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Empirical essays on the stability of the Brazilian financial system

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Summary

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 chapters 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.

In Chapter 2, “Dynamic interbank network analysis using latent space models”, a dynamic latent space approach is used to model directed networks of monthly interbank exposures. In this model, each node has an unobserved temporal trajectory in a low-dimensional Euclidean space. Model parameters and latent banks’ positions are estimated within a Bayesian framework. We apply this methodology to analyze two different datasets: the unsecured and the secured (repo) interbank lending networks of Brazilian banks. We show that the model that incorporates a latent space performs much better than the model in which the probability of a tie depends only on observed characteristics. The latent space model is able to capture some features of the dyadic data, such as transitivity, which the model without a latent space is not able to.

In Chapter 3, “The effect of bank credit supply on house prices: Evidence from Brazil”, we exploit the regulatory framework that governs housing lending in Brazil to estimate the effect of credit supply on house prices and loan terms. To establish the direction of causality, changes in savings deposits of parent banks are used as an instrumental variable for changes in credit supply at the municipality level. First, we show that growth in savings deposits positively affects lending in municipalities where banks have branches. We find that an increase in local credit supply is associated with a rise in the growth rate of house prices and leads to a decrease in the spread of contractual loan rates. Furthermore, we show that the increase in credit supply resulted in an increase in banks’ minimum provisions for loan losses due to an expansion of lending to less creditworthy borrowers.

In Chapter 4, “Investors’ behavior and mutual fund portfolio allocations during

the financial crisis in Brazil”, I examine the flow and performance of mutual funds in Brazil and their portfolio allocations during the financial crisis. First, consistent with the empirical literature, I show the sensitivity of fund flows to past performance and the negative impact of large outflows on fund returns, using a large dataset of mutual funds with different investment strategies. Subsequently, I show that mutual funds exposed to deposits and securities issued by small banks suffered significant outflows, due to concerns about the solvency of those banks after the Lehman’s default in 2008. Returns of funds exposed to small banks were also negatively affected. Funds adjusted their portfolios by reducing the exposure to deposits of small banks, but when term deposit coverage limits were raised, funds increased risk taking. Our results illustrate the potential risks presented by asset management firms to the extent that interconnections with other financial institutions can induce the transmission of shocks across markets.

Samenvatting (Summary in Dutch)

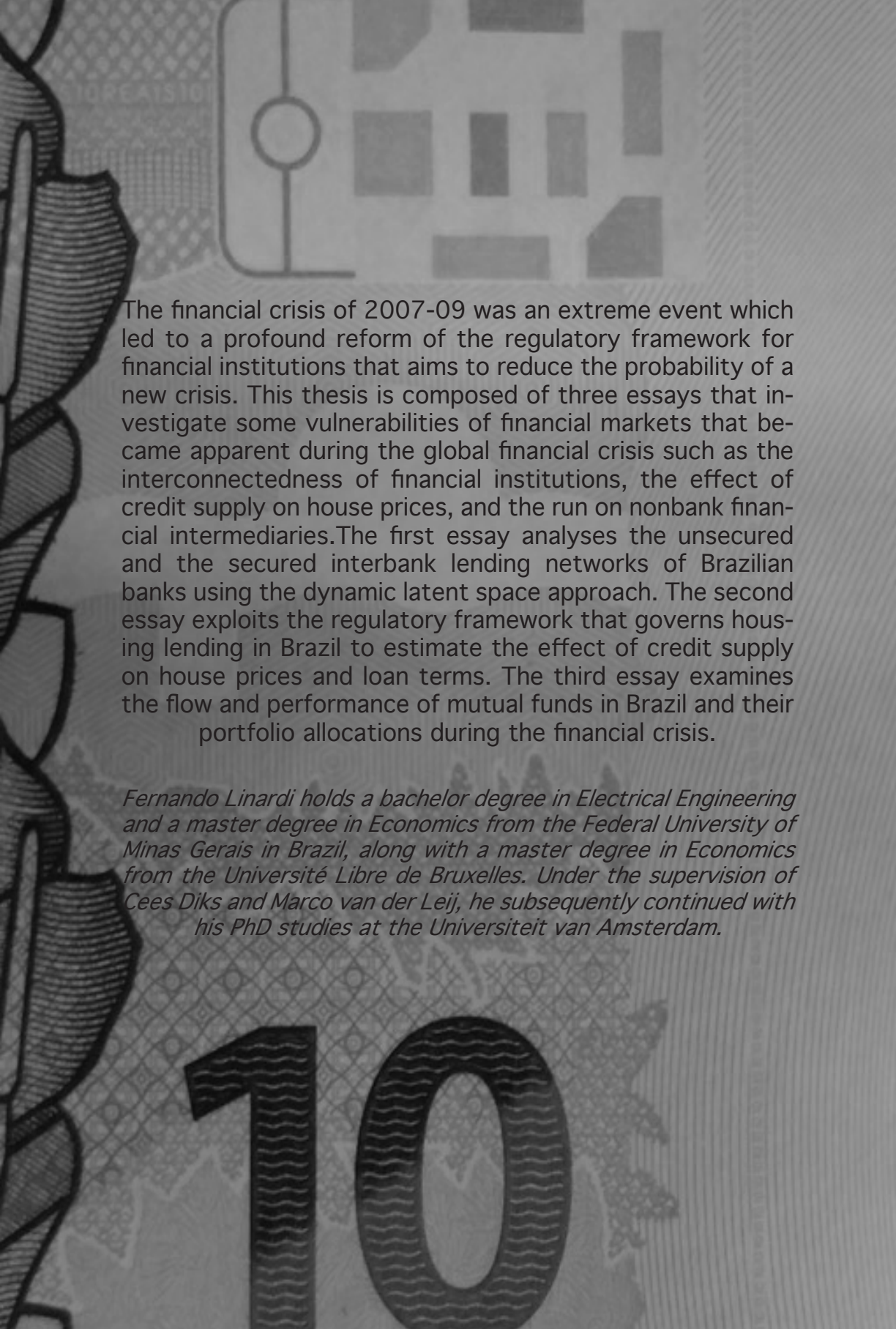
De financiële crisis van 2007-09 was een extreme gebeurtenis die heeft geleid tot een grondige hervorming van de regelgeving voor financiële instellingen, met als doel om de kans op een nieuwe crisis te verkleinen. Dit proefschrift bestaat uit drie hoofdstukken die enkele kwetsbaarheden onderzoeken die zichtbaar werden tijdens de globale financiële crisis, zoals de nauwe samenhang tussen financiële instellingen, het effect van kredietverlening op huizenprijzen, en de run op niet-bancaire financiële intermediairs.

In Hoofdstuk 2, “Dynamic interbank network analysis using latent space models”, wordt gebruik gemaakt van een dynamische latente-ruimtebenadering om gerichte netwerken van maandelijks onderlinge verplichtingen van banken te modelleren. In dit model volgt elke bank een niet-waargenomen (latent) tijdsafhankelijk pad in een laag-dimensionale Euclidische ruimte. De modelparameters en de latente posities van de banken worden gezamenlijk geschat door middel van een Bayesiaanse benadering. We passen deze methodologie toe op twee verschillende datasets: het netwerk van ongedekte en gedekte (repo) interbancaire leningen tussen Braziliaanse banken. We tonen aan dat een model met een latente ruimte beter presteert dan een model waarin de kans op een relatie tussen banken enkel afhangt van de waargenomen karakteristieken van de betreffende banken. Het model met de latente ruimte is in staat om enkele eigenschappen van de waargenomen netwerken zoals de transitiviteit goed op te pikken, terwijl het model zonder de latente ruimte daartoe niet in staat is.

In Hoofdstuk 3, “The effect of bank credit supply on house prices: Evidence from Brazil”, gebruiken we de regelgeving rond leningen voor huizen in Brazilië om het effect te schatten van kredietverlening op huizenprijzen en leningsvoorwaarden. Om de richting van de causaliteit te bepalen, worden veranderingen in de spaartegoeden van hoofdbanken gebruikt als een instrumentele variabele voor veranderingen in de kredietverlening op gemeentelijk niveau. We laten eerst zien dat een groei in de spaartegoeden een positief effect heeft op kredietverlening in die gemeenten waar banken vestigingen hebben. We zien dat een toename in de lokale kredietverlening geassocieerd wordt met een toename in de groeivoet van huizenprijzen en tot een afname leidt van de

renteopslag op contractuele leningen. Verder vinden we dat een toename in de kredietverlening resulteerde in een toename van de minimale provisies die banken aanhielden voor mogelijke verliezen ten gevolge van het uitbreiden van leningen aan minder kredietwaardige leners.

In Hoofdstuk 4, “Investors’ behavior and mutual fund portfolio allocations during the financial crisis in Brazil”, onderzoek ik de geldstromen en prestaties van beleggingsfondsen in Brazilië en de samenstelling van hun portefeuilles gedurende de financiële crisis. In overeenstemming met de empirische literatuur laat ik eerst zien dat de gevoeligheid van geldstromen van fondsen gevoelig zijn voor prestaties in het verleden en dat een grote uitstroom een negatief effect heeft op de rendementen van de fondsen. Hierbij maak ik gebruik van een grote dataset van beleggingsfondsen met verschillende investeringsstrategieën. Vervolgens laat ik zien dat beleggingsfondsen die blootgesteld waren aan deposito’s en effecten uitgegeven door kleinere banken een significante uitstroom hadden ten gevolge van de zorgen over de solvabiliteit van die banken na de val van Lehman Brothers in 2008. De rendementen van fondsen die blootstonden aan kleine banken werden ook negatief beïnvloed. Fondsen pasten hun portefeuilles aan door de blootstelling aan deposito’s van kleine banken te reduceren, maar toen de garantielimieten voor termijndeposito’s werden verhoogd, namen de fondsen weer meer risico. Onze resultaten illustreren de potentiële risico’s die gepaard gaan met vermogensbeheer in de zin dat nauwe verbanden met andere financiële instellingen transmissie van schokken tussen markten kunnen bevorderen.

The background of the page is a light gray with a subtle, repeating pattern of a stylized circuit diagram. The diagram consists of a central vertical line with a circle at the top, connected to a horizontal line that branches into several vertical lines of varying heights, resembling a bus or a network structure. In the bottom right corner, a large, bold, black number '10' is prominently displayed. The number has a textured, wavy appearance, suggesting it might be a page number or a chapter indicator.

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.