital requirements posed since the introduction of the mechanism. This means that by the use of M&As, acquiring institutions are able to improve their capital levels either by bidding on better capitalized targets or by using the increased profitability coming from financial synergies. However, when we test for the effect of multiple yearly deals as well as that of the previous accumulated deals experience for the tested period, we find that the above effects for the general sample as well as for the directly treated ones they turn insignificant or even inverse. So, M&As even though they can offer significant assistance to banks that may need to increase their capital, they are not a panacea and if they are not used with caution their beneficial effect rather diminishes for those who need it most. However, a possible explanation for this might be that the use of this tactic can induce significant changes for a limited number of deals and, as that number rises and there is an overuse, the impact of any effect gradually diminishes until it turns insignificant or even inverses as it can be, instead of an aid, a burden to the institutions. Therefore, even though equity can be used to finance a specific amount of M&A deals, when a considerable volume of them is made, the choice of the lower cost debt for their financing appears more viable. In addition, the post-merger capital improvements are not a main M&A motivation, which is shown by our findings, as the directly treated institutions that engage in M&As are the least capital constrained compared to the rest of the sample. So, there seems to be room for them to disengage from the extra capital which is more costly. The beneficial effect of M&As on the capital constrained institutions is more enforced when we find that the mechanism has failed in general to

serve its purposes for capitalization, as the effects reported for the testing of the SSM introduction appear negative and insignificant and especially for the directly treated ones.

At the second level of the analysis, regarding the direct effects of M&As on financial performance as well as the indirect through the merger induced effects found in the previous steps of the analysis, we observe significant differences between the results for the general sample and the directly treated institutions. Specifically, even though for the general sample the book profitability measures are significantly benefited, their market value is not, while the directly treated, as their capital levels are more elevated, they experience reductions in their returns on equity. But, the possible perceiving of those deals by the directly supervised, as able to give increased future earnings to investors, thanks to their size and relative experience, significantly benefited their market value. However, when we test for the effects of subsequent deals, concerning first book profitability, even though the effects remain for the general sample those of directly treated institutions become insignificant or even turn completely negative. Therefore, there is an evident saturation or even reversion of any positive effect on the profitability of these directly treated institutions when this tactic is used frequently. On the other hand, the effect on the market value measure does not change by subsequent deals for both the general sample and directly treated. Hence, investors value more deals that are made by systemically important institutions who, as mentioned, they hold the brand name and experience to be trusted to efficiently deliver such risky investments. However, as shown from our results, they do not value increases in capital levels as they can be a sign of mismanagement or that the increased costs they bear may limit their expected earnings. And they are not wrong to worry as our findings give evidence of such outcome, while things that are expected to drive upwards profitability such as reduced systematic risk and funding costs appear to work as anticipated. So, consequently, any positive result that may be found initially on book profitability and value might be inversed by the merger induced effect found previously on capitalization, while in the long run this effect of increased capital might again turn around by the expected reductions in risk and then on funding costs that may come from such adjustment. As for the effect coming from the introduction of the SSM, it does not seem again to be that helpful either, as, specifically for the directly treated, the results lean more towards to the negative side.

Overall, our results reveal that M&As have a significant effect on the measures of banks that are critically affected by the introduction of the SSM. However, even though they seem to aid them in their strive towards achieving better capitalization, becoming safer and consequently possibly reducing their funding costs, regarding their ultimate purpose, which is to increase their profitability and value, the results are mixed, regardless the effect coming from the introduction of the SSM, which mechanism does not seem to be helpful in any of these dimensions that are critical for the wellbeing of banks. A possible explanation for these results may lie on the special nature of banks whose higher leverage give more power to debtholders to take a more serious stand against their controversy with the other stakeholders, and specifically the shareholders, which is not that evident in other firms who operate with different capital structures and rely more on equity.

The above results have significant policy implications for regulators and policymakers as well as academics and executives of financial institutions. First, they show that M&As can be a significant tool for financial institutions to overcome obstacles posed by their environment such as crises and changes in regulations and supervision. Secondly, they can make regulators rethink their current guidelines for the examination of the ability of possible deals to be realized. And lastly, they can provide academics with further knowledge concerning bank M&As and their effects as well as bank executives in their decision-making process by acknowledging the capabilities of such deals and keeping better track of the benefits and drawbacks they can offer to their firms.

Essay 2

Are European bank Mergers and Acquisitions (M&A) effective strategies for the improvement of governance quality and performance?

2.1 Introduction

The financial services sector has been widely blamed to be the major contributor to the great financial crises that inflicted several parts of the world over the last couple of decades. Particularly, most of the blame was attributed to the weak corporate governance of financial institutions and specifically the board of their directors (Kirkpatrick 2009; Francis et al. (2012); De Haan and Vlahu (2016); Fernandes et al. (2018))[15]. And as a result the relevant authorities around the world started to reconsider the effectiveness of the corporate governance schemes that existed in banks (e. g. in the UK the Walker Report (2009); in Europe, the European Commission Green paper (2010); in the US, the Federal Reserve Board (2013); worldwide, the Basel Committee on Banking Supervision (2006), (2008), (2010), (2015)). And no one can blame them as Anneli Tuominen, Member of the Supervisory Board of the ECB mentioned in her speech at the joint European Central Bank/European University Institute seminar in Florence (April, 2024): "All banks need good governance and a sound risk culture to take the right decisions. We saw in the global financial crisis and in last year's banking sector turmoil that deficiencies in internal governance and risk culture can often be early warning signs of turbulence ahead. Good governance, on the other hand, can help banks develop an active strategy to steer them through the challenges of a constantly evolving environment".

But, of course it is a well-known fact that the governance of financial institutions differs significantly from that of other kinds of firms both in terms of complexity and

[15] For instance, Francis et al. [(2012) (p. 40)] state that "although weak corporate boards may not be the direct trigger of the current crisis, corporate board practices could affect the extent to which firms are vulnerable to the financial crisis".

importance (Becht et al. (2011); Laeven (2013); Van der Elst (2015)). These special characteristics of financial institutions might make simpler problems deriving from bad governance to be more intense compared to other firms as well as they might render governance structures that are considered to be effective for others not to be when they are witnessed in financial firms (Laeven (2013); John et al. (2016); Fernandes et al. (2018)).

One difference between financial and non-financial institutions that contributes to their variation in governance, is that banks operate with higher leverage. It is common for banks, especially in the previous decade, to operate with leverage reaching up to and exceeding 90 percent (Berger and Bouwman (2013); Gornall and Strebulaev (2018); DeAngelo and Stulz (2015)). This can create a conflict between the different stakeholders of the firm. As the governance of most firms should take decisions that are mostly in accordance with the interests of shareholders, the higher leverage of banks brings the interests of debtholders (mostly depositors) more actively on the decision table. As a result, the board faces the dilemma of agency costs of debt and value loss arising by satisfying the interests of shareholders that may be in contrast with those of debtholders (e.g. make riskier investments) (John and Qian (2003); John et al. (2016); Fernandes et al. (2018)).

Another difference lies on the opacity and complexity of financial institutions. The loan quality of financial institutions that is not readily observable and the complexity of the financial instruments that they possess, pose certain difficulties to the assessment of their risk (Morgan (2002); Laeven (2013); Ferrarini (2015); John et al. (2016)). This was more evident during the recent financial crisis when the new and innovative products created by these institutions, bared increased risk that was not properly understood and managed (Dell'Ariccia et al. (2012); Carlin et al. (2013); John et al. (2016)). Another fact about the risks of these assets is that they can be altered quicker, when compared to those of non-financial firms, which changes may not be immediately evident to directors or to outside investors (Becht et al. (2011); John et al. (2016)). This opacity and complexity of banking operations has significant implications on their governance (Levine (2004)) as it causes information asymmetry which reduces the ability of shareholders and debtholders to monitor managers effectively and increases agency costs (Andres and Vallelado (2008); Levine (2004); Laeven (2013); John et al.

(2016); Fernandes et al. (2018)). As a result, boards, take the significant responsibility of not only monitoring managers but also give them an objective advice, that stems from their independence, in order to make decisions that are in line with the best interest of the firm (Andres and Vallelado (2008); Becht et al. (2011); Fernandes et al. (2018)).

Lastly, compared to other firms, financial institutions are more regulated and supervised. This is thanks to their role as the most significant pillar for the flow of monetary resources, their importance for the stability of the financial system and their vulnerability to failures (Andres and Vallelado (2008); Levine (2004); John et al. (2016); Fernandes et al. (2018)). So, regulators can pose requirements based on specific standards on the quality and characteristics (such as board composition) of governance. As regulators are considered between the main stakeholders of the banks, their governance mandates, may vary from the traditional governance mechanisms, which may be in line with the fulfillment of their goals, but may be in contrast with those of the other main stakeholders (e.g. shareholders and debtholders) (Andres and Vallelado (2008); Laeven and Levine (2009); Adams and Mehran (2012); Ellul and Yerramilli (2013); John et al. (2016); Fernandes et al. (2018)).

So, all these differences make the governance of financial institutions to vary significantly and be considered of higher importance compared to that of other firms.

Therefore, changes in corporate governance and the factors that contribute to it are of high essence. One important factor that affects the governance of financial institutions in several ways is M&A activity. First, by engaging in M&As financial institutions can significantly change their board composition as, for example, it is not uncommon for acquirers to add targets' directors in their boards (Adams and Mehran (2012); Adams (2010)). Also, M&As can be a good way to transfer good corporate governance structures and practices from either the acquirer or the target to the other firm. However, this can be reversed, and bad governance may be transferred as a result of the deal and more probably by the acquirer (Chu et al. (2016); Ellis et al. (2017); Liu et al. (2017); Hussain et al. (2023); Hussain et al. (2024)). Apart from the transfers of corporate governance, the threat of an active market for corporate control can have disciplinary effects on boards and thus M&As may lead to a more effective board of directors (James (1984); Schranz (1993); Adams (2010)). However, this is not the case for banks as the market for corporate control relies on hostile takeovers which have an extremely low

frequency in banking as every such investment has to go first through a regulatory approval (Adams and Mehran (2003); Laeven (2012); John et al. (2016)).

As the good corporate governance is considered to offer better performance, then M&A induced changes in governance that increase its quality are expected to offer increased financial performance[16]. Thus, governance motivated mergers can be another way for obtaining financial synergies (Chu et al. (2016); Ellis et al. (2017); Hussain and Loureiro (2022); Hussain et al. (2023)).

Even though the literature on corporate governance is vast, the volume of them focusing on financial institutions is rather limited ((Belhaj and Mateus (2016); Berger et al. (2016); Dang and Nguyen (2016); Fernandes et al. (2017)). And even more limited is the volume of those who studied the change induced in governance quality through M&A activity (Hagendorff and Keasey (2012); Chu et al. (2016); Liu et al. (2017)) as the majority of them is mostly interested on the performance of these institutions rather than the implications of mergers on their governance.

Hence, the main focus of our study lies on the effect that M&As might have on the governance quality of European financial institutions and whether such effect might be translated to increased financial performance. To do so we collected data from a sample of 72 publicly listed financial institution from 21 European countries for the period 2008-2020 and on which we applied the 2-step system GMM method to extract our results. Our main findings show that even though there is a clear indication of positive M&A effects on the governance levels of financial institutions, these governance levels are not positively associated with higher value for them. However, they show that higher value and profitability are more probable to come directly from the M&A deals themselves, rather from the merger induced changes in governance, which results may lie on the possible false assumptions that exist on what structures consist good governance and which are not directly linked to the performance of financial institutions or any other special kind of firms.

Our research contributes to the literature in the following ways: First, we extend the existing governance related literature on financial institutions, which remains rather

[16] Specifically, theories like the portability theory of Ellis et al. (2017) state that the transfer of superior governance practices from the acquirer to the target is a source of value creation.

limited, by conducting a study with a more current data range, that is at the same time focused on the European financial industry and examines merger induced changes on complete multifactor governance indexes. Secondly, unlike the majority of previous studies who mostly rely on measures such as the abnormal returns of the deal announcement or on accounting measures such as ROE and ROA, we make a more thorough analysis by examining the effect of M&As both on accounting as well as market-based measures of financial institutions performance. Third, unlike previous relevant studies we use a novel multilevel approach and examine individually as well as in a sequential connection, the effect of these deals on two interconnected different bank dimensions (corporate governance and profitability, value), to obtain a more complete view on the benefits that M&As can offer to the financial institutions and industry in general by improving governance quality.

The remainder of this study is organized as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 describes the data and methodology. Section 4 discusses the empirical results. Section 5 concludes the essay.

2.2 Literature review

Even though there is an extensive literature on the corporate governance of banks, the role of M&As in improving this important part of these firms is not, to our knowledge, examined enough in relevant studies and if it is, the main focus of these studies lies on certain governance characteristics and mainly certain characteristics of the board of directors.

Why are boards so important and deserve special attention? One answer is that the board of directors serves as a means of monitoring and advice for managers (Adams and Ferreira (2007); Adams et al. (2010)). Specifically, it has the following roles: (1) a supervisory role as it monitors and evaluates management, (2) a managerial role as it makes management related decisions e.g., which projects should be realized and which employees to hire and (3) an advisory role (Fernandes et al. (2018)).

Also, the board's inefficiencies, and specifically its inability to come up with the appropriate risk strategies as well as its failure to properly monitor them, is blamed as

one the main reasons that caused the crisis or if they did not directly cause it, those weaknesses made banks more vulnerable when one arose (Kirkpatrick (2009); Francis et al. (2012); European Commission (2012); BCBS (2015)). Although, if shareholder-friendly boards are considered as strongly governed, Beltratti and Stulz (2012) provide evidence against this and argue that banks with more shareholder-friendly boards, generally performed worse during the crisis.

The main characteristics of corporate governance that are mostly examined in literature, usually separately and not combined in one measure, are:

a) the number of directors on the board, where studies are divided on whether larger (Adams and Mehran (2012); Aebi et al. (2012); Garcıa-Meca et al (2015)) or smaller boards (Staikouras et al. (2007); Pathan and Faff (2013); Liang et al (2013); Wang et al (2012)) are better,

b) the diversity of the board, where most studies praise the presence of more women on boards (Gulamhussen and Fonte Santa (2015); Belhaj and Mateus (2016); Fernandes et al. (2017); Dong et al. (2017); Geyfman et al. (2018); Ning et al. (2023)) but within certain limitations (Pathan and Faff (2013); Owen and Temesvary (2018); Boitan & Nitescu (2019)),

c)the number of independent members on the board with no affiliations with the management, where more independence appears in literature to protect the interests of the shareholders and prevent agency problems and increase performance (Garcıa-Meca et al. (2015); Georgantopoulos and Filos (2017); Zakaria et al. (2018); Dong et al. (2017); Liang et al. (2013); Gafoor et al. (2018); Sarkar and Sarkar (2018)) but within certain limitations as they may lack industry and firm-specific information (Adams and Ferreira (2007); Wang et al. (2012); Erkens et al (2012); Pathan and Faff (2013); Sakawa and Watanabel (2018); Minton et al. (2014); John et al. (2016); Fernandes et al. (2018)),

d) whether the CEO is also the chairman on the board, where this dual role is suggested when a single point of command is needed and the decisions are to be made fast (Mamatzakis and Bermpei (2015); Mollah and Liljeblom 2016; Ayadi et al. (2019); Vallelado and García-Olalla (2022)) but, when there is a higher risk of exploitation of this power the separation is advised (Wang et al. (2012); García-Meca et al. (2015);

Dong et al. (2017); Sarkar and Sarkar (2018); Farag et al. (2018); Gontarek and Belghitar (2021)).

e) the age and experience of directors, where there is a tradeoff between the experience of older directors (Pathan and Faff (2013); Nguyen et al. (2015); Berger et al. (2014)) and the eagerness to work and the new ideas coming from younger ones (Core et al. (1999); Grove et al. (2011); Wang et al. (2012)) and

f) the compensation of executives, where it is advised in the literature that the paying schemes of executives should be aligned with the interests of the shareholders in order to be properly motivated and turned to the direction that creates wealth for the firm (Jensen and Murphy (1990); Spong and Sullivan, (2007); Cunat and Guadalupe (2009); Grove et al. (2011) ; Cheng et al. (2014); de Haan and Vlahu (2015)).

On the matter of what structures are considered to consist good corporate governance quality, the majority of studies mainly base their assumptions on the board characteristics mentioned above. However, generally, the main path that is followed for the construction of multifactor governance indexes that contain these variables, basically rely on the general fact that good governance structures are those that decrease the probability of certain problems that may arise such as agency problems (Fama (1980); Fama and Jensen (1983); Bhatia and Gulati (2021)) and social loafing (Forbes & Milliken (1999); Bainbridge (2002); de Haan and Vlahu (2016))[17] as well as inefficiencies in performing their advisory roles effectively when the levels of knowledge and experience are rather inadequate (Aebi et al. (2012); Von Meyerinck et al. (2016); de Haan and Vlahu (2016); Fernandes et al. (2018)). So, for example governance structures which consist of less board members, include more women and outside directors, have separate roles for the CEO and the chairman, have members with knowledge and experience and have performance-oriented payment schemes for their executives, are considered of high corporate governance quality (de Haan and Vlahu (2016); John et al. (2016); Fernandes et al. (2018)). Even though, the one size fits all, concerning governance schemes, may not always apply in practice but, it lies on a solid theoretical ground as explained here (Adams and Mehran (2012); Fernandes

[17] agency problems arise when the interests and actions of executives are not oriented towards the wellbeing of shareholders, and social loafing mainly appears in larger boards where some executives may not be motivated to be productive as they might expect the rest to carry out the board's tasks.

et al. (2018)). So, empirical studies have used these variables as a means of measuring the ability of firms' governance to perform effectively their main roles as well as better assess risk and be less exposed to it and also assure compliance with the rules and guidelines set inside and outside the firm.

However, the testing of the above characteristics individually may not give results that could help determine governance quality. Therefore, instead of viewing the above characteristics individually, some studies (Liu et al. (2017); Fatemi et al. (2017); Gao et al. (2019); Rani et al. (2020); Hussain and Loureiro (2022); Hussain et al. (2024)) preferred the use of a complete multifactor index, which can be a more effective and straightforward way to measure corporate governance quality as well as give clearer results and lead to more secure conclusions.

Nevertheless, as the corporate governance of banks, and specifically the board of directors, started to get more recognition for its importance, after it was blamed as a main factor for the global financial crisis (as mentioned earlier) and their wellbeing afterwards (Kirkpatrick 2009; Francis et al. (2012); de Haan and Vlahu (2016); Fernandes et al. (2018)), it is important that the relevant literature and especially that involving the synergistic effect coming from M&As on the improvement of the governance, should be mentioned.

2.2.1 Changes in governance structures through M&A activity and post-merger synergies

The corporate governance structures of targets are not considered as strong M&A motives and it is apparent from the limited literature on this matter. Specifically, the question here is, if there is a cherry picking of targets that appear to have weak governance structures and thus, are picked for the possibility of increasing the bidders' returns that may come from their restructuring. While on the other hand, targets may be chosen because of their strong governance and their increasing growth that derives from it, and thus, it can be a good addition to the bidders' firms.

Regarding these studies for banks their vast majority are before 2008 (e.g. Hadlock et al (1999) and Brook et al (2000) for US banks and Crespi et al (2004) for Spanish ones)

even though the importance of this matter was even more highlighted the years after. In one of the scarce that is not from that period, Tompkins and Hendershott (2012) on US banks, find, for their sample of 528 banks between 1999 and 2004, that the acquired had significantly greater outside directors' percentage, when compared to non-targets.

However, even though the choice of the target, based on its governance characteristics, is not adequately examined, those of the certain acquirers' characteristics that lead to better post M&A performance present more evidence.

Obviously, the governance of the acquirer is important for the positive outcome of the deal as agency problems arise in M&A decisions (Jensen (1986)). There, the executives that have the last saying in the decision to acquire, might be incentivized by their own motives such as, ensuring their positions through enlarging the size of the firm, the building of empires and also gaining large bonuses that depend on the number and value of deals (Meckling and Jensen (1976)). If this is the case, then those deals are not chosen for having the most potential to offer profit and thusly can damage the wealth of the shareholders. So, governance structures that allow executives to exert more power, are more likely to lead to such agency problems and bad acquisitions (Meckling and Jensen (1976); Jensen (1986); Rani et al. (2020)). On the other hand, better governed firms have a greater likelihood of making better acquisitions, assuming that better governance can incentivize managers to pick more carefully the targets (Rani et al. (2020); Hussain et al. (2024)).

Beginning with evidence coming from studies not focusing on financial institutions, the empirical studies show interesting results. For the US, Gleason et al (2012), for US firms' deals from 1996 to 2003, find that the market reactions are more positive (higher CARs) for independent as well as larger boards in diversifying mergers. So, unlike the general acceptance of boards that are better monitored, interestingly larger boards that are not considered to consist good governance structures are also valued by the markets. While on the same region Parola et al. (2015) show for US bidder's boards between 2004-2009, that top management team's gender diversity is beneficial to pre-integration performance but hinders post-integration performance which however can be overcome by acquirer experience. Consistent evidence with Gleason et al (2012) is found by Boateng et al. (2017) on the other side of the Pacific. They studied the impact of firm ownership and board monitoring on operating performance of Chinese mergers and

acquisitions over the 2004–2011 period and find a positive and significant impact of independent directors on operating performance of acquiring firms.

Proceeding with studies focusing on financial institutions Liu et al. (2017) find by using a constructed governance index composed of 11 variables, that the better the governance of US acquirers, the higher the abnormal returns to the shareholders following acquisitions between 1995-2012. While Hagendorff and Keasey (2012), on a sample of US mergers between 1996 and 2004, find beneficial roles of independent directors on abnormal returns and thus showing the value of reducing agency problems, while gender diversity, board size and duality were found insignificant. Unlike, Hagendorff and Keasey (2012), Tampakoudis et al. (2022a) find for a sample of 1,130 M&As announced by U.S. banks between 2003 and 2018, that banks with at least one woman on the board, experience lower announcement abnormal returns than banks with male directors after the banking crisis, suggesting a caution on the level of diversity. However, on the other side of the Atlantic, Tampakoudis et al. (2022b) find, for European bank M&As between 2003-2017, a significant positive association between gender diversity and wealth gains for acquiring banks and therefore praised the values of enhanced monitoring, provision of critical resources and better management of stakeholder demands coming from diversity. Also, unlike most of the previous studies that mostly contain US samples, Chu et al. (2016) focus on the Taiwanese banking industry. For a sample of publicly traded banks M&As between 1997– 2006 they found that board size is significantly negative with the return on shares one and two years after M&A. So, having more compact boards that reduce the likelihood of friction as well as the time needed for a decision, may lead to better target choices and acquisition results.

So, it seems that bidders who have governance structures that reduce the chances of agency problems (more independent and diverse) seem to experience better M&A outcomes. However, the optimal level of each governance characteristic does not appear to be that straightforward and over or under certain points as well as under certain circumstances their effect on M&A outcomes could be inversed.

The next thing we investigated in the literature, following the results found for the effects of certain governance characteristics of the bidders on M&A outcomes, is the

gains obtained by the merger activity through improvements in overall firm governance.

On the firm level governance, the common consideration of the studies is that higher gains come from deals where the gap between the quality of governance between the acquirer and acquired is larger. So, through the restructuring of the acquired firm's governance and the transfer of the better structures and skills of the acquirer, higher synergies can be achieved (Martynova and Renneboog, (2010); Wang and Xie, (2009); Ellis et al., (2017); Chen et al. (2022); Hussain and Loureiro (2022)). However, an analogous effect can be derived from the inverse where bidders choose targets with high governance quality and benefit from the increased performance growth that these acquired firms present (Ismail et al. (2014)).

Concerning the empirical evidence coming from studies for non-financial firms, Hussain et al. (2023) by studying changes in corporate governance around M&As on a global sample between 2003 and 2015, they find positive average governance quality change stemming from increased board independence, audit committee independence, stock compensation, and minority shareholder protection after the acquisition. Then when testing the association with performance, they found that the higher the bidder's governance quality, the better the improvement in post-merger performance. Like them Starks and Wei (2013) on cross-border mergers with US target firms between 1980–1998 find a positive effect of corporate governance on acquirers' merger related abnormal returns. While similar evidence for this effect is presented by Gao et al. (2019) for Chinese family firms from 2006 to 2017. Governance quality improvements are also reported by Hussain et al. (2024) on a global sample of 1360 M&As involving public bidders and targets over 2004 – 2016 where the average bidder is subject to an improvement of 14% to 20% of the pre-deal governance difference. All this evidence reported above agrees with what is stated in the article by Bhagat and Huyett (2013) published in McKinsey Quarterly where the authors praise the role of boards in leading the way for executives to make a successful M&A.

However, the evidence not always gives post-merger improvements in governance quality. Indeed, in one of these studies, Rani et al. (2020) found that the governance quality of firms from 11 Asian countries from 2002-2012 has deteriorated on average post M&A. In addition, they also find no significant effect when regressing firm level

governance quality on long term performance, agreeing this way with what is reported by Bergh et al. (2016). Although, the governance of the merging firms can remain stagnant as Fatemi et al. (2017) show for Japanese firm mergers between 2000-2014.

Furthermore, increasing the governance quality in order to alleviate agency problems and the "raising all boats" strategies may act as a double edge sword. On that matter, Goranova et al. (2017) by using a sample of M&A deals from 1997 to 2006, they find that the relationship between increased monitoring and M&A value creation is not that straightforward and even though it is associated with lower M&A losses, it is also linked with lower M&A gains. Thus, even though it limits the executives' decisions to undertake bad deals, it also inhibits their willingness to take ones that can offer the most value. Additional evidence on that matter from US M&As between 2000-2011, was given by Schmidt (2015). The author, when testing the costs and benefits of less monitored boards, finds that social ties between the CEO and board members are associated with higher bidder announcement returns when the potential value of board advice is high, but with lower returns when monitoring needs are high. Also, Bergh et al. (2016) by doing a meta-analysis on that matter, they find that key board characteristics for the monitoring of executives are not related to firm performance and, as some studies in their analysis found, increasing the governance quality by strengthening the characteristics more related to monitoring may come at the expense of its advisory service (Schwartz-Ziv and Weisbach (2013); Desender et al. (2013); Baldenius et al. (2014); Krause & Semadeni (2014); Schmidt (2015)).

The cases of studies on financial institutions and the synergies created through the merger related improvement of the firm level corporate governance of the acquirer is very limited.

In one of them, Hasan and Xie (2013) attempted to examine the effect of foreign strategic investors on Chinese bank governance and performance from 1997 to 2010. Their results suggest that active involvement of foreign strategic investors in bank management has improved the corporate governance model of Chinese banks and accordingly has promoted their performance. Specifically, they find significant changes in governance variables after active involvement of foreign strategic investors in the management of those banks, which changes then led to better performance. Agreeing with them Chu et al. (2016), by focusing on the relation between bank governance and

bank merger results under Taiwan's special regulatory environment in 2000 also rule in favor of better post-merger performance through the enhancements of internal corporate governance based on the findings from their analysis and they also suggest that regulators should search for these enhancements for the increasing of the bank M&A success percentages. The similar conclusion was also made for US banks as Liu et al. (2017) using a sample of US bank mergers from 1995 to 2012 also find by the use of a composite corporate governance index that good governance is associated with more accretive deals for the bidder by offering higher announcement returns. Further evidence was provided by Chen et al. (2022). The authors based on cross-border global bank M&A data on 59 deals from 1995 to 2009, investigate the role of differences in the independent shareholder and board size between acquirer and target banks on synergy gains. They find that cross-border M&As with larger difference in independent shareholders and board size between the bidder and target bank, would result in higher synergy gains. Based on these results they state that by enhancing the quality of corporate governance and their board structures, banks can significantly improve their cross-border M&A synergies. However, they did not use in any of their regressions any type of performance measure to obtain those synergies but instead they used the takeover premiums from the deals. Thus, the meaning of synergy in their study seemed kind of abstract.

On the other hand, Kjellman et al. (2014) reported governance deteriorations following mergers. For instance, find for Finnish bank mergers during 1990 to 2013, that in almost all of the cases of merging banks, the bank managers had started to lose their confidence in being able to maintain the CEO position or the bank as independent unit while also they find agency problems behind the motivation of such mergers as evidence for Finish banks indicate that banks that don't merge will perform better than banks that are involved in merger processes.

Although, unlike the above, the majority of studies on the transfer of good governance practices through M&As, relies on country-level variables and the transfer through cross border deals (Bris et al. (2008); Bris and Cabolis (2008); Wang and Xie (2009); Martynova and Renneboog (2010); Albuquerque et al. (2019); Ellis et al. (2017)).

So, when it comes to studying the improvement of firm-level corporate governance through bank M&As and the financial synergies that can be derived from them, there

is a space in the literature that needs to be filled. Especially, after the consecutive crises that EU has gone through in the last couple of decades, there exists a need to see if banks that have good governance structures, should take charge and take over the resources from those that are not efficient in managing them.

All the above lead us to the following hypotheses:

Hypothesis 2.1: M&As have a positive effect on the banks' governance quality.

Hypothesis 2.2: M&As have a positive effect on the banks' financial performance.

Hypothesis 2.3: Governance quality has a positive effect on the banks' financial performance.

2.3 Data and methodology

In this section we present the data sample used in our empirical analysis, we offer a thorough description of the variables used and finally we describe the regression models that were constructed for the analysis.

2.3.1 Data sample

The prime source of M&A transactions as well as other firm- level measures, coming from accounting reports and market data related, and governance characteristics and quality data examined in the present study is the LSEG Eikon database. The country specific data were obtained from the World Bank's Global Financial Development databank, ECB's SDW database and ESRB.

As we want to analyze the effect of M&As on European banks' capital the financial institutions included in our study presented the following criteria: i) be based and operating in a European country for the whole period 2008-2020 and ii) they have to be publicly listed. After considering those criteria and excluding institutions for which data on governance are missing or non-existent, we finally come up with a sample of 72 European publicly listed financial institution from 21 countries namely Belgium, Germany, Ireland, Greece, Spain, France, Italy, Cyprus, Netherlands, Austria, Portugal,

Finland, UK, Switzerland, Sweeden, Poland, Denmark, Hungary, Czech Rep., Norway, Russia.

From the final sample's 72 institutions we obtain data for M&A transactions from LSEG Eikon's M&A database. In order for a M&A transaction to be included in the sample we pose the following additional conditions that should be met: i) the institution in the sample must be the acquirer, ii) the deals must be completed during the period 2008-2020, iii) the M&A transaction must result to the acquisition of a majority stake, meaning more than 50% of the target, by the institution in our sample. Also, we exclude transactions which are leveraged buyouts, spinoffs, recapitalizations, self-tenders, repurchases, minority stake purchases, acquisitions of remaining interest, and privatizations because they are relatively special cases of M&As, and it is not possible to identify the connections between acquirers' and targets' CEOs and directors.

After excluding all the deals that do not conform with the above criteria, we end up with a total of 1568 M&A deals. Furthermore, after checking for errors and inconsistencies, we end up with a balanced panel of 806 bank-year observations.

2.3.2 Empirical model, methodology and variables description

Given the nature of our research and in order take account for the heterogeneity, and differences in general that exist between the different banks in our sample, the most appropriate approach is to arrange our data into panels and perform a panel data analysis.

The most appropriate method and most frequently used in the current international literature for panel data analysis is the Generalised Method of Moments (GMM). Specifically, the main advantage of this method is that it addresses the problem of endogeneity that might exist in the regressions and as a result it is able to offer more reliable coefficients. Also, it is considered the most appropriate method for dynamic panel data regressions, namely, when the lagged dependent variable is added as an independent. Specifically the approach we use to estimate our models is the two-step system GMM estimator approach, proposed by Arellano and Bover (1995) and Blundell and Bond (1998). The benefits of this method over previous versions of the GMM lie on the handling of the instruments that GMM mandates for the calculations, as it

introduces more instruments to improve efficiency and transforms these instruments to make them uncorrelated with fixed effects. Thus, to deal with the possible problems of correlation and endogeneity we follow Arellano και Bond (1991) who suggested the use of the independent variables lags as instruments in the regressions. To test the validity of the multiple lags as instruments and the reliability of our regressions, we calculate the Hansen/Sargan test.

We then present the models to be estimated with the GMM methodology. We construct two strands of models for the purposes of our research. The first strand is constructed for the purposes of examining the effect of mergers on the governance quality of banks. The second strand is constructed in order to test at the first level the direct effects of M&As on the banks' financial performance and at the second the merger induced effect on governance quality, found on the previous step, on performance.

Starting with the testing of the relationship between mergers and governance quality levels the first models have the following form.

Bank governance models

$$GOV_{it} = a_0 + a_1 GOV_{i(t-1)} + a_2 M\&A_{it} + a_3 X_{it} + a_4 M_{it} + \varepsilon_{it} \quad (2.1\alpha)$$

$$\Delta GOV_{it} = a_0 + a_1 \Delta GOV_{i(t-1)} + a_2 M\&A_{it} + a_3 X_{it} + a_4 M_{it} + \varepsilon_{it} \quad (2.1b)$$

GOV_{it} represents the firm-level governance quality of financial institutions and combines a set of corporate governance characteristics, followed the definition given by Liu et al. (2017), Gao et al. (2019), Hussain et al. (2023) and Hussain et al. (2024). This measure is proxied by the benchmark measure, governance pillar score, collected from the LSEG Eikon's database (GOV SCORE) for bank i and year t.

$GOV_{i(t-1)}$ represents the first lag of the dependent variable and is used in order to test the significance of considering its past values, as they could be affecting the current ones, while also the coefficient a_1 represents the pace at which the dependent converges in the future. However, this variable due to its correlation with the error term can cause problems of endogeneity (Nickell (1981)) that can be solved by the use of the 2-step system GMM method which can remove it by internally transforming the data (Roodman (2009); Ullah et al. (2018)).

Next, we transform model 2.1a into what is illustrated in model 2.1b as in studies like Hussain et al. (2023) and Hussain et al. (2024) by replacing the dependent with their yearly changes, meaning the difference of the variables at year t and year t-1, in order to examine the effect of the dummy variable M&A described in Table 2.1, on the corporate governance quality levels.

In both models 2.1a,b we use the following variables.

$M\&A_{it}$ stands for the fintech collaboration/M&A activity of financial institution i at year t, and is proxied by $M\&A_{it}$, $M\&ANUM_{it}$ and $M\&AEXP_{it}$, described on Table 2.1, which are used interchangeably in the model.

X_{it} represents a vector containing variables that control for bank specific characteristics in accordance with studies like Tampakoudis et al. (2022a), Hussain et al. (2023) and Hussain et al. (2024).

Namely it contains the variables, cost to income (CIR) ratio, net interest margin (NIM), the natural log of total assets (LNSIZE), the equity to assets ratio (EQTA), loan loss provision (LLP) and loans to deposits (LD).

While, M_{it} is a vector of variables that controls for country level and macroeconomic factors and specifically we use the annual growth of GDP (GDPANGR) and a financial crisis dummy (CRISIS) in order to test whether there is a change in the governance structures of firms, so that they could adapt to changes in their environment and they can better seize the benefits from times of booms in the economy or to better deal with turbulent times.

Also, ε_{it} stands for the remaining disturbance term.

Then we present the last two models which are used to test the relationship between mergers and financial performance

Bank performance model

$$PERFORM_{it} = a_0 + a_1 PERFORM_{i(t-1)} + a_2 M\&A_{it} + a_3 GOV_{it} + a_4 X_{it} + a_5 M_{it} + \varepsilon_{it} \quad (2.2\alpha)$$

$$\Delta PERFORM_{it} = a_0 + a_1 \Delta PERFORM_{i(t-1)} + a_2 M\&A_{it} + a_3 GOV_{it} + a_4 X_{it} + a_5 M_{it} + \varepsilon_{it} \quad (2.2b)$$

$PERFORM_{it}$ represents the financial performance of our sample's financial institutions accounting for their book profitability as well as their market value followed the definitions given by Hasan and Xie (2013), Boateng et al. (2017), Gao et al. (2019) and Hussain et al. (2024). This measure is proxied first, by accounting based measures return on average equity (ROE), which is calculated on the average equity of the institutions at the beginning and the end of the year while and return on average assets (ROA) which is calculated on the average value of assets and second, in order to also account for the effects on the institutions' market value apart from its book profitability, we proxy the dependent by its price to book ratio (PB), as described in Table 2.1, for bank i and year t. The use of both accounting and market-based performance measures will let us know and compare whether any post-merger gains in the profitability of the acquirers are translated to higher valuations by the investors or if, even though the post-merger profitability is hurt, the markets are expecting increased future profits and therefore they would value more the acquiring firms.

$PERFORM_{i(t-1)}$ represents the first lag of the dependent variables and is used in order to test the significance of considering its past values. Considering the past values of the dependent is important as there is the possibility that they could be affecting the current ones, while also the coefficient a_1 represents the pace at which the dependent converges in the future. Also, the problems of endogeneity caused by the adding of this variable can be again solved by the use of the 2-step system GMM method.

Next, as in the previous models for governance quality and following the previous studies of Gao et al. (2019), Hussain et al. (2023) and Hussain et al. (2024), we transform model 2.2a into what is illustrated in model 2.2b by replacing the dependent with their yearly changes, meaning the difference of the variables at year t and year t-1, in order to examine the effect of the dummy variable M&A described in Table 2.1, on the performance levels.

In both models 2.2a,b we use the following variables.

Like the models constructed for the previous relationships we also use the variable M&A which stands for merger related variables and is proxied again by M&A, M&ANUM and M&AEXP which are used interchangeably in the model.

Also, for the purposes of examining the indirect effect of M&As on performance and in line with previous studies (Gao et al. (2019); Hussain et al. (2023); Hussain et al. (2024)) we add the governance quality variable GOV_{it} which is proxied by the governance measure GOV SCORE to find out whether the merger induced effect that might be found on these variable from the testing of the previous models 2.1a,b , has a significant effect on performance and as a result whether there could be a post-merger chain effect in the future.

X_{it} as in models 2.1a,b, represents a vector containing variables that control for bank specific characteristics in accordance with studies like Hasan and Xie (2013), Boateng et al. (2017), Gao et al. (2019) and Hussain et al. (2024). Specifically, it contains the variables, cost to income (CIR) ratio, net interest margin (NIM), loans to assets ratio (LOANSTA), the natural log of total assets (LNSIZE), loan loss provision (LLP), loans to deposits (LD), the equity to assets ratio (EQTA), the non-interest income to operating income (NIIOPINC).

And M_{it} is a vector of variables that control for country level and macroeconomic factors. Specifically, it contains the annual growth of GDP (GDPANGR) as institutions in countries with higher GDP growth are expected to make larger adjustments which could lead either way as, while on the one hand they are expected to have higher income and thus increased profitability, on the other hand they might choose to sacrifice those profits to invest so that they might gain more in the future which can, increase its value thanks to the expected increased future profitability (Hagendorff and Nieto (2015)). And also, we use a financial crisis dummy (CRISIS) which takes the value of 1 at times of crisis and 0 otherwise and is used in order to control for the effect of a crisis in the institution's country which can have serious implications for its profitability and value.

Also, ε_{it} stands for the remaining disturbance term.

Table 2.1: Definition of variables

VARIABLES	DEFINNITIONS	SOURCES

DEPENDENT VARIABLES		
GOV SCORE	Governance quality variable as constructed by the LSEG Eikon database. It measures a company's systems and processes, which ensure that its board members and executives act in the best interests of its long-term shareholders. It reflects a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives, as well as checks and balances in order to generate long term shareholder value.	LSEG Eikon
ROE	Net income after taxes for the fiscal year divided by the same period Average Total Equity	LSEG Eikon
ROA	Net income after taxes for the fiscal year divided by the same period Average Total Assets	LSEG Eikon
PB	Bank's market capitalization divided by its total equity book value	LSEG Eikon
MAIN INDEPENDENT VARIABLES		
M&A	Dummy variable taking the value 1 if the bank has engaged as an acquirer in a M&A deal and 0 otherwise	LSEG Eikon
M&ANUM	The annual number of mergers and acquisitions that the bank has engaged	LSEG Eikon
M&AEXP	The accumulated number of mergers and acquisitions up to a given year that the bank has engaged	LSEG Eikon
CONTROL VARIABLES		
CIR	The ratio of Non-Interest Expense for the fiscal year to Total Revenue less Interest Expense for the same period	LSEG Eikon
EQTA	The ratio of Common Shareholders Equity for the fiscal year to Total Assets for the same period	LSEG Eikon
NIM	The difference between interest income earned and the interest paid on borrowings by the bank divided by its earning assets	LSEG Eikon
LD	Ratio of end of the fiscal year net loans to net deposits for the same period	LSEG Eikon
LLP	The ratio of Provision for loan losses for the fiscal year as a proportion of total loans for the same period	LSEG Eikon
LNSIZE	The natural logarithm of total assets	LSEG Eikon
LOANSTA	The ratio of total loans reported for the fiscal year to total assets for the same period	LSEG Eikon
NIIOPINC	This ratio represents the portion of operating income that comes from non-lending sources. It is calculated as Non-Interest Income, Bank for the fiscal year divided by the sum of Income Before Tax and Total Interest Expense for the same period	LSEG Eikon
MACROECONOMIC VARIABLES		

GDPANGR	Country's GDP for a given year minus the country's GDP for the same period one year ago divided by the country's GDP one year ago	World Bank Global Financial Development
CRISIS	Dummy variable taking the value 1 if at a given year a country is under a crisis and 0 otherwise	ESRB

2.3.3 Summary statistics

Table 2.2 presents the statistics of the full sample of EU financial institutions between 2008-2020. Starting with the governance quality score (GOV SCORE), we see that even though the index fluctuates over a large range, the mean as well as the median stand over the half of the maximum value of 100 that the index can take. Therefore, we can say that the financial institutions in our sample are on average above par concerning their governance quality for the tested period. However, the results are on average far worse when we look at the performance measures. Indeed, as we can see the book profitability measures, ROE and ROA, present means at relatively low levels as they take the values of 2.4% and 0.5% respectively, even though they fluctuate over a large range. While also, concerning their market valuations, as measured by the market price to book value ratio (PB), they appear on average undervalued as the ratio presents a mean of about 90%. This result regarding the low performance and undervaluation of our sample's institutions can be explained by the intense hits that these firms took on their profitability during the great debt crisis in Europe which had as a result their undervaluation as they could not generate enough and steady income relative to their size. For M&A deals and starting with the dummy variable M&A, we can see that, even though the industry is characterized by the high frequency of such deals, only 53% of the observations contained M&A activity. This result is also highlighted by the average number of deals per year (M&ANUM) and the accumulated experience of such investments (M&AEXP). Especially, for M&ANUM the mean of almost 2 deals per year is indicative of the deals frequency decline in the European industry. This is again mostly attributed to the great crisis in Europe that shrunk the profits of these institutions and did not leave them much room for further expansion and resulted to the imposing of more restrictions with the launch of the SSM.

Table 2.2: Summary statistics of the full sample

VARIABLES	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
INDEPENDENT VARIABLES						
GOV INDEX	23.0297	23	36	8	4.9731	806
GOV SCORE	57.3966	59.3470	97.0029	1.8840	23.2705	806
ROE	0.0244	0.0693	11.5038	-17.4089	0.9452	806
ROA	0.0046	0.0043	0.3104	-0.12371	0.0193	806
PB	0.9138	0.7900	5.5600	-2.14218	0.5946	806
MAIN INDEPENDENT VARIABLE						
M&A	0.5297	1	1	0	0.4994	806
M&ANUM	1.9454	1	23	0	3.0709	806
M&AEXP	14.7555	6	122	0	21.0829	806
CONTROL VARIABLES						
CIR	0.7476	0.6665	25.1000	0.0510	0.9299	806
EQTA	0.0742	0.0643	0.2881	-0.0420	0.0392	806
NIM	0.0226	0.0177	0.5580	0.0028	0.0282	806
LD	1.0315	0.8900	32.0150	0.0670	1.4005	806
LLP	0.0104	0.0066	0.1057	-0.0146	0.0128	806
LNSIZE	11.8212	11.7117	14.7369	6.8564	1.6307	806
LOANSTA	0.5616	0.5873	0.8793	0.0200	0.1570	806
NIIOPINC	0.7434	0.8150	26.7700	-281.1100	10.1913	806
MACROECONOMIC VARIABLES						
GDPANGR	0.6718	1.3957	24.3704	-11.3254	3.7246	806
CRISIS	0.4131	0	1	0	0.4927	806

Figure 2.1 shows the yearly evolution of the dependent variables. The effect of the crisis is evident on all variables even directly or indirectly. As we can see for the governance quality index (GOV SCORE) in Panel A, there is a clear upwards trend ever since the crisis which began to increase even more after the application of stricter supervisory directions concerning governance such as the Single Supervisory Mechanism in the EU. This outcome lies on a sensible basis because, as mentioned earlier, the governance of banks was blamed as a main factor that caused the crisis or that if it did not, it rendered them vulnerable when the crisis struck (Kirkpatrick 2009; Francis et al. (2012); de Haan and Vlahu (2016); Fernandes et al. (2018)). While the direct effect of the crisis is more than evident when we look at the performance measure in Panels B though D, as proceeding the big upwards spike just before the year 2010 when the crisis reached Europe, a steep decline in all performance measures as well as the market power one in Panel D is observed. However, there was a quick recovery, as the following year again a pattern is observed in all measures and an upwards trajectory is evident.

Figure 2.1: Mean of dependent variables per year

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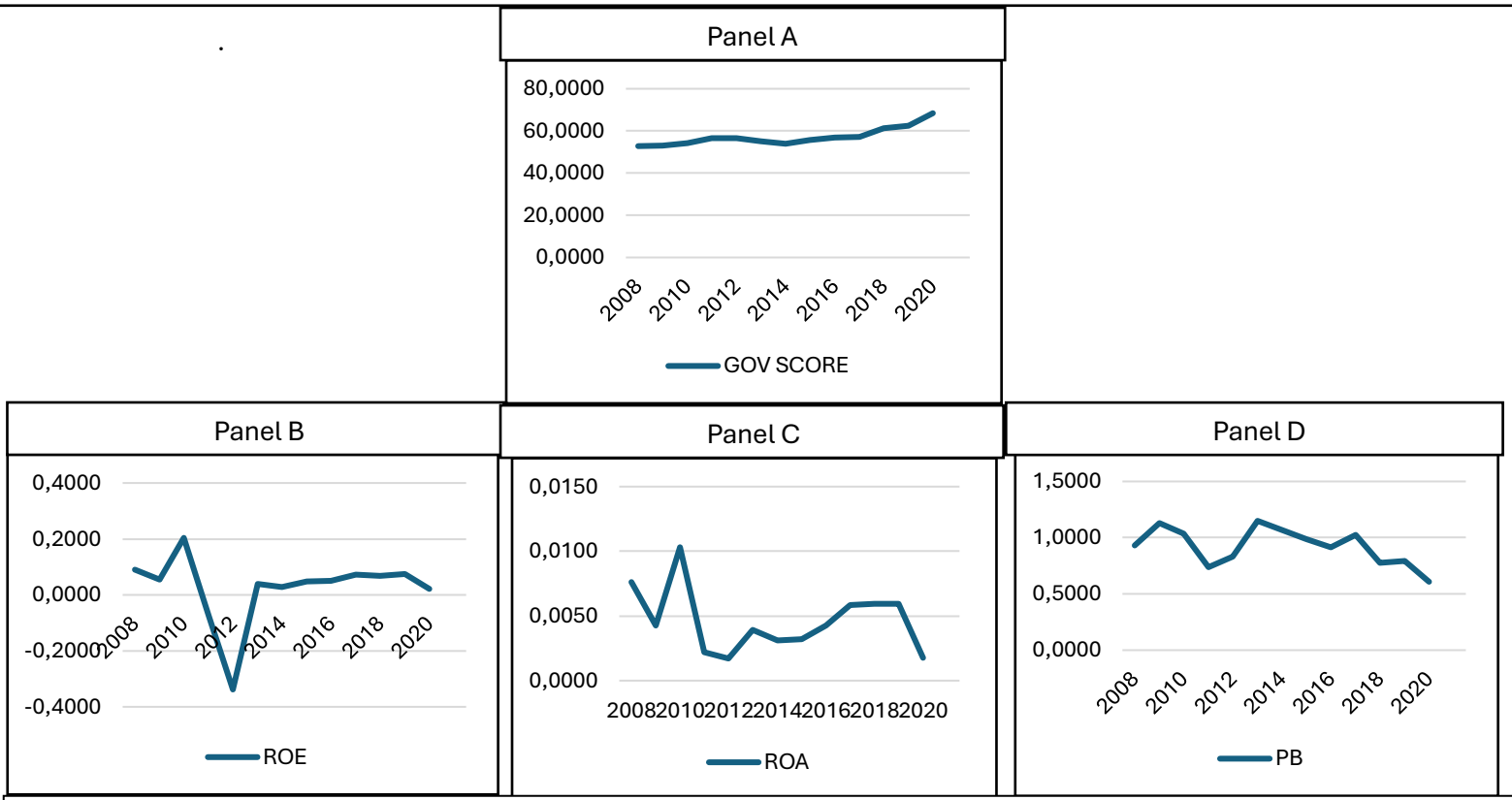
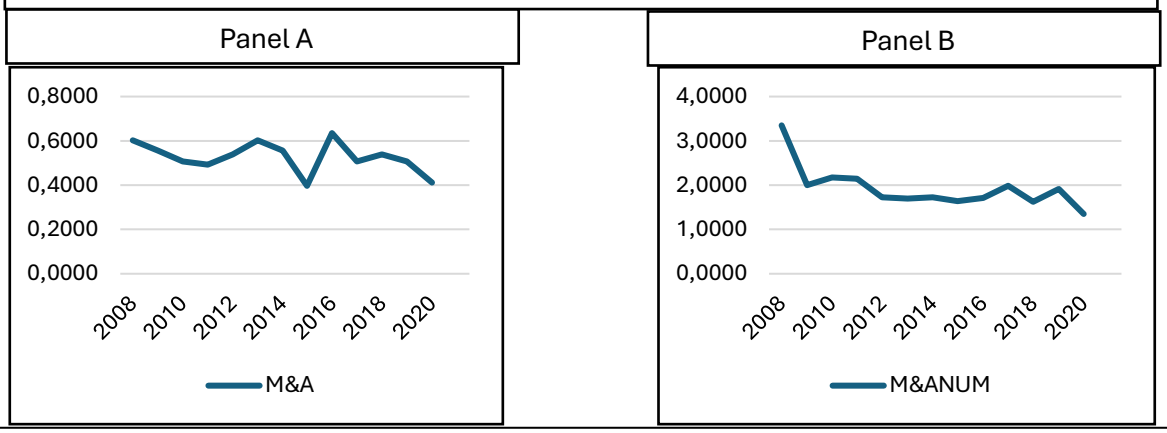


Source: Authors own calculations based on data obtained from LSEG Eikon database

Proceeding to Figure 2.2 we can see the yearly change in the average M&A activity of our sample. We can see that even though the observations shown by the M&A dummy variable in Panel A, appear to be going up and down depending on whether there are times of crisis present or stricter supervisory schemes are introduced in the region, the number of those deals per year (M&ANUM) as shown in Panel B, never recovered since the crisis of 2008. So, it seems that even though M&A activity is present on our tested period, it is far weaker than the past and it keeps on weakening.

Figure 2.2: Mean of merger related variables per year



Source: Authors own calculations based on data obtained from LSEG Eikon deals screener database

2.4 Empirical results of the econometric analysis

2.4.1 Econometric analysis using the 2-step GMM method for the relationship between M&A activity and governance quality

Table 2.3 shows the GMM estimation results on equations 2.1a.b that examine the relationship between M&A activity and governance quality. Starting with the dummy variable for M&A (M&A), we can see that in the first column there is not any significant relationship with the governance quality of the acquirers (GOV SCORE). Thus, the difference in the governance measures between observations where the activity is present, and the rest seems to be negligible in this case.

However, when we test the ability of M&A deals to change the governance of the acquirers with the yearly change of the dependent (ΔGOV SCORE), the results clearly show that there is a significant improvement in their governance quality by over 3

points. Therefore, based on this result, we come to initially accept Hypothesis 2.1, by showing that there is a positive and significant at the 1% level change of the board composition, which can happen, for example, by adding targets' directors in their boards (Adams and Mehran (2012); Adams (2010)) as well as by a transfer of good governance practices from the deal (Chu et al. (2016); Ellis et al. (2017); Liu et al. (2017); Hussain et al. (2023); Hussain et al. (2024)) or that there is a chance that the governance quality of the acquirer improved so that the deal is completed successfully and the synergies from it can be maximized. These results agree with the former findings of Hussain et al. (2023) for nonfinancial firms as well as that of Hasan and Xie (2013) for banks who also reported post-merger improvements in governance.

Table 2.3: Empirical results for the effect on governance based on the 2-step system GMM method

VARIABLES	**GOV SCORE**	**ΔGOV SCORE**
ΔGOV SCORE(-1)		**-0.2620*****
		(-26.1628)
GOV SCORE(-1)	**0.1987*****	
	(7.0462)	
M&A	-1.7483	**3.0427****
	(-1.3331)	(2.3419)
LNSIZE	**11.3587*****	**-1.5578***
	(3.9588)	(-1.7026)
NIM	3.6727	**-307.5562*****
	(0.0511)	(-3.4715)
EQTA	**69.8322***	**-48.3838*****
	(1.9265)	(-4.5635)
CIR	0.2733	**-1.6683****
	(0.3403)	(-2.3326)
LD	1.6303	**-6.8367*****
	(0.6427)	(-3.3193)
LLP	**-326.8205*****	**-308.9016*****
	(-4.8651)	(-6.9919)
GDPANGR	**-0.6110*****	**0.2080***
	(-7.1764)	(1.7227)
CRISIS	0.7489	-0.1905

	(0.5274)	(-0.1912)
Observations	682	620
S,E, of regression	11.6372	12.0899
J-statistic	52.6098	58.1938
Prob(J-statistic)	(0.4502)	(0.2579)
Instrument rank	62	62

Note: This table reports regression results obtained with the 2-step system GMM method The dependent variable is bank governance which is proxied by Gov index and Gov score. The definitions of all variables are provided in Table 2.1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. t-stats are reported in parentheses.

In order to measure the effect that more than one deals in a year and the previous accumulated deals experience might have on the governance quality of the acquiring institutions, we rerun the above regressions with M&ANUM and M&AEXP respectively. The results appearing on Table 2.4 show in the first column that more deals in a year clearly improve the governance quality (GOV SCORE) with the results being significant at the 1% level. However, in the second column when we test for the effect of the previous accumulated experience (M&AEXP), the results clearly turn insignificant. Therefore, having more deals in one year can still continue to benefit the governance quality of the financial institutions who can derive this result possibly by continuously changing their board structure as a result of the deal or for the deal, or adopt the good governance characteristics of the acquired. While, however, this of course cannot be going on to perpetuity and when there is a previously accumulated baggage of deals on the firm, the extra ones might not make any difference. Therefore, Hypothesis 2.1 can be accepted by keeping in mind that this condition should be met.

Table 2.4: Empirical results for the effect on governance based on the 2-step system GMM method

VARIABLES	**GOV SCORE**	**GOV SCORE**
GOV SCORE(-1)	**0.1912*****	**0.1753*****
	(4.6741)	(8.1408)
M&ANUM	**0.7272*****	
	(3.1248)	

M&AEXP		-0.0044
		(-0.0663)
LNSIZE	8.4329	**13.1472*** **
	(1.9488)	(4.9014)
NIM	31.3249	0.8098
	(0.3864)	(0.0136)
EQTA	48.4095	83.5669
	(1.1809)	(2.2472)
CIR	0.7996	0.5072
	(1.2257)	(0.7230)
LD	0.7481	1.2550
	(0.2679)	(0.4386)
LLP	**-223.6261*** **	**-322.8026*** **
	(-3.2698)	(-5.2864)
GDPANGR	**-0.5148*** **	**-0.5994*** **
	(-6.7242)	(-9.3125)
CRISIS	-1.0486	-0.6171
	(-0.7111)	(-0.4168)
Observations	682	682
S,E, of regression	11.5173	11.5939
J-statistic	54.3668	56.7497
Prob(J-statistic)	(0.3844)	(0.4706)
Instrument rank	62	62

Note: This table reports regression results obtained with the 2-step system GMM method The dependent variable is bank governance which is proxied by Gov index and Gov score. The definitions of all variables are provided in Table 2.1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. t-stats are reported in parentheses.

As for the rest of the control variables in Tables 2.3 and 2.4, we observe that there exists a positive relationship with EQTA, indicating that the more the loss absorption capacity of an institution, the better its governance, as well as a positive one with the size of the institutions, thus the larger the institution the better its governance quality. While on the other hand, negative relationships are reported for LLP and GDPANGR. So, as expected a decrease in the provisions for bad loans is linked with better governance quality while

advancements in the economy are not linked with better governance in this case and therefore it seems that institutions do not seem to adapt their governance to changes in their environment so that they can better seize opportunities or deal with threats more effectively.

2.4.2 Econometric analysis using the 2-step GMM method for the relationship between M&A activity, governance quality and performance

Table 2.5 shows the estimation results for equations 2.2a,b that test the relationship that might exist between our sample's institutions M&A activity and financial performance. Taking a closer look at all the regressions, the M&A dummy variable, appears to be positively linked with the performance measures (ROE, ROA, PB), as the signs of all its coefficients appear positive and significant. Hence, we can say that M&A activity comes from better performing institutions. So, what is clear from this result is that better performing institutions would be able to perform such deals due to the possession of the excess resources that are needed for them to be realized and also maybe pass the regulatory authorities' standards.

Then, in order to fully complete our analysis, we move to the final step and, as in the previous analysis, we test whether M&A activity can offer positive changes to the financial performance of our sample's institutions. To do so, again, we replace the dependent variables in the regressions with their yearly differences (ΔROE, ΔROA, ΔPB). The results are also shown on Table 2.5. As we can see on that table, there exists one inconsistency between the two profitability measures, as the coefficients of the dummy variable M&A appear positive in the regressions with ROE but, negative in the ones with ROA. This inconsistency probably stems from the difference in the nature of the two performance ratios as well as the choice of targets and the nature of the deal. Therefore, it is possible that bidders might have chosen targets with more leverage in their books, as this is a sign of mismanagement and leaves room for increased returns for bidders who are able to restructure the acquired. Hence, even though the net profits are the same and there is a fixed increase in the assets, those profits even if they increase, they are not enough to cover the increase in assets but, their growth appears to be over the smaller growth of equity. When it comes to the results for the market-

based measure (PB), the coefficient for the dummy variable appears again positive. Therefore, it seems that those kinds of deals where there is a choice of possibly mismanaged targets is received well by the investors who may expect increased profitability stemming from the better management of those targets. Thus, M&A activity appears to increase the financial performance of institutions which results resemble the ones reported by Hasan and Xie (2013), Fatemi et al. (2017) and Rani et al. (2020). Hence, based on this result we come to initially accept Hypothesis 2.2.

Table 2.5: Empirical results for the effect on financial performance based on the 2-step system GMM method

VARIABLES	ROE	ROA	PB	ΔROE	ΔROA	ΔPB
ROE(-1)	**0.1893*****			**-0.2937*****		
	(556.4883)			(-391.4855)		
ROA(-1)		**0.3798*****			**-0.1569*****	
		(384.7763)			(-148.8414)	
PB(-1)			**0.5031*****			**-0.1772*****
			(58.2306)			(-27.1530)
M&A	**0.3067*****	**0.0079*****	**0.0646*****	**1.5466*****	**-0.0017*****	**0.0896*****
	(88.8032)	(30.4741)	(3.7321)	(300.1970)	(-3.5109)	(4.8763)
GOV SCORE	**0.0031*****	**-5,82E-05*****	**-0.0046*****	**0.0154*****	**-0.0007*****	**0.0026*****
	(41.3929)	(-7.1287)	(-13.7753)	(40.9291)	(-60.5710)	(5.6779)
LNSIZE	**-0.2269*****	**-0.0142*****	**-0.5602*****	**-0.4678*****	**0.0024*****	**-0.3933*****
	(-17.7678)	(-23.8531)	(-10.9605)	(-14.0989)	(4.0449)	(-11.3746)
EQTA	**6.1898*****	**-0.0623*****	**-3.2941*****	**-12.1957*****	**0.1153*****	**-3.0264*****
	(158.7427)	(-19.4446)	(-6.3981)	(-62.8329)	(18.5249)	(-7.1174)
NIM	**-4.5581*****	**-0.2240*****	**-15.5030*****	**40.2521*****	**-0.4493*****	**-20.4443*****
	(-7.5367)	(-14.8660)	(-10.1220)	(20.2442)	(-21.8630)	(-13.6388)
LD	**-0.1035*****	**0.0023****	**0.2693*****	**0.9593*****	**0.0572*****	-0.1571
	(-6.0678)	(2.6558)	(8.2888)	(19.0435)	(35.4440)	(-1.5191)
LLP	**3.5174*****	**-0.1762*****	**4.1452*****	**20.4914*****	**-0.6185*****	**11.7796*****
	(53.1382)	(-29.7708)	(6.1079)	(112.2192)	(-87.4566)	(15.9538)
CIR	**-0.1077*****	**-0.0034*****	**-0.3082*****	**-0.0308*****	**-0.0052*****	**-0.2648*****
	(-8.9812)	(-13.0130)	(-5.2421)	(-3.6555)	(-19.5960)	(-5.1193)
NIIOPINC	**0.0024*****	**-2.32E-04*****	**0.0136*****	0.0004	**-0.0002*****	**0.0180*****
	(2.9311)	(-8.1314)	(3.9168)	(0.2575)	(-4.1138)	(6.4339)
LOANSTA	**-1.9949*****	**-0.0209*****	**0.3059*****	**-6.6514*****	**-0.0397*****	**0.7856*****
	(-88.2920)	(-7.9842)	(3.8190)	(-57.3869)	(-11.0099)	(3.8499)

GDPANGR	**0.0199*** **	**8.76E-05*** **	**-0.0015***	**0.0514*** **	**-0.0003*** **	-0.0009
	(48.1563)	(4.4469)	(-1.8178)	(30.7848)	(-8.1981)	(-0.6905)
CRISIS	**-0.2078*** **	**-0.0034*** **	-0.0136	**-0.6856*** **	**0.0007*** **	**0.0658*** **
	(-51.2509)	(-20.5185)	(-0.8450)	(-47.4360)	(3.1630)	(4.0017)
Observations	682	682	682	620	620	620
S,E, of regression	0,9762	0.0169	0.4427	1.4261	0.0280	0.4890
J-statistic	42,5302	49.5428	59.1707	51.4014	50.2823	57.1776
Prob(J-statistic)	(0,6183)	(0.4514)	(0.1514)	(0.3798)	(0.4224)	(0.1974)
Instrument rank	62	62	62	62	62	62

Note: This table reports regression results obtained with the 2-step system GMM method. The dependent variable is bank performance which is proxied by ROE, ROA and the market value of the institution (PB). The definitions of all variables are provided in Table 2.1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. t-stats are reported in parentheses.

Then in order to fully understand the effect of M&As on the financial performance of acquiring institutions we put to the test the yearly number of M&As (M&ANUM) and the previous accumulated experience on such deals (M&AEXP). The results shown on Table 2.6 starting with the firsts three columns where M&ANUM is tested, remain mostly in line with what is found in the ones with the other merger related variable (M&A) on Table 2.5. So, we can see that in every regression M&ANUM presents a positive coefficient and therefore M&A activity followed along by an elevated number of deals per year is beneficial for the improvement of both accounting and market based financial performance and as a consequence the creation of financial synergies. However, if we move to the examination of the link between M&A experience (M&AEXP) and performance, the results differ when compared to the regressions with the other merger related variables. Indeed, the results of the regressions in the last three columns of Table 2.6 reveal mostly that there is not a considerable significance or when it appears there is a negative one between the link of M&AEXP and performance measures. Hence again the previous merger experience of acquiring institutions seems to turn the positive effect of M&As insignificant, which might indicate that the beneficial effect of mergers declines after each deal until it reaches a point where it becomes saturated and cannot give significant results. Therefore, this result forces us to pose the condition that there should not exist a large previous M&A baggage by the

acquirer so that the deal would be successful and Hypothesis 2.2 can be unconditionally accepted.

Table 2.6: Empirical results for the effect on financial performance based on the 2-step system GMM method

VARIABLES	ROE	ROA	PB	ROE	ROA	PB
ROE(-1)	**0.1903*****			**0.1793*****		
	(361.3605)			(788.2661)		
ROA(-1)		**0.3770*****			**0.3789*****	
		(391.1253)			(495.0891)	
PB(-1)			**0.5000*****			**0.5054*****
			(65.3875)			(62.1527)
M&ANUM	**0.1814*****	**0.0016*****	**0.0189*****			
	(86.7112)	(14.8210)	(3.0871)			
M&AEXP				**-0.0050*****	-1.91E-06	-0.0002
				(-10.8770)	(-0.0967)	(-0.1566)
GOV SCORE	**0.0043*****	**-7.14E-05*****	**-0.0047*****	**0.0016*****	**-8.24E-05*****	**-0.0046*****
	(24.8329)	(-13.5007)	(-13.3656)	(29.6172)	(-30.6986)	(-15.1162)
LNSIZE	**-0.2692*****	**-0.0128*****	**-0.5670*****	**-0.0968*****	**-0.0124*****	**-0.5459*****
	(-24.8723)	(-17.3659)	(-10.5356)	(-12.9567)	(-42.8708)	(-10.6924)
EQTA	**5.6649*****	**-0.0639*****	**-3.3792*****	**7.5236*****	**-0.0584*****	**-2.9859*****
	(51.7431)	(-24.4713)	(-6.8158)	(482.1434)	(-26.7107)	(-6.9397)
NIM	**-1.0178***	**-0.1948*****	**-15.5740*****	**-1.7007*****	**-0.1937*****	**-14.2756*****
	(-1.9199)	(-12.0757)	(-10.2786)	(-7.3071)	(-22.2453)	(-8.7328)
LD	**-0.1623*****	**0.0026*****	**0.2743*****	**-0.1614*****	**0.0023*****	**0.2521*****
	(-7.8558)	(5.0416)	(9.0568)	(-18.0091)	(5.5503)	(7.5911)
LLP	**6.5108*****	**-0.1511*****	**4.2538*****	**3.6703*****	**-0.1458*****	**4.8340*****
	(53.8150)	(-44.0459)	(6.3528)	(143.6626)	(-42.2256)	(7.3054)
CIR	**-0.1008*****	**-0.0033*****	**-0.3123*****	**-0.1017*****	**-0.0032*****	**-0.2763*****
	(-9.1452)	(-24.6911)	(-4.9493)	(-36.8187)	(-23.9434)	(-5.1965)
NIIOPINC	**0.0057*****	**-2.47E-04*****	**0.0134*****	**0.0028*****	**-2.02E-04*****	**0.0156*****
	(6.3576)	(-7.5119)	(4.1674)	(9.8511)	(-9.5968)	(4.5617)
LOANSTA	**-1.9977*****	**-0.0214*****	**0.3499*****	**-2.0664*****	**-0.0236*****	**0.2975*****
	(-68.7096)	(-11.4259)	(4.5246)	(-125.7259)	(-22.3828)	(3.6077)
GDPANGR	**0.0212*****	**1.39E-04*****	**-0.0018****	**0.0204*****	**2.20E-04*****	-0.0011
	(30.6334)	(10.5532)	(-2.0104)	(125.6087)	(26.5748)	(-1.5315)
CRISIS	**-0.2908*****	**-0.0038*****	-0.0126	**-0.2589*****	**-0.0037*****	-0.0226

	(-43.3291)	(-25.8007)	(-0.7117)	(-156.2319)	(-55.1254)	(-1.5237)
Observations	682	682	682	682	682	682
S,E, of regression	0.9926	0.0168	0.4446	0.9397	0.0166	0.4350
J-statistic	51.6008	52.0915	59.1988	56.0192	51.2727	59.5351
Prob(J-statistic)	(0.3724)	(0.3924)	(0.1508)	(0.2283)	(0.3846)	(0.1439)
Instrument rank	62	62	62	62	62	62

Note: This table reports regression results obtained with the 2-step system GMM method. The dependent variable is bank performance which is proxied by ROE, ROA and the market value of the institution (PB). The definitions of all variables are provided in Table 2.1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. t-stats are reported in parentheses.

Concerning the results for the governance variable (GOV SCORE) appearing in both Tables 2.5 and 2.6, the results reveal that an increase in the governance quality of our sample's institutions are associated with either decreases in equity or increases in the size of these institutions but mostly funded by debt, as the opposite signs for the coefficient in the first two columns with ROE and ROA reveal. Therefore, better governance structures may allow them to operate with less costly equity and pack on more cheaper deposits or other sources of debt, which then may force their profitability. However, either positive or negative the effect on profitability is, advancements in governance levels are not perceived well by the markets. This may have as an explanation that the governance structures of firms are not the first things that investors consider when valuing those firms even though the improving of those structures entail the protection of their interests. Therefore, we lean more towards not being able to accept Hypothesis 2.3, as governance quality of our sample's institutions does not mostly appear to be associated with increased financial performance. Hence our finding seems to be more in accordance with the previous unfortunate findings of Goranova et al. (2017) and Schmidt (2015).

As for the other control variables, LNSIZE, NIM, and CIR present a significant and negative relationship with all performance measures. Thus, smaller institutions seem to perform better as also do the more efficient ones, but interesting results were found for NIM as the outcome of this variable states that more profitability coming from core activities means worse performance, which contradicts the common logic concerning

the way that financial institutions conduct their business. For the rest of the variables mixed results were reported. So, LLP appears with positive coefficients with ROE and PB and negative with ROA, while we would have expected that it would give only negative results with performance due to its use as a credit risk measure. Next, EQTA presents a positive coefficient with ROE and negative ones with ROA and PB, even though the anticipated outcome would be that higher levels of equity would technically reduce ROE.

Concerning the macro variables GDPANGR and CRISIS, they give, in general, the expected effects on performance, as booms in the economy (higher GDPANGR) and times of non-crisis (CRISIS is 0) are associated with better profitability.

2.5 Conclusion

This essay examined the impact of bank M&As on their governance quality and financial performance by using a sample of 72 European publicly listed acquiring financial institutions for the period 2008-2020. Specifically, we propose a new study to extend the knowledge on the ability of M&As to improve the corporate governance quality of financial institutions as well as their financial performance. This examination involves the turbulent period following the global financial crisis concerning which the weak governance quality of banks was considered the main causing factor and still many of them are thought to be falling behind the acceptable levels.

The empirical findings from the GMM estimation provided us with interesting and useful results. First, when we examine the effect of M&As on the governance quality of banks, we find that the governance quality of banks can be positively impacted by M&A transactions. However, any positive effect that may be found can become saturated when there is more accumulated previous experience of such deals, which is shown when we put this extra test into our analysis. Therefore, the tactics of constantly investing in sequential M&A deals as a means of improving governance (by using it as a disciplinary measure for managers as well as by employing the better corporate governance practices of the targets, restructuring their firms or any other effect on governance that M&As could have), is found to be not a panacea and it should be used with moderation.

Concerning the second level of the analysis where we test the direct effect of M&As on financial performance as well as the indirect effects through the merger induced changes in governance, the results are again revealing. Specifically, there is a clear direct positive impact of M&As on both accounting based and market-based measures of financial performance. These results remain when we test for multiple yearly deals but, they change to rather insignificant when there is a greater previous accumulated M&A experience. Thus, it seems that by engaging in multiple deals in a given year, banks, can keep increasing their performance, up to a given point of course, without them becoming saturated. However, saturation appears when we add to the tests the previous accumulated M&A experience for the period, as the previous beneficial effects are turning insignificant. When it comes to the examination of the indirect merger effect through the changes in corporate governance, the results reveal a rather more negative transferred impact, as the governance quality measure that appears to be positively affected by M&A transactions gives mostly negative results on performance and firm value. This is rather contradicting as, even though mergers that lead to better governance structures are considered to increase the value of their firms, they are not perceived well by the markets. This may rely on the fact that the governance structures may not be the first thing that investors look when deciding to invest in firms or if they do, they may have different standards on which structures consist good governance.

Overall, from the above results we can deduct that M&As have a significant impact and positive on the governance quality of European financial institutions but, they also fail to offer an indirect increase in profitability and firm value which is better acquired from the direct effect of the M&A transaction itself.

Our findings could have several significant policy implications for regulators and policymakers as well as academics and executives of financial institutions. Specifically, along with a new measure for measuring governance quality that relies on the main board characteristics of banks and their connection with multifactor performance, new evidence is given on what board structures consider good corporate governance. Also, the importance of M&As for the creation of good corporate governance quality that could lead to increased financial performance is highlighted. Thus, regulators and policymakers can use the above findings to rethink and restructure their standards and guidelines regarding the corporate governance of the institutions under their

jurisdiction. While also new knowledge is created for the further understanding by the academics of the impacts that M&As could have on financial institutions as well as for the assistance in the decision-making process for the executives of financial institutions who may consider these kinds of tactics as means to benefit their firms.

Essay 3

Some lessons from the collaboration between FinTech firms and European banks

3.1 Introduction

The financial services sector around the world is on a transitional period over the last couple of decades. While the incumbent financial institutions still remain the key players in the industry, the recent boom in the development of technologies such as artificial intelligence, big data, cloud computing, machine learning and blockchain, caused the exponential rise and spread of the relatively new financial technology (FinTech)[18] sector worldwide (Frame et al., 2019; Haddad and Hornuf (2023); Cornelli et al. (2023)).

Therefore, the ever-increasing pervasiveness and evolution of FinTech firms, is causing great headache to traditional banks. And they are not wrong to worry, as the developments that FinTechs have made in the way of executing the services that traditionally were offered by banks, can make those traditional players become obsolete and is even likely to edge out the traditional business model the majority of them have (Carbó-Valverde et al. (2021); Carlini et al. (2022); Collevecchio et al. (2024); Hodula (2023)). Specifically, their complete dependence to new technologies allows them to offer the same services faster, at lower cost, more adapted to the customers' needs and available 24/7 to even the most underbanked places in the world, while at the same time they face lighter regulation (CGFS & FSB (2017); IOSCO (2017)).

In Europe, the data on the rising volume of FinTech business are not lying. Specifically, the revenue of FinTechs between 2017-2023, measured in billion dollars, grew from 0.29 to 16.01 in the digital assets management sector, while in that of digital investments from 0.01 to 2.91. So, they experienced a 5421% and a 29000% increase accordingly. Also, a study by Mckinsey (2022) reported that European FinTechs in 2022

[18] For a complete definition of FinTech see FSB (2023) "FinTech." Updated on December 2023. https://www.fsb.org/work-of-the-fsb/financial-innovation-and-structural-change/FinTech/

had a total valuation of almost €430 billion which is more than the combined market capitalization of Europe's seven largest listed banks.

However, incumbents are not helpless in this fight, as their size, the years of experience and their established brand name that were built over the years, along with the distrust to the robustness of the newly formed FinTech business models allows them to defend their positions by increasing the entry barriers in the industry and retain a big part of the industry's market share (CGFS & FSB (2017)). Nevertheless, they cannot always rely on these characteristics, as this new way of conducting their business is imminent of turning them obsolete. So, they were forced to change the usual rigid and old ways they operate as well as get detached from the conservatism that characterizes the industry and try to adopt FinTech technologies (Klus et al. (2019); Hornuf et al. (2021)). Although, the fear of becoming obsolete is not the only and main driving force for incumbents to engage in FinTech, as the opportunity to seize even some of the benefits that FinTechs enjoy can be an even stronger motivating factor for them to restructure their business in order to integrate the new FinTech ways (Klus et al. (2019); Hornuf et al. (2021)).

The main ways for them to engage in FinTechs include a) In-house development, b) Investment in a FinTech firm, c) Collaboration with FinTechs, d) participation in a Joint FinTech program with other financial institutions or e) Lead such a program and f) M&As, with each choice entailing its pros and cons for the engaging institutions[19].

Following the above the purpose of this study is to examine whether M&As or any other form of collaboration with FinTechs are a good way for financial institutions not only to just survive the FinTech invasion but also, to seize the opportunities that the engagement in FinTech entails by realizing financial synergies. Specifically, by focusing on a sample of European financial institutions, we study the separate and chain impact of partnerships with FinTechs, on their market power, profitability and value, while controlling for bank-specific and macro-level characteristics.

One way that such partnerships can affect the above measures (market power and financial performance) is by the direct impact they have on them. However, as the

[19] For more elaboration on the matter refer to the article by EY (2017) "Unleashing the potential of FinTech in banking."

integration of FinTechs is a difficult process and requires most of the times a considerable amount of time to be spend[20], the anticipated synergies may arrive in the long run as a result of the restructuring of the incumbent financial institutions' line of business by adopting the technologies and more efficient business processes of FinTechs (Puschman (2017); Bomer and Maxin (2018); Hornuf et al. (2021); Huang and Wang (2023); Ruhland and Wiese (2023)). These changes in efficiency and the adding of the new innovative products to their portfolios may allow the incumbents to gain a competitive advantage over their competitors as well as reduce the existent number of these competitors, either by acquiring them or making them allies. Therefore, by having less competitive pressures they are able to impose higher mark-ups for their services and as a result increase their profitability and value (Rohm (2018); Murinde et al. (2022); Ruhland and Wiese (2023)).

Hence, the main focus of our study lies on the effect that M&As or any other form of partnerships with fintechs might have on the ability of European financial institutions to gain competitive advantages and impose higher markups and whether such effect might be translated to increased financial performance. To do so we collected data from a sample of 72 publicly listed financial institution from 21 European countries for the period 2008-2020 and on which we applied the 2-step system GMM method to extract our results.

Our main findings show that even though there is not a clear indication of competitive advantage gains and financial synergy creations that arrive directly from FinTech partnerships, initially, the indirect effect coming from giving the appropriate time and effort for the proper integration of FinTechs and the transition to more efficient structures as a result of the adopting of the FinTech ways, seems to be able to lead to the attainment of the desired results by financial institutions.

This paper contributes to the existing bank-FinTech partnership related literature in three ways. First, we extend the previous limited literature on bank-FinTech partnerships and fill this gap by offering also more current evidence on the matter that focuses on the European incumbent financial institutions for a period which included many radical changes for this financial industry. As the evolution of fintech has been

[20] For more on the difficulties of FinTech integration see EY (2022) "Why FinTech integration can be a challenge for financial institutions."

proven to be of great importance more evidence and specifically more focused evidence should be provided for the further understanding of this current phenomenon. Second, we explore the effect of such partnerships on the market power of financial institutions, which remains an important issue for their well-being as well as the sector's stability and which effect to our knowledge has not yet been examined in literature. So, our study comes to also fill another important gap. Third, unlike previous relevant studies we use a novel multilevel approach and examine individually as well as in a sequential connection, the effect of these deals on two interconnected different bank dimensions (market power and profitability, value), to obtain a more complete view on the benefits that bank-FinTech partnerships are able to offer to the financial institutions and industry in general, during this transitional period in the financial services sector that the rapid development and expansion of the financial technologies induced.

The remainder of this study is organized as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 describes the data and methodology. Section 4 discusses the empirical results. Section 5 concludes the essay.

3.2 Literature review

Even though there is an extensive literature on bank M&As, the part of them that examines those with FinTechs consists only a very small portion of them, given that these tech savvy intruders started to make their appearance more evident over the last few years. However, as FinTechs are becoming a keener topic of interest over the years the volume of studies on them begins to grow exponentially.

Nevertheless, we start by presenting evidence on a matter not yet examined in the bank-FinTech M&A literature.

3.2.1 Evidence on the effects of Bank M&As on competition and market power

A reason for financial institution to engage with FinTechs is their willingness to enhance their ability to impose higher prices for their services, commonly called market power,

as a result of adopting the more efficient business structures of FinTechs and adding their innovative cutting-edge products to their business lines.

However, evidence of changes in financial institutions' market power, as a result of engaging in deals with FinTechs, is not yet examined in literature. Nevertheless, the existing relative literature on the matter lies on two main hypothesis that mostly examine the indirect effect of M&As. The first one is called the Structure Conduct Performance (SCP) hypothesis (Mason (1939), Bain (1951)) which argues that increases in concentration, as a result of an increase in the industry's consolidation and the gathering of market shares to fewer banks, will result to decreased competition (increase in market power) and consequently elevated financial performance of the institutions who are able to seize this opportunity. While on the other hand, the Efficient Structure (ES) Hypothesis (Demsetz (1973), Peltzman(1977)) states that higher market shares as well as higher performance are a result of higher efficiency rather than the exploitation of market power opportunities to impose higher mark-ups (Christopoulos et al., 2021).

Concerning the SCP hypothesis, evidence was reported for the EU15 banking sectors over the period 2002-2012 by de Guevara and Maudos (2017), who, with the use of both the Lerner index and the Boone indicator, found that the mergers and acquisitions-oriented strategy followed in some countries to restructure the sector may have had a negative impact on competition and as a result gave the right to the remaining institutions to exploit this outcome to impose higher prices. While this result is also evident in ASEAN countries, as the similar study of Khan et al. (2017), with data covering the period 1995–2014, provides the relevant evidence for the existence of the hypothesis.

On the other hand, Efthyvoulou and Yildirim (2014) presented evidence closer to the ES hypothesis for their study on Central Eastern European banks as they reported no statistically significant relationship between concentration and competition, which are in line with the previous findings of Carbo-Valverde and Rodriguez-Fernandez (2007). While outside Europe, Rakshit and Bardhan (2019) also provided similar evidence for Indian banks.

However, studies not only give results for the indirect effect of mergers on competition and market power through the rise of concentration, but, even significantly more limited in volume, also on the direct effect that those deals had on the ability of acquiring banks to impose higher prices for their products and services.

On the ones that found an exercise of post-merger market power, Devos et al. (2016), found, for bank megamergers occurring between 1983-2014, market power gains, that rather emerge from the concentration of forces on a specific region that help build brandname and trust which can cause prices to be more anelastic. While evidence in line with the former are provided by Delis et al. (2016) who instead examines the entering into new markets and Kontonikas et al. (2022) for European bank M&As. However, Berger and Roman (2015) do not find that acquiring banks take advantage of the increased market power opportunities that a merger gives them, as they find no significant effect of mergers on market power of US banks.

Literature approaching the effects of bank-FinTech partnerships on market power comes from studies exploring the effects coming of innovation and trade openness.

Specifically, Lee et al. (2020) on European banks as well as Duygun et al. (2013) for UK ones and Beck et al. (2016) on a multicountry sample give evidence that financial innovation positively relates to competitive advantage gains of financial institutions. On the other hand, surprisingly there is evidence on the negative side of increased innovation and trade openness for banks, as Fukuyama et al. (2024) reports for Chinese banks that concerning the overall market power level, bank innovation does not show a significant impact, while trade openness has a significantly negative impact.

By keeping all the above results and arguments reported in the literature about the effects of increased consolidation and innovativeness on market power, we come to the following Hypothesis:

Hypothesis 3.1: Partnerships with FinTechs have a positive effect on banks' market power.

3.2.2 Evidence on the effects of Bank-FinTech M&As on performance

Even few in number, the evidence from the previous empirical research gives support to different effects on the performance of the involved institutions, although, the studies conducted, mostly focused on post announcement abnormal returns.

Most of them found that bank-FinTech M&As lead to negative results (Hornuf et al. (2021); Carlini et al. (2022); Cappa et al. (2022)), or that mixed results exist (Akhtar and Nosheen (2022)), while in others different results are reported for different characteristics of the parties in the deals (Collevecchio et al. (2024)). Specifically, Hornuf et al. (2021) found, by conducting an event study for banks located in four developed economies (Canada, France, Germany, and UK) between 2007 and 2017, that alliances with FinTech are value-reducing, which they argue might have as a potential explanation that in the future, banks might lose their relevance due to the growing number of innovation followers in the new financial ecosystem. While according results were reported by Cappa et al. (2022) and Carlini et al. (2022) in similar studies on European and US banks. While the study of Collevecchio et al. (2024) on financial institutions from USA, Canada, Europe, China and India during the period 2010-2018 reported different results for minority and majority acquisitions as well as between the different levels of bank sustainability, as measured by ESG, and the institutional environment of the acquirer. Also, varying results were reported by Akhtar and Nosheen (2022) who find different impact of FinTech deals on the different measures used for performance.

However, there are those who found different results between the short- and long-term period (Dranev et al. (2019)), or that while it does not affect performance it lowers risk (Austin and Dunham (2022)). Although, among them there is only one evidence clearly pointing to positive results obtained from deals (Kueschnig and Schertler (2024)). In the study of Dranev et al. (2019) on deals coming from financial institutions from USA, Canada, Europe, China and India, even though they found evidence that there are positive abnormal returns for the acquirers in the short term period, in the long run the deals with FinTechs fail to create additional value, which, as they argue, may be indicative of initial investors overreaction on FinTech M&A announcement. Insignificance is also evident in the study of Austin and Dunham (2022), in terms of higher Cash Flow Return or ROA but they present strong evidence that the risk profiles of acquirers significantly improve in the post-acquisition period. The only evidence we

came across that is clearly showing a positive outcome coming from bank-FinTech alliances is reported by Kueschnig and Schertler (2024) who found significant positive abnormal returns for US banks between 2006-2022, which, however, mostly derived from the first deals rather compared to the engagement in multiple deals and the previous built-up M&A experience.

Seeing all the above results and arguments found in the relevant literature, but mostly based on our own theoretical assumptions, as the volume of evidence on the relationship is limited, we come to the following Hypothesis:

Hypothesis 3.2: Partnerships with FinTechs have a positive effect on banks' performance.

3.2.3 Evidence on the effects of competition and market power on performance

Concerning the second scale of the SCP hypothesis, meaning the effect of decreased competition on performance as a result of merger induced increases in industry concentration, the theory suggests that this affect would be positive and beneficial for the remaining institutions who have the opportunity to exploit the higher market power created by these circumstances.

As a result of the European sovereign debt crisis and the greater consolidation that it caused in the European countries financial services sector the circumstances mentioned above arise, as competition is found to become suppressed (De Jonghe et al. (2016); de Guevara and Maudos (2017); Maudos and Vives (2019); Kontonikas et al. (2022)). So, it comes to the remaining financial institutions to decide whether to exercise the opportunity to impose higher mark-ups for their services or not.

Empirical evidence supporting the exploitation of this opportunity is provided by Angori et al. (2019) who found, by using the Lerner index, that the rise in the market power of EU banks, during the sovereign crisis in the region between 2008-2010, was able to partly counteract the direct negative effect that these troubled times and contracting loan growth rates had on traditional profitability. While in relevant studies Sun et al. (2017) for Islamic countries and Moudud-Ul-Huq (2021) for BRICS reported

evidence in line with the former by showing that banks in these countries who enjoy greater market power thanks to increased concentration, gain significantly higher NIMs.

On the other hand, some supported that even though the circumstances arise, financial institutions do not choose to exploit them and instead of the SCP hypothesis they lay more support on the ES hypothesis or even on the Quiet life hypothesis (Hicks (1935))[21]. For example, in the Chinese banking sector Tan (2016) as well as Dong et al. (2016) do not find support for the traditional SCP hypothesis. Specifically, Dong et al. (2016) for the period 2002-2013 even though they find that banks with greater market power (a larger Lerner value) are better at handling costs, a significantly negative relationship between the Lerner index and profit efficiency appeared, while Tan (2016) for the period 2003-2011 fails to find any robust impact of competition on Chinese bank profitability. Relative support on this matter is also provided by Koetter et al. (2012) and Chortareas et al. (2012) for the US and Latin American banking sectors respectively.

However, having less competition in the industry, which means greater ability for large banks to impose higher mark-ups (greater market power), may leave room for FinTechs and Bigtechs to enter strong in the industry. As argued by Cornelli et al. (2023), based on their obtained results from an international study, an increase in credit provided by FinTechs and big techs is anticipated when incumbent banking services are more expensive and they impose higher mark-ups, as less competition proxied by fewer bank branches per capita may lead to larger unmet or undermet demand. Although, when certain barriers such as more stringent regulation are present this result is reversed, and incumbent banks can be protected.

So, as soon as the EU banking industry is heavily regulated and there are high barriers for the entrance of new competitors in the industry, it is expected that higher concentration as well as the increased market power that may come with it are going to stay as they are for the years to come. Although, as history proved nothing is certain.

[21] The Quiet life hypothesis (Hicks (1935)) posits that even though banks enjoy higher market power, they incur inefficiencies rather than reap monopolistic rents thanks to the lack of motivation to try harder stemming from reduced competition.

By viewing all the above arguments and findings in the literature we are driven to the following Hypothesis:

Hypothesis 3.3: Market power has a positive effect on banks' financial performance.

3.3 Data and methodology

In this section we present an analysis of the data sample used in our empirical analysis, we offer a thorough description of the variables used and finally we describe the regression models that were constructed for the analysis.

3.3.1 Data sample

The prime source of M&A transactions as well as other firm- level measures, coming from accounting reports and market related data, examined in the present study is the LSEG Eikon database. The country specific data were obtained from the World Bank's Global Financial Development databank, ECB's SDW database and ESRB.

As we want to analyze the effect of M&As on European banks' capital the financial institutions included in our study presented the following criteria: i) be based and operating in a European country for the whole period 2008-2020 and ii) they have to be publicly listed. After considering those criteria, we finally come up with a sample of 72 European publicly listed financial institutions from 21 countries namely Belgium, Germany, Ireland, Greece, Spain, France, Italy, Cyprus, Netherlands, Austria, Portugal, Finland, UK, Switzerland, Sweden, Poland, Denmark, Hungary, Czech Rep., Norway, Russia.

From the final sample's 72 institutions we obtain data for their M&A transactions from LSEG Eikon's M&A database. In order for a partnership transaction to be included in the sample we pose the following additional conditions: i) the institution in the sample must not be the target, ii) the deals must be completed during the period 2008-2020, iii) the M&A transaction must entail either the acquisition, the joint venture, the investment or every other form of a collaboration with a financial technology (FinTech) firm. Where, as FinTechs we include firms that comply with the definition given by the Financial Stability Board (FSB (2023)). In order to make the distinction between Fintechs and other types of firms we follow Austin and Dunham (2022) and filter the sample by manually reading the targets' business descriptions, which must state that the

targets operate in both the technology and financial industries, in order to meet the definition given by the FSB (2023). For example, a financial institution is considered a FinTech if its business description includes also the development of a FinTech solution such as robo-advisors, or a technology firm is considered a fintech if they also develop technologies for the financial services industry. However, we do not pose any restrictions in the form of the deal, as we had to relax our requirements due to the small number of existing transactions, in order to obtain a number of observations that would allow a better statistical analysis, as any form of collaboration with a FinTech is probable to offer the appropriate changes to the involved, concerning the adoption of the FinTechs technologies and practices.

Therefore, after excluding all the deals that do not conform with the above criteria, we end up with a total of 301 M&A deals. Furthermore, after checking for errors and inconsistencies, we end up with a balanced panel of 806 bank-year observations.

3.3.2 Empirical model, methodology and variable description

Our econometric analysis is conducted with the use of the 2-step system GMM methodology proposed by Arellano and Bover (1995) and Blundell and Bond (1998). The system GMM methodology is considered to the most appropriate method for estimating dynamic panel data models, as it is able to address the problems of endogeneity that may arise between the dependent variables and the error terms. Also, to test the validity of the multiple lags as instruments and the reliability of our regressions, we calculate the Hansen/Sargan test.

We then present the models to be estimated with the GMM methodology. We construct two strands of models for the purposes of our research. The first strand is constructed for the purposes of examining the effect of mergers/collaborations with FinTechs on the ability of banks to impose higher mark-ups for their services (higher market power). The second strand is constructed in order to test, at the first level, the direct effects of M&As/collaborations with FinTechs on the banks' financial performance and at the second level indirectly through the changes M&As are found previously to induce on market power.

Starting with the testing of the relationship between mergers and market power levels, the equations have the following form.

Bank market power models

$$MP_{it} = a_0 + a_1 MP_{i(t-1)} + a_2 M\&A_{it} + a_3 X_{it} + a_4 M_{it} + \varepsilon_{it} \quad (3.1\alpha)$$

$$\Delta MP_{it} = a_0 + a_1 \Delta MP_{i(t-1)} + a_2 M\&A_{it} + a_3 X_{it} + a_4 M_{it} + \varepsilon_{it} \quad (3.1b)$$

MP_{it} represents the market power of our sample's financial institutions and specifically, their ability to impose higher markups for their services, followed the definition given by Carbo-Valverde and Rodriguez-Fernandez (2007), Delis et al. (2016), Berger and Roman (2015), Khan et al. (2017) and Kontonikas et al. (2022). This measure is proxied by the most commonly used index for market power, the Lerner index[22] (LERNER), for bank i and year t.

$MP_{i(t-1)}$ represents the first lag of the dependent variable and is used in order to test the significance of considering its past values, as they could be affecting the current ones, while also the coefficient a_1 represents the pace at which the dependent converges in the future (Carbo-Valverde and Rodriguez-Fernandez (2007)). As Berger et al. (2000) and Goddard et al. (2004) suggest, the financial services industry's information opacity, networking, and relationship lending cannot let competition function as in other industries. Therefore, these characteristics can maintain the market power levels of these firms (Delis et al. (2016)). However, this variable causes the problems of endogeneity due to its correlation with the error term (Nickell (1981)). Although it can be efficiently solved by the use of the 2-step system GMM method which can remove it by internally transforming the data (Roodman (2009); Ullah et al. (2018)).

Next, we transform model 3.1a into what is illustrated in model 3.1b by replacing the dependent with their yearly changes, meaning the difference of the variables at year t

[22] Despite the multi-product nature of banks, we calculated the aggregate index as it still remains popular in literature and it is proven to be able to give adequate results while the product related estimations are rarely used (Shaffer and Spierdijk (2020)). Also, it is worth mentioning that the index can be evaluated at the bank level and is unaffected by the composition of the investigated institutions' sample. (Bikker and Spierdijk (2017); Altunbas et al. (2023)).

and year t-1, in order to examine the effect of the dummy variable M&A described in Table 3.1, on the market power levels.

In both models 3.1a,b we use the following variables.

$M\&A_{it}$ stands for the fintech collaboration/M&A activity of financial institution i at year t, and is proxied by $M\&A_{it}$, $M\&ANUM_{it}$ and $M\&AEXP_{it}$, described on Table 3.1, which are used interchangeably in the model.

X_{it} represents a vector containing variables that control for bank specific characteristics in accordance with studies like Efthyvoulou and Yildirim (2014), Berger and Roman (2015), Delis et al. (2016) and Rakshit and Bardhan (2019).

Namely it contains the variables, cost to income (CIR) ratio, the tangible assets of banks (TANGIBLE ASSETS) and the number of employees (EMPLOYEES) in order to test for the structural changes brought by FinTechs due to the rationalization of procedures and resources, the net interest margin (NIM), the natural log of total assets (LNSIZE), the equity to assets ratio (EQTA), loan loss provision (LLP) and loans to deposits (LD), the loans to assets ratio (LOANSTA) and also following the model of Carbo-Valverde and Rodrıguez-Fernandez (2007) we include the measure for the profitability from fee based activities (FEE BASED ACTIV), the measure for interest rate risk (INTER RATE RISK) and the 5-bank asset concentration ratio (CONCENTRATION).

While, M_{it} is a vector of variables that controls for country level and macroeconomic factors and specifically we use the annual growth of GDP (GDPANGR) as the economic cycle may affect the competitive conditions and specifically to see if the macroeconomic environment of our sample's countries can be an explanatory factor for the differences in competition (Khan et al. (2017)), and a financial crisis dummy (CRISIS) in order to account for times of crisis in the institution's country that may have serious implication on the ability of banks to impose higher markups for their services.

Also, ε_{it} stands for the remaining disturbance term.

Then we present the last two models which are used to test the relationship between mergers and financial performance

Bank performance model

$$PERFORM_{it} = a_0 + a_1 PERFORM_{i(t-1)} + a_2 M\&A_{it} + a_3 MP_{it} + a_4 X_{it} + a_5 M_{it} + \varepsilon_{it} \quad (3.2\alpha)$$

$$\Delta PERFORM_{it} = a_0 + a_1 \Delta PERFORM_{i(t-1)} + a_2 M\&A_{it} + a_3 MP_{it} + a_4 X_{it} + a_5 M_{it} + \varepsilon_{it} \quad (3.2b)$$

$PERFORM_{it}$ represents the financial performance of our sample's financial institutions accounting for their book profitability as well as their market value followed the definition given by Akhtar and Nosheen (2022) and Austin and Dunham (2022). This measure is proxied first, by accounting based measures return on average equity (ROE), which is calculated on the average equity of the institutions at the beginning and the end of the year while and return on average assets (ROA) which is calculated on the average value of assets and second, in order to also account for the effects on the institutions' market value apart from its book profitability, we proxy the dependent by its price to book ratio (PB), as described in Table 1, for bank i and year t. Therefore, we differentiate from the vast majority of relevant studies who measure M&A performance through CARs (Dranev et al. (2019); Hornuf et al. (2021); Cappa et al. (2022); Carlini et al. (2022); Kueschnig and Schertler (2024)).

$PERFORM_{i(t-1)}$ represents the first lag of the dependent variables and is used in order to test the significance of considering its past values. Considering the past values of the dependent is important as there is the possibility that they could be affecting the current ones as well as to capture persistence over time, which is an important determinant of bank profitability and risk (Goddard et al. (2004); Liu and Wilson (2013); Efthyvoulou and Yildirim (2014)), while also the coefficient a_1 represents the pace at which the dependent converges in the future. In addition, the introduction of this variable also causes here endogeneity problems that can be again solved by the use of the 2-step system GMM.

Next, as in the previous models for capitalization, we transform model 3.2a into what is illustrated in model 3.2b by replacing the dependent with their yearly changes, meaning the difference of the variables at year t and year t-1, in order to examine the effect of the dummy variable M&A described in Table 3.1, on the performance levels.

In both models 3.2a,b we use the following variables.

Like the models constructed for the previous relationships we also use the variable M&A which stands for merger related variables and is proxied again by M&A, M&ANUM and M&AEXP which are used interchangeably in the model.

Also, for the purposes of examining the indirect effect of M&As on performance we add, in accordance with previous studies (Dong et al. (2016); Sun et al. (2017); Angori et al. (2019); Moudud-Ul-Huq (2020); Kontonikas et al. (2022)), the market power variable MP_{it}, which is proxied by the Lerner index, to find out whether the merger induced effect that might be found on this variable from the testing of the previous models 3.1a,b , has a significant effect on performance and as a result whether there could be a post-merger future effect.

X_{it} as in models 3.1a,b, represents a vector containing variables that control for bank specific characteristics in accordance with studies like Dranev et al. (2019), Akhtar and Nosheen (2022) and Carlini et al. (2022). Specifically, it contains the variables, cost to income (CIR) ratio, the tangible assets of banks (TANGIBLE ASSETS) and the number of employees (EMPLOYEES) in order to test for the structural changes brought by FinTechs due to the rationalization of procedures and resources, net interest margin (NIM), loans to assets ratio (LOANSTA), the natural log of total assets (LNSIZE), loan loss provision (LLP), loans to deposits (LD), the equity to assets ratio (EQTA), the non interest income to operating income (NIIOPINC).

And M_{it} is a vector of variables that control for country level and macroeconomic factors, specifically, the annual growth of GDP (GDPANGR) as institutions in countries with higher GDP growth are expected to make larger adjustments which could lead either way as, while on the one hand they are expected to have higher income and thus increased profitability, on the other hand they might choose to sacrifice those profits to invest so that they might gain more in the future which can, increase its value thanks to the expected increased future profitability (Hagendorff and Nieto (2015)). And also, we use a financial crisis dummy (CRISIS) which takes the value of 1 at times of crisis and 0 otherwise and is used in order to control for the effect of a crisis in the institution's country which can have serious implications for its profitability and value.

Also, ε_{it} stands for the remaining disturbance term.

Table 3.1: Definition of variables

VARIABLES	DEFINITIONS	SOURCES
DEPENDENT VARIABLES		
ROE	Return on average equity	LSEG Eikon
ROA	Return on average assets	LSEG Eikon
PB	Price to book ratio	LSEG Eikon
LERNER	Lerner index calculated by (P-MC)/P where P is the market price set by the bank and is proxied by the ratio of total revenues to total assets and MC is the firm's marginal cost which is calculated with the use of a translog cost function. The index ranges from 0 to 1 with 1 indicating a compete and ultimate market power by the bank, a complete absence of price competition and an inelastic market while 0 indicates the exact opposite so that the bank is operating on perfect competition. More details concerning the index can be found in the Appendix	LSEG Eikon and own calculations
MAIN INDEPENDENT VARIABLES		
M&A	Dummy variable taking the value 1 if the bank has engaged as an acquirer in a M&A deal and 0 otherwise	LSEG Eikon
M&ANUM	The annual number of mergers and acquisitions that the bank has engaged	LSEG Eikon
M&AEXP	The accumulated number of mergers and acquisitions up to a given year that the bank has engaged	LSEG Eikon
CONTROL VARIABLES		
CIR	Cost to income ratio	LSEG Eikon
NIM	Net Interest Margin	LSEG Eikon
EQTA	Total equity to total assets ratio	LSEG Eikon
LD	Loans to deposits	LSEG Eikon
LLP	Loan Loss Provisions	LSEG Eikon
LNSIZE	The natural logarithm of total assets	LSEG Eikon
LOANSTA	Loans to total assets	LSEG Eikon
NIIOPINC	Non-interest Income to Operating Income	LSEG Eikon
OTHER EXPENSE	Other Expense as a part of the non-core non-interest expense from banking activities	LSEG Eikon
TANGIBLE ASSETS	Net tangible assets	LSEG Eikon
EMPLOYEES	Number of employees in thousands	LSEG Eikon
CONCENTRATION	5-bank asset concentration index	World Bank Global Financial Development

FEE BASED ACTIV	The Boyd and Gertler (1994) estimator is a proxy of bank fee-based activities which is directly comparable with balance sheet assets. It is computed as ([fee income/total revenue fee income]. total bank assets).	LSEG Eikon and own calculations
INTER RATE RISK	Interest rate risk computed as the difference between the interbank market (three months) rate and the interest rate for customer deposits.	LSEG Eikon and own calculations
MACROECONOMIC VARIABLES		
GDPANGR	Gross domestic product annual growth	World Bank Global Financial Development
CRISIS	Dummy variable taking the value 1 if at a given year a country is under a crisis and 0 otherwise	ESRB

3.3.3 Summary statistics

Table 3.2 shows the descriptive statistics for the full sample of European financial institutions between 2008-2020. Starting with the financial performance measures we observe that average book profitability, as measured by ROE and ROA, stand at relatively low levels as they take the values of 2.4% and 0.5% respectively, even though they fluctuate over a large range. While the mean market valuation (PB) stands at about 90% of our sample's financial institutions assets. Therefore, as a result mainly coming from the European credit crisis, there seemed to be a problem with the ability of European financial institutions to generate enough and steady income relative to their size and as a natural consequence this may have led to their undervaluation. Also, the statistics of the market power measure LERNER rather show that on average European financial institutions had limited ability of imposing higher mark-ups. This result is also explained by the crisis, but as previous studies showed, started to pick up following the recovery of the financial sector (De Jonghe et al. (2016); de Guevara and Maudos (2017); Maudos and Vives (2019)). For M&A deals and starting with the dummy variable M&A, we can see that in only 21% of the observations there is at least one reported deal with a FinTech, and as seen in M&ANUM only an average of 0.34 deals

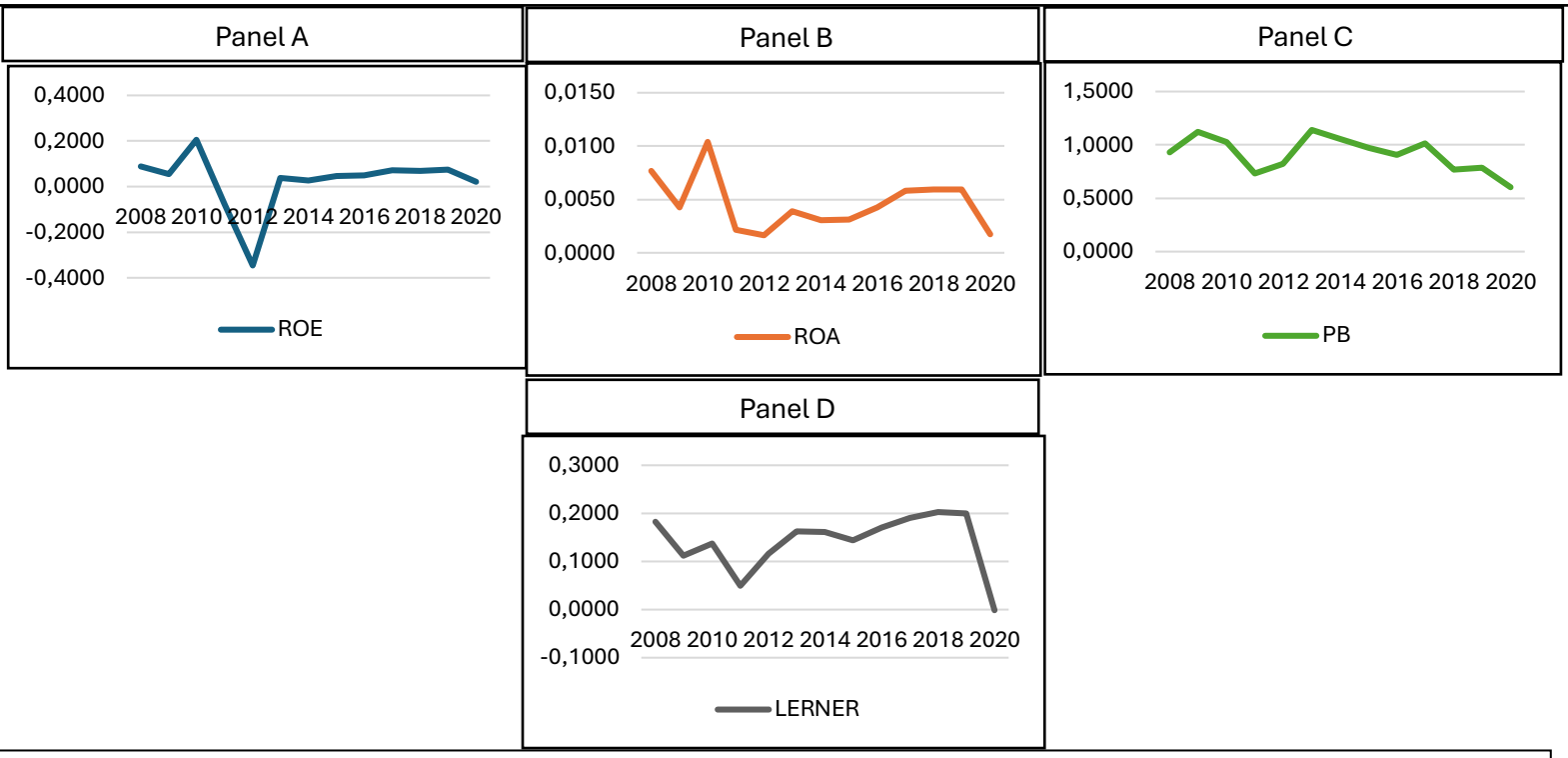
per year are reported for the period. This result is logical as the FinTech firms are not around for a long time and their integration entails difficulties for financial institutions.

Table 3.2: Summary statistics of the full sample

VARIABLES	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
DEPENDENT VARIABLES						
ROE	0.0244	0.0693	11.5038	-17.4089	0.9452	806
ROA	0.0046	0.0043	0.3104	-0.1237	0.0193	806
PB	0.9138	0.79	5.56	-2.1421	0.5946	806
LERNER	0.1406	0.1906	1.8578	-5.5684	0.3250	806
MAIN INDEPENDENT VARIABLES						
M&A	0.2134	0	1	0	0.4099	806
M&ANUM	0.3734	0	6	0	0.9003	806
M&AEXP	2.0409	0	34	0	3.8874	806
CONTROL VARIABLES						
CIR	0.7476	0.6665	25.1	0.051	0.9299	806
NIM	0.0226	0.0177	0.5580	0.0028	0.0282	806
EQTA	0.0742	0.0643	0.2881	-0.0420	0.0392	806
LD	1.0315	0.89	32.0150	0.0670	1.4005	806
LLP	0.0104	0.0066	0.1057	-0.0146	0.0128	806
LNSIZE	11.8212	11.7117	14.7369	6.8564	1.6307	806
LOANSTA	0.5616	0.5873	0.8793	0.0200	0.1570	806
NIIOPINC	0.7434	0.815	26.77	-281.11	10.1913	806
OTHER EXPENSE	4569.655	1009.55	64954	-80	8759.502	806
TANGIBLE ASSETS	2962.501	893.5	34262	14	4885.147	806
EMPLOYEES	46.9781	17.873	330.677	0.613	63.3025	806
CONCENTRATION	79.9966	80.0049	100	29.9383	12.8343	806
FEE BASED ACTIV	316897.4	54429.96	4106781	-163224.1	622368.3	806
INTER RATE RISK	-0.0155	-0.0124	0.0289	-0.4428	0.0200	806
MACROECONOMIC VARIABLES						
GDPANGR	0.6718	1.3957	24.3704	-11.3254	3.7246	806
CRISIS	0.4131	0	1	0	0.4927	806

Figure 3.1 shows the yearly evolution of the dependent variables. The crisis effect is clear in all variables depicted in Panels A through C, as proceeding the big upwards spike just before the year 2010 when the crisis reached Europe, a steep decline in all performance measures as well as the market power one in Panel D is observed. However, there was a quick recovery, as the following year again a pattern is observed in all measures and an upwards trajectory is evident.

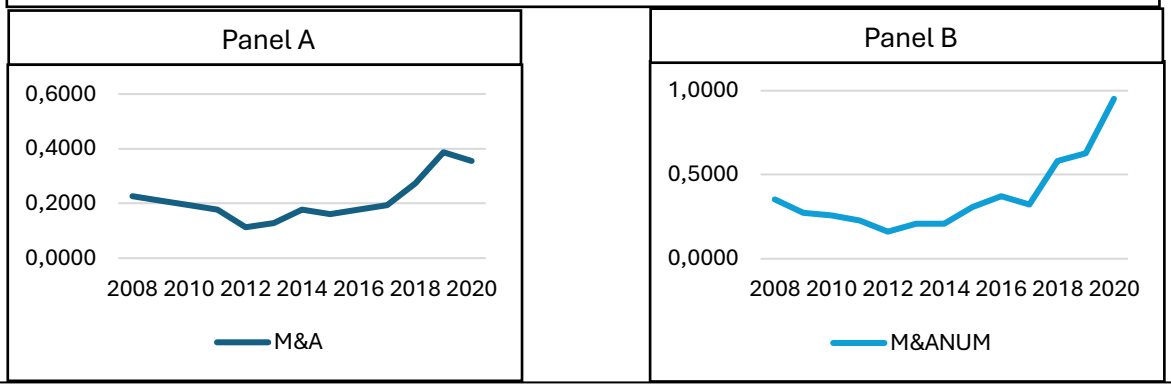
Figure 3.1: Mean of dependent variables per year



Source: Authors own calculations based on data obtained from LSEG Eikon database

Proceeding to Figure 3.2 we can see the yearly change in the average M&A activity of our sample. Both the M&A dummy variable and the average yearly number of those deals follow the same pattern as our dependent variables and clearly show a decline in merger activity following the coming of the credit crisis in Europe. Although the alliances with FinTechs from that low point followed a rather exponentially rising upwards trajectory which goes hand in hand with the evolution and the spread of the FinTech across the markets.

Figure 3.2: Mean of merger related variables per year



Source: Authors own calculations based on data obtained from LSEG Eikon deals screener database

3.4 Empirical results of the econometric analysis

3.4.1 Econometric analysis using the 2-step system GMM method for the relationship between M&A activity with FinTechs and market power

The GMM estimation results on equations 3.1a,b are presented on Table 3.3. Regarding the results in the regression with LERNER we can clearly see that FinTech M&A activity, as proxied by the M&A dummy, mostly comes from institutions with higher market power as shown by the positive and significant coefficient on that variable. However, when examining the effect of this merger activity as presented in the regression with ΔLERNER, we observe that FinTech M&A activity drives down the market power of institutions and specifically by about 0.18, with the results being significant at the 1% level. Therefore, based on this result we come to initially reject Hypothesis 3.1 by showing that, even though the collaboration with a FinTech is made mainly for the reasons of gaining a competitive advantage that would give them the ability to charge more for their services, this is not evident in the results, keeping in line with previous studies like that of Berger and Roman (2015).

Table 3.3: Empirical results for the effect on market power based on the 2-step system GMM method

VARIABLES	LERNER	ΔLERNER
ΔLERNER(-1)		**-0.2805***** (-56.4491)
LERNER(-1)	**0.1379***** (29.9874)	

M&A	**0.0379*** **	**-0.1344*** **
	(7.0650)	(-19.7382)
TANGIBLE ASSETS	-2.21E-06	**6.39E-06***
	(-0.9948)	(1.9163)
EMPLOYEES	**-0.0010***	**-0.0050*** **
	(-1.8445)	(-8.0486)
CONCENTRATION	**0.0038*** **	**0.0179*** **
	(8.7245)	(22.3506)
INTER RATE RISK	**-5.3603*** **	**-10.2999*** **
	(-12.5362)	(-8.8774)
FEE BASED ACTIV	**-8.35E-08****	2.95E-09
	(-2.4946)	(0.1977)
LNSIZE	**-0.0316*** **	**-0.2331*** **
	(-3.2459)	(-11.0280)
CIR	**-0.2417*** **	**-0.2354*** **
	(-91.6518)	(-78.6269)
EQTA	**-0.3212*** **	**-4.1714*** **
	(-3.8975)	(-33.3352)
LOANSTA	**-0.1923*** **	**-1.1956*** **
	(-5.9033)	(-10.1111)
LD	**-0.0928*** **	**0.3585*** **
	(-6.4735)	(6.1558)
LLP	**-5.6080*** **	**2.0294*** **
	(-34.9478)	(8.7011)
NIM	**3.2856*** **	**20.4000*** **
	(5.0927)	(13.7625)
GDPANGR	**0.0037*** **	**0.0135*** **
	(15.2434)	(26.5804)
CRISIS	**-0.0419*** **	**-0.1771*** **
	(-8.1318)	(-15.6246)
Observations	682	682
S,E, of regression	0.1453	0.2821
J-statistic	50.3258	45.5533
Prob(J-statistic)	(0.3062)	(0.4908)
Instrument rank	62	62

Note: This table reports regression results obtained with the 2-step system GMM method. The dependent variable is bank market power which is proxied by the Lerner index. The definitions of all variables are provided in Table 3.1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. t-stats are reported in parentheses.

At the next stage of the analysis, we add the yearly number of deals (M&ANUM) as the main independent variable, with the results of the regressions shown in Table 3.4. Unlike what is reported in Table 3.3, the effect of multiple yearly collaborations with FinTechs appears to be significantly beneficial for the engaging financial institutions market power. Thus, the institutions that engage in more collaborations with FinTechs seems to foster their ability to benefit from imposing higher mark-ups. However, the above are again reversed if we examine the third merger related variable (M&AEXP). The results of the regressions also shown on Table 3.4, accordingly indicate that institutions that have more experience in FinTech partnership lose market power, as shown by the significant and negative coefficient of M&AEXP. Hence, unlike the first merger related variable (M&A), more mergers in one year (M&ANUM) if not accompanied by an increased amount of previously accumulated deals (M&AEXP) for the period seem to be more in line with the results previously reported by studies like the ones of Delis et al. (2016) and Kontonikas et al. (2022) who also found the beneficial direct effect of M&As on market power. So, we are only able to accept Hypothesis 3.1 when the above conditions are met. However, based on the above contradictions, it seems more likely that other factors than the instant effect of partnerships with FinTechs are able to better explain changes in market power.

Table 3.4: Empirical results for the effect on market power based on the 2-step system GMM method

VARIABLES	**LERNER**	
LERNER(-1)	**0.1432*** **	**0.129567*** **
	(37.3952)	(34.9182)
M&ANUM	**0.0281*** **	
	(10.0526)	
M&AEXP		**-0.0131*** **
		(-4.7676)
TANGIBLE ASSETS	**-6.63E-06*** **	**8.83E-06*** **
	(-2.8460)	(3.3877)

EMPLOYEES	**-0.0008***	**-0.0018****
	(-1.7606)	(-5.2471)
CONCENTRATION	**0.0035****	**0.0037****
	(11.2856)	(10.3627)
INTER RATE RISK	**-5.3737****	**-5.1552****
	(-13.1581)	(-12.2122)
FEE BASED ACTIV	**-7.39E-08****	**-4.47E-08****
	(-2.8655)	(-2.1877)
LNSIZE	**-0.0340****	-0.0175
	(-3.0311)	(-1.5185)
CIR	**-0.2401****	**-0.2414****
	(-125.7229)	(-93.8547)
EQTA	**-0.3867****	**-0.1695****
	(-5.2306)	(-2.6908)
LOANSTA	**-0.1979****	**-0.14679****
	(-5.7532)	(-4.1658)
LD	**-0.0920****	**-0.1179***
	(-5.1306)	(-6.8790)
LLP	**-5.6131****	**-5.7446****
	(-40.7996)	(-34.5324)
NIM	**3.0954****	**4.2449****
	(4.9662)	(7.1314)
GDPANGR	**0.0041****	**0.0028****
	(15.6117)	(19.4295)
CRISIS	**-0.0377****	**-0.0566****
	(-8.6680)	(-13.2745)
Observations	682	682
S,E, of regression	0.1465	0.1469
J-statistic	52.5186	52.0370
Prob(J-statistic)	(0.2361)	(0.2505)
Instrument rank	62	62

Note: This table reports regression results obtained with the 2-step system GMM method. The dependent variable is bank market power which is proxied by the Lerner index. The definitions of all variables are provided in Table 3.1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. t-stats are reported in parentheses.

Regarding the control variables, with their results appearing on Tables 3.3 and 3.4, we find initially evidence for the existence of the SCP hypothesis (Mason (1939), Bain (1951)) as a positive relationship with market power seems to exist with CONCENTRAION. Therefore, the institutions in our sample seem to benefit from the decreased competition as a result of the increase in the consolidation of the European banking sector (de Guevara and Maudos (2017); Khan et al. (2017)). While analogous expected positive and negative relationships are evident for the profitability coming from core activities as proxied by NIM and the level of provisions for bad loans (LLP) respectively. However, it appears that the benefits coming from adopting the business structures of FinTechs, meaning a decrease in tangible assets (TANGIBLE ASSETS), the number of employees (lower EMPLOYEES) and the transition to more agile structures (lower LNSIZE) as well as the change to more efficient procedures (lower CIR), appear to add a competitive advantage and increase the market power of financial institutions as shown by the coefficients of the relevant variables in the regressions.

As for the macro variables we can see that booms in the economy (positive GDPANGR) and times when no crisis is evident (negative CRISIS) are linked with increased market power.

3.4.2 Econometric analysis using the 2-step GMM method for the relationship between M&A activity with FinTechs and financial performance

In Table 3.5 we see the GMM estimation results for equations 3.2a,b that test the relationship that may exist between the partnership with FinTechs and the incumbents' financial performance. Beginning with the regressions where the financial performance measures ROE, ROA and PB are the dependent variables, we see that the results for the main independent variable, proxied initially by the M&A dummy, have a clear negative link with all the above performance measures. Hence, institutions with worse accounting as well as market-based performance, are the ones who partner mostly with FinTechs, which is logical as they may be more in need of finding alternative ways to increase their profitability and value which may be found in FinTechs.

While when we move to the examination of the changes that such partnerships may cause on the book profitability and value of the incumbents, by adding the yearly changes of the dependent (ΔROE, ΔROA, ΔPB), we observe one contradiction in the results. Indeed, as the results on Table 3.5 show, even though partnerships with FinTechs, as proxied first by the M&A dummy (M&A), appear to have a significant positive effect on ROE (ΔROE), the inverse is observed for the one on ROA (ΔROA). However, even though the results on book profitability are rather mixed, the ones on market value are more straightforward as the effects on PB (ΔPB) appears significant and positive. Although, even the effect on financial performance leans more towards the positive side, we cannot accept initially Hypothesis 3.2 with absolute certainty.

Table 3.5: Empirical results for the effect on financial performance based on the 2-step system GMM method

VARIABLES	ROE	ROA	PB	ΔROE	ΔROA	ΔPB
ΔROE(-1)				**-0.3303*** **		
				(-35.1402)		
ΔROA(-1)					**-0.0709*** **	
					(-25.5932)	
ΔPB(-1)						**-0.1863*** **
						(-32.6775)
ROE(-1)	**0.1784*** **					
	(363.6252)					
ROA(-1)		**0.3722*** **				
		(-46.5824)				
PB(-1)			**0.5289*** **			
			(35.1540)			
M&A	**-0.0784*** **	**-0.0143*** **	**-0.2439*** **	**0.3252*** **	**-0.0490*** **	**0.0358***
	(-5.0418)	(-46.5824)	(-8.3566)	(10.5944)	(-18.1512)	(1.6756)
LERNER	**1.6864*** **	**0.0404*** **	**0.6223*** **	**2.5263*** **	**0.0650*** **	**0.6266*** **
	(172.0629)	(27.6327)	(5.0112)	(83.2163)	(16.8460)	(6.0598)
LNSIZE	**-0.0891*** **	**-0.0126*** **	**-0.5822*** **	**0.3020*** **	**-0.0153*** **	**-0.3072*** **
	(-6.0058)	(-11.8931)	(-8.0824)	(11.9248)	(-5.3668)	(-3.6848)
EQTA	**6.1862*** **	**-0.0741*** **	**-3.5398*** **	**-5.2425*** **	**-0.1009*** **	**-2.5056*** **
	(69.8814)	(-8.6878)	(-4.5035)	(-30.4046)	(-6.7948)	(-4.3955)
LD	**-0.0958*** **	**0.0037*** **	**0.2786*** **	-0.1031	**-0.0147** **	0.0459
	(-2.9526)	(3.504595)	(4.3836)	(-1.6406)	(-2.3588)	(0.3313)

LLP	**14.8721*** **	**0.1741*** **	**8.8052*** **	**34.4760*** **	**0.8627*** **	**16.0994*** **
	(123.6126)	(7.0865)	(5.5962)	(188.3216)	(19.1406)	(11.1429)
CIR	**0.3064*** **	**0.0064*** **	**-0.1209***	**0.5793*** **	**0.0116*** **	-0.0931
	(22.3367)	(15.3073)	(-1.7574)	(68.5742)	(13.214)	(-1.3637)
LOANSTA	**-1.8897*** **	**-0.0080*** **	0.1909	**-3.9793*** **	**0.1067*** **	0.3596
	(-35.1402)	(-3.2209)	(0.8877)	(-37.1009)	(8.6332)	(1.6516)
NIIOPINC	**-0.0046*** **	**-0.0005*** **	**0.0096** **	**-0.0119*** **	**-0.0008*** **	**0.0130*** **
	(-4.5435)	(-3.2209)	(2.2212)	(-8.8687)	(-4.5764)	(2.9290)
NIM	**-2.9991*** **	**-0.2403*** **	**-11.8473*** **	**11.0896*** **	**-0.7154*** **	**-15.0906*** **
	(-4.0470)	(-8.6568)	(-4.6609)	(11.8309)	(-7.9991)	(-5.4367)
OTHER EXPENSE	-1.04E-05	1.04E-08	**2.34E-05** **	-9.33E-06	5.73E-07	**1.42E-05** **
	(-1.5048)	(0.0266)	(2.1034)	(-0.9659)	(1.2325)	(2.0321)
TANGIBLE ASSETS	-1.64E-06	**1.22E-06*** **	1.31E-05	**-2.85E-05***	**3.12E-06*** **	5.12E-06
	(-0.1166)	(2.7531)	(0.9830)	(-1.7488)	(4.4978)	(0.5446)
EMPLOYEES	**0.0041*** **	**-0.0001***	-0.0012	0.0014	**-0.0002** **	0.0001
	(4.9173)	(-1.9802)	(-0.4435)	(1.4580)	(-2.1740)	(0.0897)
GDPANGR	**0.0222*** **	**0.0002*** **	**-0.0044** **	**0.0372*** **	**-0.0008*** **	**-0.0051** **
	(49.6154)	(9.2395)	(-2.2613)	(51.4442)	(-11.6764)	(-2.3427)
CRISIS	**-0.2299*** **	**-0.0036*** **	-0.0095	**-0.3820*** **	**-0.0031*** **	**0.0527*** **
	(-46.5824)	(-12.8188)	(-0.3921)	(-49.1464)	(-3.4549)	(3.0883)
Observations	682	682	682	682	682	682
S,E, of regression	0.9339	0.0173	0.4307	1.2820	0.0295	0.4605
J-statistic	49.2837	42.4009	52.7277	43.4376	49.9133	53.5310
Prob(J-statistic)	(0.3432)	(0.6237)	(0.2300)	(0.5801)	(0.3205)	(0.2076)
Instrument rank	62	62	62	62	62	62

Note: This table reports regression results obtained with the 2-step system GMM method. The dependent variable is bank performance which is proxied by ROE, ROA and the market value of the institution (PB). The definitions of all variables are provided in Table 3.1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. t-stats are reported in parentheses.

Moving to the next step of the analysis, we try to examine the effects of multiple yearly deals as well as those of the previous accumulated deals experience for the period, by adding M&ANUM and M&AEXP respectively, as main independent in the regressions. The results of these regressions appearing in Table 3.6 show that even though the effects on ROE and ROA remain when incumbents add more partnerships in a year with FinTechs, those on the market value (PB) reverse. As a result, when adding more deals

with FinTechs in one year these extra deals appears to not being perceived well by the markets and the incumbents seem to rather lose than gain in value. While the effects change even more when there is a previous accumulated number of deals with FinTechs (M&AEXP) as, if we exclude the effect on ROA that stays negative, the other effects turn insignificant any positive or negative effect that may come from such partnerships and consequently saturation is evident.

Therefore, the above results seem to be more in line with the ones reported by Kueschnig and Schertler (2024) who find value creation only for the first deals with FinTechs and insignificant response for the subsequent ones. So, again Hypothesis 3.2 cannot be accepted.

Table 3.6: Empirical results for the effect on financial performance based on the 2-step system GMM method

VARIABLES	ROE	ROA	PB	ROE	ROA	PB
ROE(-1)	**0.1787*** **			**0.1782*** **		
	(261.2290)			(296.0030)		
ROA(-1)		**0.3673*** **			**0.3656*** **	
		(259.4775)			(1009.537)	
PB(-1)			**0.5330*** **			**0.5378*** **
			(-14.9426)			(52.3085)
M&ANUM	**0.0374*** **	**-0.0031*** **	**-0.0921*** **			
	(3.5923)	(-6.3667)	(-5.4172)			
M&AEXP				-0.0055	**-0.0004** **	0.0087
				(-0.8512)	(-2.4072)	(0.9349)
LERNER	**1.6377*** **	**0.0355*** **	**0.6213*** **	**1.6439*** **	**0.0338*** **	**0.4857*** **
	(111.2276)	(67.3614)	(4.5853)	(144.0710)	(93.9904)	(4.6795)
LNSIZE	**-0.1142*** **	**-0.0148*** **	**-0.5545*** **	**-0.0924*** **	**-0.0150*** **	**-0.6102*** **
	(-4.5594)	(-18.9989)	(-7.4593)	(-6.4698)	(-36.9738)	(-7.4270)
EQTA	**6.0170*** **	**-0.0781*** **	**-3.6363*** **	**6.0859*** **	**-0.0771*** **	**-3.6010*** **
	(80.1680)	(-15.4520)	(-5.7898)	(85.9420)	(-30.7131)	(-5.1823)
LD	**-0.0955*** **	**0.0052*** **	**0.2910*** **	**-0.1123*** **	**0.0050*** **	**0.2768*** **
	(-2.8891)	(9.7701)	(4.3737)	(-3.4795)	(16.9834)	(5.9266)
LLP	**14.2414*** **	**0.1483*** **	**9.1699*** **	**14.4136*** **	**0.1304*** **	**7.9976*** **
	(115.7656)	(13.3631)	(5.2441)	(115.8831)	(23.4301)	(5.4391)
CIR	**0.2993*** **	**0.0051*** **	-0.1186	**0.2973*** **	**0.0047*** **	**-0.1539** **
	(26.9004)	(14.6837)	(-1.3879)	(39.1078)	(27.0450)	(-2.3134)

LOANSTA	**-1.8888*** **	**-0.0097*** **	0.1941	**-1.9111*** **	**-0.0132*** **	0.2796
	(-33.7203)	(-7.1797)	(0.9379)	(-35.3476)	(-20.4460)	(1.6232)
NIIOPINC	**-0.0040*** **	**-0.0004*** **	0.0048	**-0.0043*** **	**-0.0003*** **	**0.0109*** **
	(-4.0282)	(-5.1627)	(1.1734)	(-4.5125)	(-14.6415)	(2.8487)
NIM	**-4.3270*** **	**-0.3222*** **	**-12.838*** **	**-2.9430*** **	**-0.3030*** **	**-13.7801*** **
	(-4.3362)	(-18.4220)	(-5.7570)	(-3.5392)	(-29.4718)	(-5.0328)
OTHER EXPENSE	**-1.44E-05***	7.69E-08	2.16E-05	**-1.05E-05***	1.69E-07	1.78E-05
	(-1.8544)	(0.4267)	(1.6620)	(-1.7889)	(1.5603)	(1.5218)
TANGIBLE ASSETS	-1.11E-05	**9.82E-07*** **	**1.77E-05***	-1.3E-05	**6.41E-07*** **	-2.89E-06
	(-1.1781)	(3.1965)	(1.6825)	(-0.1978)	(4.4016)	(-0.2714)
EMPLOYEES	**0.0054*** **	**-4.26E-05***	-0.0016	**0.0042*** **	-6.71E-06	3.22E-05
	(9.4567)	(-1.8903)	(-0.7997)	(9.9299)	(-0.4187)	(0.0178)
GDPANGR	**0.0231*** **	**0.0003*** **	**-0.0050*** **	**0.0223*** **	**0.0003*** **	-0.0022
	(33.7841)	(11.9921)	(-3.2731)	(43.2917)	(21.0452)	(-1.4383)
CRISIS	**-0.2111*** **	**-0.0032*** **	0.0068	**-0.2382*** **	**-0.0035*** **	0.0276
	(-42.0788)	(-14.9426)	(0.2986)	(-66.8589)	(-25.5126)	(1.2605)
Observations	682	682	682	682	682	682
S,E, of regression	0.9379	0.0164	0.4150	0.9361	0.0163	0.4169
J-statistic	53.7804	43.7237	52.1369	53.1554	51.0812	55.4401
Prob(J-statistic)	(0.2009)	(0.5680)	(0.2475)	(0.2179)	(0.2808)	(0.1605)
Instrument rank	62	62	62	62	62	62

Note: This table reports regression results obtained with the 2-step system GMM method. The dependent variable is bank performance which is proxied by ROE, ROA and the market value of the institution (PB). The definitions of all variables are provided in Table 3.1. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. t-stats are reported in parentheses.

The above differences in the effects on value, where the initial positive results inverse or become saturated by sequential deals, can be an evidence for the existence of a signaling effect (Spence (1978); Kueschnig and Schertler (2024)), as investors may start to buy the stocks of the bank after the deal with a FinTech because they perceive the partnership as a signal of future, over the ordinary, increases in earnings, due to the positive changes inflicted by the adoption of the FinTech practices by the incumbent. While, then every other relevant deal that follows, is perceived as any other conventional deal and no significant or even negative changes in the market value might be observed (Kueschnig and Schertler (2024)).

Unlike the differential direct effect of M&A activity on financial performance the results are more straightforward for the impact of market power as proxied by LERNER. As shown in the regression on Tables 3.5 and 3.6, the coefficients for LERNER appear positive and significant for all financial performance measures, either they measure book profitability (ROE, ROA) or market value (PB), remaining in line with the majority of previous relevant studies (Sun et al. (2017); Angori et al. (2019); Moudud-Ul-Huq (2020); Kontonikas et al. (2022)). So, consequently, we are able to provide full support for the SCP hypothesis, as institutions who seize the opportunity coming from decreased competition, as a result of the increased consolidation in the sector, are able to impose higher mark-ups for their services and gain in profitability and value. So, we come to fully accept Hypothesis 3.3. However, based on the results found in Tables 3.3 and 3.4, we do not find a clear indirect effect of FinTech M&A activity on performance through the merger induced impact on market power. But it seems more likely that this effect would appear in the long time by the other factors found to affect market power and may arise from the changes that specifically a partnership with FinTech might induce.

Regarding the control variables, we observe that LNSIZE appears with negative signs with all performance measures. Hence, economies of scale by increases in size do not seem to work for institutions in the sample, which however, can be achieved by FinTech technologies who offer easier scalabilities with parallel reductions in size. While unexpectedly, higher NIM also seems to be linked with decreased performance. This may indicate that specializing more in traditional activities may weaken the ability of the institutions to earn from other resources or even weaken their will and ability to learn about new ways of conducting their business and explore new sources of income. Unexpected results were also found for LLP, as, unlike what common logic dictates for financial institutions, the variable appears to have a positive relationship with all performance measures. Regarding the rest of the control variables, we observe that higher equity levels (EQTA) and decreased tangible assets are not valued well by the markets as they lead to lower PB, while interestingly lower loan levels (LOANSTA), lower non-interest incomes (NIIOPINC) and lower efficiency (CIR) is associated with higher book profitability (ROE, ROA). As for the macro variables no surprises are evident as booms in the economy (higher GDPANGR) and times of non-crisis (CRISIS is 0) are associated with better profitability.

3.5 Conclusion

In this essay we investigated the impact that M&As or other forms of collaborations with FinTech firms could have on the market power and performance of incumbent financial institutions by using a sample of 72 European publicly listed financial institution for the period 2008-2020. Specifically, we proposed a new study to fill the gaps, extend as well as give more current evidence to the limited literature on bank-FinTech partnerships and their ability to be used by financial institutions as a tool not just to improve their financial performance but, to achieve this by gaining a competitive advantage that the cutting edge technology developed by FinTech firms can give them and can result to the increasing of their market power and their ability to impose higher mark-ups for their services.

The empirical findings from the GMM estimations provide us with interesting as well as contradicting results. First, when we examine the effect of M&As/collaborations with FinTechs on the financial institutions' market power, we find that, the institutions who engage in at least one such deal in a given year, are experiencing a reduction in their market power compared to those that did not. However, when we test for multiple yearly deals and for the previous accumulated experience of such partnerships, the results reverse and show a significant improvement in market power of institutions that engage in more deals in a year, but with the condition that they have limited previous accumulated experience on such deals that can turn this effect again negative. However, the effect on market power appears to be provided though different channels by the improvements in other critical dimensions of the incumbents. Indeed, a clear improvement in market power is inflicted by increases in efficiency as well as transitions to more efficient business structures, which are some of the long-term benignant powers that the adoption of FinTech technologies and structures can offer. This result may have an explanation on the difficulties that such deals entail for financial institutions, as the integration of such firms as well as the transition to the new systems needs a lot of effort and time thanks to the differences in culture and business structures that exist between banks and FinTechs. As a result, the incumbents by engaging in such partnerships must keep due diligence and be eager to sacrifice the appropriate time which could help them better address these difficulties and gain the advantages that FinTechs have to offer.

Concerning the second level of analysis where we explore the direct effect of partnerships with FinTechs on the financial performance of financial institutions as well as the indirect through the changes they may induce to market power, the results we obtain are again not that straightforward. Specifically, even though returns on equity appear to improve, the reverse happens for the ones on assets. But for market capitalization there appears a clearer positive effect. Therefore, we could say that the results lean more towards to the positive side. Although, when testing for multiple deals and previous experience we see that any beneficial result found turns insignificant or worsens. Therefore, the above results obtained for the merger related effect on value seem more likely to be driven by signaling effects. In addition, what comes to further complicate things is the positive effect of the market power measure on performance, which, combined with the, mostly negative, previously acquired merger induced effects on that competition measure, they come to further widen the unfortunate effect of those deals. However, this result, even unfortunate, comes to highlight again the importance of the proper planning of fintech deals, accompanied with the parallel transformation of the incumbents' business structures to the more efficient ones proposed by and aided by the partnership with Fintechs.

Overall, the above results even though that they do not clearly point towards the gaining of competitive advantages and the creation of financial synergies directly at first glance, the indirect effect coming from giving the appropriate time and effort for the proper integration of FinTechs and the transition to the more efficient and agile business structures as a result of the FinTech adoption, seem to be able to lead to the attainment of the wanted benefits by financial institutions.

The aforementioned results could have significant implications for regulators and policymakers as well as academics and executives of financial institutions. Specifically, as the relatively new sector of FinTech has entered rather faster than supervisory authorities would have wanted, in order to set the appropriate rules to efficiently regulate it, the merger with an adequately supervised financial institution, which in addition can be promptly and will be less likely to lead to unfortunate results and consequently fail, might be a good way to give some solution to the problem. Also, the threat that these newcomers pose to incumbents may have serious implications for stability of the sector. Thus, if M&As are found to be a good way for those incumbents

to overcome this problem, then supervisory authorities may rethink their stance towards M&As in the sector or even try to promote them. Also, new knowledge is offered to academics about the implications of such kinds of partnerships and even inform the executives of financial institutions about the threats or opportunities that arise from taking such a step.

4. Conclusion

This thesis investigates the role of M&As in providing a solution to European financial institutions to problems they were called upon to face over the last couple of decades. Specifically, the recent problems that we consider in our research include i) the increased regulatory burden since the introduction of the Single Supervisory Mechanism (SSM) and in particular the limitations that the increased capital requirements have caused for the directly supervised institutions, ii) the need for an improvement in the corporate governance quality of financial institutions which ever since the crises (GFC and credit crisis in Europe) was recognized as a main factor for the cause of them or that when those crisis occurred the inefficacy in governance caused them to be more vulnerable and iii) the need to adapt to the advancements in Financial Technology where they had to make the choice either to partner with Fintechs and embrace the new way of conducting their everyday business that these newcomers propose or keep hanging in their old ways and eventually become obsolete. For this reason, we divide our thesis into three essays where each essay includes the examination of one of the above problems.

The first essay examines the effect that M&A transactions may have on the capital levels of EU financial institution and then whether such deals may have a direct positive effect on their financial performance or an indirect one through the changes it may incur to the capital levels and consequently the reduction in their risk by mainly focusing on the effects of the SSM introduction and the changes it induced to the supervised institutions. By applying 2-step system GMM regressions on our panel data we were able to find that M&A transactions are able to increase the capital levels of acquiring institutions but provided that this tactic is used with moderation, as multiple deals cause the effect to be saturated, while they appear either directly or indirectly mostly not to lead to financial synergies and even more when we control for multiple deals and previous accumulated experience. Also, another finding is the inability of the SSM to positively influence the above tested measure in general which are of high importance for the mechanism.

The second essay focuses on the possibility of M&A transactions in improving the corporate governance quality of European financial institutions by restructuring their

governance structures which matter became of great importance ever since the credit crisis struck in Europe and then whether such transactions may lead directly to financial synergies or whether they can be obtained indirectly through merger induced changes in governance. Our GMM regressions reveal that, M&As appear to have a significant positive effect on it provided that the previous number of accumulated deals is limited, while concerning the effect on financial performance, again, if some moderation on the accumulated number of deals is kept, the direct effect appears to be beneficial, while on the other hand any merger induced effect on governance does not lead to increased performance and value.

And lastly the third essay investigates whether M&As or any other form of collaboration with Fintech firms are able to give them a competitive advantage by increasing their market power and then whether any such partnership is able to lead to financial synergies either directly from the partnership itself or indirectly by increasing their market power. The results revealed that when it comes to partnerships with fintech firms, the effects do not come that straightforward, as an increase in market power from the acquired competitive advantage requires multiple yearly deals that are kept under limits as well as time so that the transition towards more efficient business structures can be realized. This effect appears also when testing the effects on performance as, even though, at first sight partnerships seem to have a rather complex effect, they can gain the expected synergies by the changes they induce over time in market power.

Therefore, as a general conclusion we can say that M&As may not be a panacea after all and despite our theoretical assumptions they should be used with moderation. So, even though they can give a solution when increased capital levels and better governance quality are needed but when they are motivated for such reasons, they could restrain financial performance. While the matter of conducting a meticulous planning that aims in the achievement of goals in the long term is highlighted in the research of Fintech partnerships. Specifically, even though they do not appear to offer the expected results initially, the M&As and other forms of collaborations with fintech firms, seem to be leading to synergies only when the needed time is given for the transferred changes, adopted from the fintech firms, to take place.

The main lessons learned from this thesis are that for the beneficial effects of M&As to take place three things are of concern, first to be applied at the appropriate situation and

for the appropriate reasons that can consequently lead to financial synergies, second that the institutions should be cautious on how many times this tactic can be used for the same reason, as it can cause an effect to become saturated or even inversed, and third the indirect effect of them that causes changes over time along with the instant one must be kept into consideration.

Therefore, our findings highlight the importance of M&A transactions as a factor that is able to lead to considerable changes for European financial institutions. As a result, our findings could have several significant policy implications for regulators and policymakers as well as academics and executives of financial institutions. First, they show that M&As can be a significant tool for financial institutions to overcome obstacles posed by their environment such as crises and changes in regulations and supervision. Therefore, they can make regulators rethink their current guidelines for the examination of the ability of possible deals to be realized by better considering the pros and cons and even promoting them and not just be part of the screening process. While also, they can provide academics with further knowledge concerning bank M&As and their effects as well as assist bank executives in their decision-making process by acknowledging the capabilities of such deals and keeping better track of the benefits and drawbacks they can offer to their firms.

The findings of this research may serve as a baseline to stipulate future research regarding the ability of M&As to offer solutions to other significant bank measures. As history has proven, the financial services sector is an ever-changing environment that interacts with many other industries and sectors such as governments, the technological sector, the manufacturing sector and etc. Therefore, M&As might be one tactic that future researchers may consider in case a highly effective event such as a financial crisis strikes again.

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Appendix A

Calculation of the Lerner index for market power

This study uses the Lerner index, which has been commonly used in banking research, as a measure of competition (or market power). The Lerner index captures the capacity of price power by computing the disparity between price and marginal cost as a percentage of the price and ranges between 0 and 1. In case of perfect competition and monopoly, the index equals 0 and 1, respectively. Following previous studies (Carbo-Valverde and Rodriguez-Fernandez (2007); Efthyvoulou and Yildirim (2014); Fu et al (2014); Kasman and Kasman (2015); Shaffer and Spierdijk (2020)) the timevariant Lerner index at bank-level is calculated as follows:

$$L = \frac{p_{it} - mc_{it}}{p_{it}}$$

Where p_{it} is the price of total assets proxied by the ratio of total revenues (interest and non-interest income) to total assets for bank i at time t and mc_{it} is the marginal cost for bank i at time t.

The marginal costs are obtained by differentiating a translog cost function with respect to one output. We use a stochastic frontier model to estimate a translog cost function with one output (total assets) and three inputs (labor, funding and physical capital). The cost function for a given bank i at time t can be specified as follows:

$$\ln TC_{it} = \alpha_0 + \alpha_Q \ln Q_{it} + 0.5\alpha_{QQ}(\ln Q_{it})^2 + \sum_{k=1}^{3} \alpha_k lnW_{k,it} + \sum_{k=1}^{3} \alpha_{Qk} lnQ_{it} lnW_{k,it} +$$

$$+ 0.5 \sum_{j=1}^{3} \sum_{k=1}^{3} \alpha_{jk} lnW_{j,it} lnW_{k,it} + \varepsilon_{it} \qquad (1)$$

Where,

$\varepsilon_{it} = v_{it} + u_{it}$

Where C is the total costs, Q is the output (total assets), and W is a vector of input prices (price of labor, price of funds and price of physical capital), v represents standard statistical noise and u captures inefficiency. Following Turk-Ariss (2010), the total costs and prices of funds and labor are scaled by the price of physical capital to correct for heteroscedasticity and scale biases.

$$\ln(TC_{it}/W_{3,it}) = \alpha_0 + \alpha_Q \ln Q_{it} + 0.5\alpha_{QQ}(\ln Q_{it})^2 + \sum_{k=1}^{2} \alpha_k ln(W_{k,it}/W_{3,it}) +$$

$$+ \sum_{k=1}^{2} \alpha_{Qk} ln Q_{it} ln(W_{k,it}/W_{3,it}) + 0.5\sum_{j=1}^{2}\sum_{k=1}^{2} \alpha_{jk} ln(W_{j,it}/W_{3,it})\, ln(W_{k,it}/W_{3,it}) +$$

$$+ \varepsilon_{it}$$

To obtain the marginal cost, Eq. (1) is differentiated with respect to Q:

$$\frac{\partial \ln TC_{it}}{\partial \ln Q_{it}} = \left(\frac{TC_{it}}{Q_{it}}\right)\left(\alpha_Q + \alpha_{QQ}\ln Q_{it} + \sum_{k=1}^{2} \alpha_{Qk} ln(W_{k,it}/W_{3,it})\right) = MC_{it}$$