Empirical essays on the stability of the Brazilian financial system

de Menezes Linardi, F.

Creative Commons License (see https://creativecommons.org/use-remix/cc-licenses):
Other

Citation for published version (APA):
The financial crisis of 2007-09 was an extreme event which led to a profound reform of the regulatory framework for financial institutions that aims to reduce the probability of a new crisis. This thesis is composed of three essays that investigate some vulnerabilities of financial markets that became apparent during the global financial crisis such as the interconnectedness of financial institutions, the effect of credit supply on house prices, and the run on nonbank financial intermediaries. The first essay analyses the unsecured and the secured interbank lending networks of Brazilian banks using the dynamic latent space approach. The second essay exploits the regulatory framework that governs housing lending in Brazil to estimate the effect of credit supply on house prices and loan terms. The third essay examines the flow and performance of mutual funds in Brazil and their portfolio allocations during the financial crisis.

Fernando Linardi holds a bachelor degree in Electrical Engineering and a master degree in Economics from the Federal University of Minas Gerais in Brazil, along with a master degree in Economics from the Université Libre de Bruxelles. Under the supervision of Cees Diks and Marco van der Leij, he subsequently continued with his PhD studies at the Universiteit van Amsterdam.
Empirical essays on the stability of the Brazilian financial system
Empirical essays on the stability of the Brazilian financial system

ACADEMISCH PROEFSCRIFT

ter verkrijging van de graad van doctor
aan de Universiteit van Amsterdam
op gezag van de Rector Magnificus
prof. dr. ir. K.I.J. Maex
ten overstaan van een door het college voor promoties ingestelde commissie, in het openbaar te verdedigen in de Agnietenkapel
op donderdag 16 mei 2019, te 14:00 uur
door

Fernando de Menezes Linardi

geboren te Belo Horizonte MG
Promotiecommissie:

Promotor(es):  Prof. dr. C.G.H. Diks  Universiteit van Amsterdam
Copromotor(es):  Dr. M.J. van der Leij  Universiteit van Amsterdam
Overige leden:  Dr. N. van Horen  Bank of England
                Prof. dr. I.P.P. van Lelyveld  Vrije Universiteit Amsterdam
                Prof. dr. B.D. Kandhai  Universiteit van Amsterdam
                Prof. dr. S.J.G. van Wijnbergen  Universiteit van Amsterdam
                Prof. dr. C.H. Hommes  Universiteit van Amsterdam
                Dr. S.J. Huber  Universiteit van Amsterdam

Faculteit Economie en Bedrijfswetenschappen
Acknowledgments

I would like to thank each person who directly or indirectly contributed to the completion of this work. First, I am grateful to Professors Cees Diks, Cars Hommes and Marco van der Leij for accepting me to the doctoral programme. In particular, I would like to thank my supervisor and co-supervisor Cees Diks and Marco van der Leij for their enormous willingness to answer me and clarify my doubts. They were always available for our meetings and their constructive suggestions have contributed to improve this thesis. I could not have better supervisors.

I would like to thank the professors of the Doctorate Committee for accepting the invitation to take part in my doctoral defence. I am sure that their comments will contribute to the improvement of this thesis.

This work would not have been possible without the financial support of the Central Bank of Brazil. Its postgraduate education program allowed me to pursue my PhD. The support of the University of Amsterdam for the courses at the Tinbergen Institute is thankfully acknowledged.

I would not have finished this work without the support and love of my family. I am extremely grateful to my parents for their guidance and encouragement throughout my life. I wish to thank the support and understanding of my wife Luciana. My deepest affection goes to my son André and my daughter Isabel which were a source of great joy after the lonely days at the library of the Central Bank. I would also like to thank my brother Leonardo and my wife’s family.

Finally, I want to dedicate this thesis to the memory of my beloved sister Silvia who would be delighted with the conclusion of this work.

Thank you all.

Brasília, March 2019.
## Contents

Acknowledgments .......................................................... i

1 Introduction .................................................................. 1

2 Dynamic interbank network analysis ............................... 5
   2.1 Introduction ......................................................... 5
   2.2 The model ......................................................... 9
   2.3 Estimation ......................................................... 12
      2.3.1 Posterior sampling and the MCMC algorithm .... 13
   2.4 Data ................................................................. 14
      2.4.1 The topology of the Brazilian interbank networks 15
      2.4.2 Banks' observed characteristics ......................... 17
   2.5 Results ............................................................ 19
      2.5.1 Unsecured network ......................................... 19
      2.5.2 Repo network ................................................ 22
   2.6 The latent space and model's goodness-of-fit ............... 28
   2.7 Conclusion ........................................................ 31
   2.A Appendix .......................................................... 31
      2.A.1 Posterior distributions ..................................... 31
      2.A.2 Initialization ................................................ 33
      2.A.3 Network statistics .......................................... 34

3 The effect of bank credit supply on house prices ............ 35
   3.1 Introduction ....................................................... 35
   3.2 Institutional Background: Savings Deposits and Home Loans....... 39
   3.3 Data and Summary Statistics .................................. 42
   3.4 Methodology ....................................................... 45
   3.5 Results ............................................................. 47
      3.5.1 The effect of saving deposits on credit supply (First Stage) 47
4 Investors’ behavior and mutual fund portfolio

4.1 Introduction ........................................................................... 59
4.2 Institutional background: The mutual fund sector .................. 63
  4.2.1 The regulatory framework .............................................. 64
  4.2.2 The financial crisis and the mutual fund sector ............... 65
4.3 Data and summary statistics ............................................... 67
4.4 Empirical methodology ..................................................... 71
  4.4.1 Flows and fund performance ....................................... 71
  4.4.2 Mutual funds and the banking sector during the financial crisis 73
4.5 Results ............................................................................. 76
  4.5.1 The flow-performance relationship ............................... 76
  4.5.2 The run on mutual funds during the financial crisis ......... 80
4.6 Robustness checks ......................................................... 87
4.7 Conclusion ..................................................................... 88

Bibliography ............................................................................. 91

Summary .................................................................................. 99

Samenvatting (Summary in Dutch) ............................................. 101