QUEEN'S UNIVERSITY BELFAST
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Doctor of Philosophy
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JOINT EXAMINER REPORT

All examiners should complete this report after the oral examination of the student.

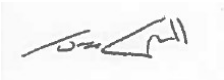STUDENT'S NAME: Ying Zhang
STUDENT'S NUMBER: 40267661

SCHOOL: Queen's Business School

TITLE OF THESIS: Towards Financial Resilience: An Examination of Basel III Implementation, Efficiency and Stability in China's Banking Landscape

Please Note: If recommending option d, examiners may also propose one of options e, f, or g as a possible alternative. The student must confirm the preferred option with Student Registry Services.

On the basis of your reading of the thesis, and following the oral examination of the student, your examination decision is:

a.	the Doctoral degree be awarded as the thesis stands.	
b.	the Doctoral degree be awarded subject to corrections being made to the thesis that must be completed within three months.	
c.	the Doctoral degree be awarded subject to corrections being made to the thesis that must be completed within six months.	✔
d.	the thesis be revised and re-submitted for the Doctoral degree at a later date. (The revised thesis must normally be re-submitted for examination within twelve months)	
e.	the Master's degree be awarded as the thesis stands.	
f.	the Master's degree be awarded subject to corrections being made to the thesis that must be completed within three months.	
g.	the Master's degree be awarded subject to corrections being made to the thesis that must be completed within six months.	
h.	the thesis be revised and re-submitted for the Master's degree at a later date. (The revised thesis must normally be re-submitted for examination within twelve months)	
i.	no research degree be awarded.	

Signed:	External Examiner	Date:	12 June 2024
Thomas Flavin	Thomas Flavin		
Signed:	Internal Examiner	Date:	14062024

Signed:	*[signature]*	Head of School/Nominee	Date:	14/06/24
Signed:	*[signature]*	Head of Registry Services	Date:	19.06.2024

STUDENT'S NAME: Ying Zhang
DEGREE: Doctor of Philosophy

Doctoral degrees are awarded to students who have demonstrated:

i. The creation and interpretation of new knowledge, through original research or other advanced scholarship, of a quality to satisfy peer review, extend the forefront of the discipline, and merit publication.

ii. A systematic acquisition and understanding of a substantial body of knowledge which is at the forefront of an academic discipline or area of professional practice.

iii. The general ability to conceptualise, design and implement a project for the generation of new knowledge, applications or understanding at the forefront of the discipline, and to adjust the project design in the light of unforeseen problems.

iv. A detailed understanding of applicable techniques for research and advanced academic enquiry.

   Typically, holders of the qualification will be able to:

i. Make informed judgements on complex issues in specialist fields, often in the absence of complete data, and be able to communicate their ideas and conclusions clearly and effectively to specialist and non-specialist audiences.

ii. Continue to undertake pure and/or applied research and development at an advanced level, contributing substantially to the development of new techniques, ideas, or approaches.

   Holders will have:

i. The qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and largely autonomous initiative in complex and unpredictable situations, in professional or equivalent environments.

Masters degrees are awarded to students who have demonstrated:

i. A systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of an academic discipline, field of study, or area of professional practice.

ii. A comprehensive understanding of techniques applicable to their own research or advanced scholarship.

iii. Originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline.

iv. Conceptual understanding that enables the student:
   a. To evaluate critically current research and advanced scholarship in the discipline.
   b. To evaluate methodologies and develop critiques of them and, where appropriate, to propose new hypothesis.

   Typically, holders of the qualification will be able to:

i. Deal with complex issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences.

ii. Demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level.

iii. Continue to advance their knowledge and understanding, and to develop new skills to a high level.

   Holders will have:

i. The qualities and transferable skills necessary for employment requiring:

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a. The exercise of personal responsibility.
b. Decision making in complex and unpredictable situations.
c. The independent learning ability required for continuing professional development.

STUDENT'S NAME: Ying Zhang
DEGREE: Doctor of Philosophy

Joint Examiners' Report

- Please provide a report below which describes the reasons for your decision having taken into account the criteria above. You are asked to comment specifically on whether the issues raised in the independent reports were satisfactorily answered at the oral.
- Where the decision is to award Degree subject to Corrections within three months, Corrections within six months or Revise and Resubmit, you must provide a list of the amendments required below (where two options are given, amendments must be provided for both options).

We confirm that our recommendation is to award the Doctoral degree subject to the completion of the required corrections (outlined below) within the next six months. Our recommendation is reached on the basis that the candidate performed well in the oral examination and demonstrated, both in the written thesis and the examination, the capability of producing new knowledge using appropriate econometric methods and interpreting her findings in an insightful manner. This thesis represents a substantial body of work on the evolution of the Chinese financial system and shines new light on the operation of the banking sector within this system. The thesis contains important policy implications for the Chinese banking sector and provides a comprehensive review of the industry.

Following our recommendation, we have a number of required corrections and amendments which are set out here. We start with a general comment and then give a detailed list on a chapter-by-chapter basis.

General requirement for all chapters

1. There are many grammatical errors, typographical errors, omissions in each chapter. Both examiners have shared annotated copies of the thesis with the candidate, identifying these types of errors. There must be dealt with to increase the readability of the thesis.
2. There is a great deal of repetition in the later chapters which should also be eliminated where it is not necessary. The reader should be referred to the appropriate sections or footnotes of the thesis.
3. The candidate must make sure that the numbering of Tables, Figures and Equations are correct and consistent within and across chapters.

Required corrections / amendments to Chapter 1

1. On page 7, there is a reference to 'securitization'. Since this can have different meanings in the world of finance, the author should clarify its meaning in this context.

2. On page 8, the citation Fund, 2018 should be IMF, 2018.

3. On page 10, greater explanation is required of the "…hypotheses proposed by Berger and Humphreys (1997)".

4. On page 10, we meet our first reference to "the efficiency of the Chinese banks…". The term 'efficiency' should be defined.

5. On page 10, we are introduced to the concept of systemic risk. A line or two on the link between individual bank risk and systemic risk would be appropriate to build the bridge between chapters.

Required corrections / amendments to Chapter 2

1. A short paragraph with some statistics in section 2.1.3, outlining the performance of Chinese banks during the GFC would be useful to motivate the subsequent adoption of Basel III regulations.

2. The axis of Figures 2.4 and 2.5 should be edited to ensure legibility.

3. As discussed in the oral examination, there are issues with some data items summarised in Figures 2.6 – 2. Firstly the notes to the Figures should be more precise as to what we are looking at, e.g. Figure 2.6 is based on capital ratios as of X-2018. The outliers should be discussed and explanations offered where possible. Other examiner comments contained in the annotated copies should point the candidate as to what needs to be done..

4. Foreign-owned banks appear to do poorly in China. This should be acknowledged and discussed.

5. Many times the text talks about increases or decreases of x%, when it should be x percentage points.

Required corrections / amendments to Chapter 3

1. The Introduction to Chapter 3 would be strengthened by explaining the a priori expectations regarding the importance of ownership structures on bank risk.

2. The literature review should clearly distinguish between theoretical contributions and empirical findings. All the literature should be in this review section, which requires that some paragraphs of section 3.4.2 (highlighted in the annotated copies) should be moved to the literature review.

3. In the development of testable hypotheses, the candidate cites papers that have studied similar topics. It should also be made clear what is unique to this study.

4. In the baseline regression, it would be useful to include a non-linear term, given that a non-linear relationship has already been documented in other studies.

5. Include graphs of the dependent variables to help the reader understand the data.

6. Estimation by OLS is potentially problematic since the dependent variables are bounded by zero and one (or zero and 100 in percentage terms). We recommend that the author does the following to ensure the robustness of the findings:

   (i). Plot the fitted values from the current regressions to ensure that they remain within the bounds.

   (ii). Use an alternative estimator, like a (two-sided) Tobit model, to verify results.

   (iii). Use clustered standard errors.

7. In the oral examination, it was disclosed that the data was winsorised to remove the influence of outliers. This should be discussed in the text and the descriptive statistics based on the winsorised data should be included in Table 3.5.

8. As is clear from Chapter 2, foreign-owned banks are different and may not be the best reference group. For robustness, we recommend the use of an alternative reference group.

9. The interpretation of some of your results needs to be reviewed. For example, a statistically significant coefficient on the 'state-owned' variable means that state-owned banks are different from the reference group, but it does not mean that 'state-owned' banks are different from any of the other groups. Paired t-tests should be performed to check if differences between each pair of groups are statistically significant.

Required corrections / amendments to Chapter 4

1. The final paragraph of page 115 needs some further development. Why is this study going to provide more insight than previous studies?

2. Differences between efficiency measures are relatively small. They are based on estimated coefficients that are estimated with error so the author should be careful not to place too much emphasis on these differences.

3. Use of TC to represent Total Costs and Total Capital is confusing and should be avoided.

4. What is the regression equation for results in Table 4.5? Please explain more.

Required corrections / amendments to Chapter 5

1. The Introduction should provide a better motivation for this study. The literature has already shown that, while individually banks can appear healthy, they can still represent a threat to the stability of the system. Papers such as Wagner (2010) and Mayordomo, Rodriguez-Moreno and Peña (2014) make this point and could be cited as a motivation for this study.

2. I would expect a deeper discussion of system risk and the various that are commonly used. You can then justify why you choose to use Delta CoVaR.

3. By concentrating on Delta CoVaR, you focus on one dimension of systemic risk, i.e. the contribution of individual banks to systemic risk. I recommend that you also look at another dimension to this concept, the vulnerability to a systemic shock. This would give you a more complete picture of the effects of systemic risk in the banking sector. Vulnerability to systemic risk can be measured using Reverse Delta CoVaR which is closely related to the employed measure (also proposed by Adrian and Brunnermeier). This would allow you to check how regulatory capital requirements make banks more resilient (less vulnerable) to this type of risk.

4. Your sample contains non-banking financial institutions, and these have the potential to enrich our understanding of systemic risk. There is already some literature on the systemic risk of insurance companies, e.g. Dungey, Luciani and Veredas (2018) and this literature should be discussed and used to motivate your work.

5. Be clear that Delta CoVaR can only be computed for exchange-listed firms and therefore you should tell the reader how many firms underlie the graphs in Figure 5.1. It would then be useful to have a sub-section discussing the differences in the systemic risk measures across different sectors of the financial industry.

6. Be clear that the regression analysis presented in Table 5.4 is based only on listed banks and also be clear what is the reference group in the regression.

7. As in chapter 3, make sure your interpretation of results is correct, especially regarding differences between ownership types.

8. On page 175, there is a statement "… as China seeks to decouple its reserve banking system from the US, there may be important implications for continued regulatory cooperation in international banking". How does this statement stem from your results? Please provide more explanation.

9. Finally, as in all corporate finance studies, endogeneity is a potential problem here. Therefore I recommend that you don't claim causality when discussing your results, but be satisfied with 'association'. For example, statements like "… high liquidity ratio imposes excessive systemic risk…" should be avoided.

Full references used in report

Dungey, M., Luciani, M., Veredas, D. (2018). Systemic risk in the US: Interconnectedness as a circuit breaker. **Economic Modelling**, Vol. 71, pp. 305-315.

Mayordomo, S., Rodriquez-Moreno, M., Peña, J.I., 2014. Derivatives holdings and systemic risk in the U.S. banking sector. **Journal of Banking and Finance**, Vol. 45, pp. 84–104.

Wagner, W. (2010). Diversification at financial institutions and systemic crises. **Journal of Financial Intermediation**, Vol. 19, pp. 37

Signed:		External Examiner Thomas Flavin	Date: 12-6-2024
Signed:		Internal Examiner Fearghal Kearney	Date: 14.06. 2024

QUEEN'S UNIVERSITY BELFAST
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Doctor of Philosophy
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<u>*EXTERNAL EXAMINER'S INDEPENDENT REPORT*</u>

Please complete this report without consulting the other examiners and bring it with you to the oral examination

<u>STUDENT'S NAME:</u>   Ying Zhang

<u>STUDENT'S NUMBER:</u>   40267661

<u>SCHOOL:</u>   Queen's Business School

<u>TITLE OF THESIS:</u>   Towards Financial Resilience: An Examination of Basel III Implementation, Efficiency and Stability in China's Banking Landscape

<u>EXTERNAL EXAMINER:</u>   Dr Thomas Flavin

On the basis of your reading of the thesis, and subject to an oral examination of the student, your provisional decision is:

a.	the Doctoral degree be awarded as the thesis stands.		
b.	the Doctoral degree be awarded subject to corrections being made to the thesis that must be completed within three months.		
c.	the Doctoral degree be awarded subject to corrections being made to the thesis that must be completed within six months.	✔	
d.	the thesis be revised and re-submitted for the Doctoral degree at a later date. (The revised thesis must normally be re-submitted for examination within twelve months)		
e.	the Master's degree be awarded as the thesis stands.		
f.	the Master's degree be awarded subject to corrections being made to the thesis that must be completed within three months.		
g.	the Master's degree be awarded subject to corrections being made to the thesis that must be completed within six months.		
h.	the thesis be revised and re-submitted for the Master's degree at a later date. (The revised thesis must normally be re-submitted for examination within twelve months)		
i.	no research degree be awarded.		

[10]

STUDENT'S NAME: Ying Zhang
DEGREE: Doctor of Philosophy

External Examiner's Independent Report

Please provide a report below which clearly describes the reasons for your provisional decision:

On the basis of what I have read, and before the oral examination, I would recommend the award of the degree subject to a number of amendments and corrections that I believe will take more than three months but should be completed within six months. All chapters require a careful editing and there are some substantial issues to be addressed in the original chapters, particularly chapters 3 and 5. There is also a great deal of repetition which could be removed to make the thesis more reader friendly.

The thesis is comprised on six chapters; namely an Introduction and Conclusion bookending four original chapters. Chapter 2 gives a detailed description of how the Chinese financial sector has developed and evolved over the past four decades, before presenting some summary statistics of the data that paints a picture of the entire sector. There are some minor issues in this chapter but, overall, I am happy with this. Chapter 3 is the first of the empirical chapters and looks at the relationship between capital requirements and bank risk, and then proceeding to look at differences in this relationship across different ownership types. I have some doubts about the methodology employed here, particularly the lack of robustness checks for the estimated relationships. In particular, I plan to discuss with the candidate:

1. How appropriate is the methodology? Are there other estimators that could be more appropriate? Are your standard errors robust?

2. The differences across ownership structures and evidence for (some) of the conclusions. For example, there are no tests for statistical difference between 'state-owned' and 'joint-stock' companies but the candidate proceeds to talk about differences that may or may not exist.

Chapter 4 is the strongest of the empirical chapters with an appropriate methodology and a clear application. There are some issues but overall, I find this chapter to be the most compelling.

Chapter 5 has lots of potential and is definitely worth pursuing and strengthening. However, in its current format, there are many issues that need to be addressed and the oral examination will provide a forum for this discussion. In particular, I want to address:

1. The motivation of the chapter and why individually healthy banks may still pose a risk to the system.

2. The sample of financial institutions and how the non-banks are dealt with in the chapter.

3. Why the candidate focused on just one measure of systemic risk, and hence, just one dimension of systemic risk.

4. The computation of the systemic risk measure for non-listed banks.

5. The interpretation of results.

Signature: Date: _11-June-2024_____

This report must be submitted to the School Office, along with the Joint report, Independent Convenor report and the other Examiner's independent report within five working days of the oral examination.

Doctor of Philosophy
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INTERNAL EXAMINER'S INDEPENDENT REPORT

Please complete this report without consulting the other examiner and bring it with you to the oral examination

STUDENT'S NAME:	Ying Zhang
STUDENT'S NUMBER:	40267661
SCHOOL:	Queen's Business School
TITLE OF THESIS:	Towards Financial Resilience: An Examination of Basel III Implementation, Efficiency and Stability in China's Banking Landscape
INTERNAL EXAMINER:	Mr Fearghal Kearney

On the basis of your reading of the thesis, and subject to an oral examination of the student, your provisional decision is:

a.	the Doctoral degree be awarded as the thesis stands.	
b.	the Doctoral degree be awarded subject to corrections being made to the thesis that must be completed within three months.	
c.	the Doctoral degree be awarded subject to corrections being made to the thesis that must be completed within six months.	x
d.	the thesis be revised and re-submitted for the Doctoral degree at a later date. (The revised thesis must normally be re-submitted for examination within twelve months)	
e.	the Master's degree be awarded as the thesis stands.	
f.	the Master's degree be awarded subject to corrections being made to the thesis that must be completed within three months.	
g.	the Master's degree be awarded subject to corrections being made to the thesis that must be completed within six months.	
h.	the thesis be revised and re-submitted for the Master's degree at a later date. (The revised thesis must normally be re-submitted for examination within twelve months)	
i.	no research degree be awarded.	

STUDENT'S NAME: Ying Zhang
DEGREE: Doctor of Philosophy

<u>Internal Examiner's Independent Report</u>

Please provide a report below which clearly describes the reasons for your provisional decision:

This thesis deals with an important topic that is how Basel III implementation has shaped Banking in China. As we will likely have further iterations of Basel accords, and no doubt will have changes to banking regulations in the future this constitutes key information that should drive policy makers' actions going forward.
Chapter 2 begins with comprehensive overview of China's Banking landscape, including regulation changes and reforms.
Chapter 3 focuses on how ownership structure and regulation impact a bank's credit risk.
Chapter 4 looks at bank efficiency and links it to ownership structure.
Chapter 5 assesses systemic risk using CoVar and asks how the introduction of Basel III and ownership structures again impact that risk.
I have some queries however:

Overall:
• The piece is pitched as focusing on Chinese banking but can it generalise? For instance, throughout most of the chapters it appears to be ownership structure that is put forward as the main driver of the relationships observed. • if trying to generalise do the different implementation years and phase in arrangements in different countries make a difference?
• the thesis seems to be a lot about ownership and regulation interplay. Maybe this could be reflected in the Titles/Intro more
• Furthermore, there is an extensive literature review about the landscape of Chinese banking in Chapter 2, however as there are many factors at play simultaneously during this time period, is it difficult to disentangle the impact of Basel III regulation? Maybe: "Modern corporate governance changes, and market competition." Can you comment further on this. "We focus on risk-based capital regulation from the Basel III framework that affects Chinese commercial banks over the period 2010-2019. This period coincides with the fourth stage of China's financial reform and the implementation of Basel III framework in China." [pg. 112]
• Minor point: If submitting for publication subsequently, literature reviews in the individual chapters could be more targeted to that individual chapter.
• Minor: Typos/Proof read: e.g., a few examples of %% throughout - maybe a latex issue. In figures no need for double decimal places in a lot of places; give full years (not Y11 Y12 etc e.g., Figure 2.7)

Chapter 2 onwards: Data section adjustments mainly
- Pg 43: In the data section you do a systematic search using S&P Global to identify banks. However, you also use manual calcs - such as looking up annual reports, how do you know what other banks/institutions are out there to look up? Also would be interesting to know how many of the institutions and ownership types came from S&P and how many were from manual calcs.
- Around Pg 43: Can you give me a paragraph explaining joint-stock: Institutional holders, but can it be state? Can foreign joint-stock be foreign government? Also a bit of a description of foreign-owned, what are the trends there in terms of the likely owners? Joint stock stands out in terms of Tier 1 Capital ratios and Total Equity/Total Assets in 2.3.3.1 - so would be nice to have a tighter definition. Responded: good for listed, not unlisted. Could investigate more foreign owned figures. Maybe robustness check without them.
- Fig 2.4 Page 45 mashed together - spread out the years. Also longer legends. Could be clearer what this table means
- Pg 45: fintech - what type of fintechs are considered part of the banking sector? If they just do payment processing are they? Or just money transfer but no current A/C?
- Pg. 46: Fig 2.4 says 232 banks but the text in 2nd paragraph of Pg 46 says 231
- Fig 2.6 for example: a lot of the tables are included as figures – however, from what I

understand you created them yourself and didn't lift them directly from another source?

Chapter 3: Use Non-Performing Loans (NPL) and Loan Loss Reserve (LLR) Ratios to reflect Credit risk taking

- maybe rethink the titles of the individual chapters to better reflect what is in them Pg. 79: "Ownership dynamics, risk and regulation in Chinese banking: New evidence" doesn't tell you too much.
- Pg 80: it was phased in over several years with full implementation by 2019 - what does the phasing impact? "China's financial authority fully accepted the Basel III framework and began its implementation in 2013."
    - Does the performance of other areas, like the performance/policies of the real estate/housing sector in China have a big impact on Non-Performing loans that should be included?
    - Pg.92 Data: any examples of "doubtful values"?
    - Table 3.4, fix latex link at the top.
    - Pg.93: There should be a better link between eqn 3.1 variable names and the variable names in Table 3.4 i.e., are both GDP and inflation included in the macro variable. What about interest rates here?
    - Pg. 96: NL_to_GL What does GL mean here? NL should be Net Loans and it is to be standardised by total assets (TA).

Table 3.6 pg 103: what % CI? Is it 95%? Include a legend explaining the regression

Table 3.8 pg 109: "could multicolinearity be an issue here? not all these constructed variables were in correlation matrix shown...building up reg specs in different iterations could alleviate this concern somewhat". Also title should detail more clearly that it's a credit risk regression.

Pg 112 Conclusion: Could have a stronger conclusion here. Besides, ownership structure - do you test any other attributes that might impact a bank's risk taking reaction to a new regulatory regime? Would subsector (insurance company etc) be a big driver? CEO attributes? Geographical competition?

Chapter 4: Cost frontier efficiency

Pg 129: "Cost frontier efficiency, or how close a bank (firm) is to a "best practice" cost frontier" Can you provide a longer non-mathematical definition of this? Also can you introduce the data being used for it earlier in Section 4.3

Pg 130: Use a 4 component SF model. Is there any debate about the interpretation of the 4 components, or are they always interpreted the same? "The four component model splits the error term into four components. The first component captures firms' latent heterogeneity (see Greene, 2005); the second component captures random shocks and measurement errors. The third component captures the persistent (long-run) inefficiency (see Kumbhakar and Heshmati, 1995); and the forth component captures time-varying (transient/short-run) inefficiency."

Pg. 131 The iid assumption, you should state that you deal with it later on too. [4.5.1]

Pg 136 Table 4.3: Explain and expand on translog and ly2, lx2 – maybe a legend is sufficient

Pg. 137 As Table 4.4 appear to be a panel, it might be better in landscape orientation

Pg. 140 the code in the middle of the page looks unusual, should it be formatted as a table?

Pg 147: "Firstly, because Basel III capital adequacy requirements have a negative impact on banks' transient (in)efficiency, China's regulatory authorities may set up a well-established, dynamic framework to address banks' cost containment strategies as well as control the risk-taking behaviors." Should you acknowledge that other factors might also play a role in this causality?

Pg 148: "We will also consider conducting comparative analyses with banking sectors in other emerging markets undergoing similar regulatory changes, such as Brazil." Is there something special about Brazil? Just interested to know why you picked it out

Pg 151: Table 4.6: Are there US banks in the data, as listed here?

Chapter 5:

Justify CoVAR better. Show alternatives.

Pg 154: "Systemic risk is defined by De Bandt and Hartmann (2019) as "the risk of experiencing systemic events in the strong sense". There must be a better reference/definition wording when introducing systemic risk for the first time. This is not very informative.

Pg. 178: Bring it back to the literature more here – what do the results mean in the context of

what literature has been done previously.

Main finding seems to be ownership structure plays a role – but more should be analysed here as a bit narrow.

Should other factors like access to interbank lending networks, contagion between banks and derivatives exposure come into play?

Signature: Date: 14.06.2024

This report must be submitted to the School Office, along with the Joint report, Independent Convenor report and the External Examiner's independent report within five working days of the oral examination.

ORAL EXAMINATION

REPORT FROM THE INDEPENDENT CONVENOR OF THE BOARD OF EXAMINERS

(1)

Student's Name:	**Ying Zhang**
Student Number:	**40267661**
School:	**Queen's Business School**
Degree:	**Doctor of Philosophy**
Title of Thesis:	**Towards Financial Resilience: An Examination of Basel III Implementation, Efficiency and Stability in China's Banking Landscape**
Date of Examination:	**12th June 2024**

(2)

Comments concerning the conduct of the oral examination (optional):
If you have nothing further to add, please proceed to Section 3.

Nothing further to add

(3)

I can confirm that the oral examination was conducted fairly and in accordance with the University Regulations.

Name: Dr Philip T. Fliers

Date: 14/06/2024

Signature: