C E U

The Public Defense

of the Doctoral Thesis in Economics

by

Miklós Farkas

on

Three Essays on Financial Economics

will be held on

Thursday, May 25, 2017 at 10:00 am

in

N13 Room 118,

Central European University,

Nador utca 13, Budapest, Hungary

Thesis Committee

Botond Kőszegi (Chair)
Hubert János Kiss (External member)
Alessandro De Chiara (Internal member)

Supervisors

Péter Kondor and Adam Zawadowski

Examiners

Francesco Sangiorgi, Associate Professor at Frankfurt School of Finance and
Management, Finance Department
(External examiner)
Alessandro De Chiara, Assistant Professor at Central European University,
Department of Economics
(Internal examiner)

The doctoral thesis is available for inspection
at the CEU Economics Department

Abstract

My thesis contributes to understanding how innovative financial assets affect the behavior of financial market participants. The first two chapters focus on why credit rating agencies failed to correctly assess the riskiness of innovative structured products, like those of collateralized debt obligations. The third chapter investigates how the introduction of retail structured products may lead to systematic patterns in aggregate retail investor behavior.

The subprime crisis began to unfold when markets realized that structured products designed to be safe are, in fact, toxic. Credit rating agencies prolonged this misperception by granting triple-A credit ratings to many of these assets. In an applied game theoretic setting, I derive the conditions in Chapter 1 under which credit rating agencies operating in a duopoly, similarly to S&P and Moody's, are likely to provide overly optimistic assessments of risk. The main innovation of Chapter 1 is that I allow agencies to learn about each other's assessments during the rating process. Importantly, learning enables agencies to cater credit ratings, that is, offer a higher rating to a given issuer based on the other agency's more favorable assessment. Catering is harmful for social welfare as it reduces the informativeness of ratings. I show that the negative welfare implications of catering are most severe when the skewness of the rated assets' payoff is large, similarly to the payoffs of collateralized debt obligations. Chapter 2 builds on the framework of Chapter 1 and investigates how a rating agency calibrates its information technology as a response to changes in its business environment and also whether it has sufficient incentives to invest into information acquisition. I show that the agency's business environment has a strong effect on calibration and, in turn, on rating standards. Additionally, while the agency's ability to calibrate may have the benefit of alleviating conflicts of interests in the industry, when these conflicts are extreme, the agency chooses to ignore additional information about rated assets' quality. This helps to reconcile the empirical evidence documented in the literature on structured ratings, according to which agencies ignored valuable information that was available to them at the time they issued their ratings.

The third chapter is joint work with Kata Váradi and it focuses on retail structured products that are derivatives designed by banks for individual investors. Retail structured products became increasingly popular in the last decade as they enabled individual investors to trade with complex assets, that were previously not available to them. We analyze both empirically and theoretically a subset of these products, called knock-out warrants. Individuals can trade with knock-out warrants through stock exchanges and they allow individuals to place leveraged speculative bets in the market of their chosen underlying, like a stock index or a commodity. We show theoretically that in these markets individuals, on average, are likely to

bet on price reversals, even if at the individual level investors randomly choose the direction of their respective bet. Using proprietary data from a bank, we provide supportive evidence for our prediction. We speculate that the setup of these markets may be beneficial for the banks if they need to hedge their own exposure to the underlying asset.

The results of my thesis suggest that the presence of innovative financial assets often affect the behavior of market participants. In particular, assets with highly skewed payoffs may change market outcomes in unforeseen ways. The skewed payoffs of collateralized debt obligations seem to have an adverse effect on rating agencies' incentives to exercise due diligence. On the other hand, the skewed payoffs of knock-out warrants results in unintentional but predictable aggregate behavior of individual investors.

Chapter 1: Credit Rating Catering

I analyze how competition between credit rating agencies affects market efficiency. As a main innovation, I introduce information flows between rating agencies that take place during the rating process. In the model, rating agencies cannot commit to truthfully reveal their information, but they have to pay a penalty whenever a project carrying their high rating defaults. The key insight is that competing agencies in a duopoly are tempted to cater ratings, that is, agencies selectively offer better ratings to issuers based on the more favorable assessment of the other agency. As a main result, I show that catering in a duopoly may lead to lower welfare than achieved with a monopolist agency even though agencies in a duopoly have more information. Two conditions are key to this result. First, agencies frequently need to disagree about fundamentals, which creates opportunities to cater ratings. Second, the rated asset's payoff needs to be sufficiently skewed to the left, which makes catering in a duopoly relatively cheap. These features seem to match the characteristics of complex structured products, which are difficult to precisely evaluate and have skewed payoffs by design.

Chapter 2: The Benefits of Loose Rating Standards

I study the information technology choice of a credit rating agency. The information technology classifies projects as good or bad and may commit two types of errors: it may classify a project as good that later defaults or it may classify a project as bad that would otherwise succeed. After its private signal about the project's quality is realized, the rating agency cannot commit to truthfully reveal it. However, the agency faces penalties if a project with a high rating defaults. When the penalties are relatively high the agency cannot afford to misclassify bad projects. However, when the penalties are relatively low the agency does not want

to misclassify good ones. In the latter case the agency's conflict of interests is alleviated as projects classified as bad will, in fact, be correct, which maximizes the expected penalty for misreporting their signals. When the agency cannot commit to truthfully reveal its signals, it will not want to invest in a more precise technology because the additional information is ignored. I connect the results to stylized facts on fluctuations of rating standards.

Chapter 3: Individual Investors Exposed (joint with Kata Váradi)

We show in a simple model that investors' aggregate position is influenced by the menu of available products. Our focus is on exchange traded call and put knock-out warrants, because they are popular among individual investors who seek directional bets. If investors allocate their funds randomly between calls and puts, then their aggregate position will depend on the relative leverage of the offered call and put warrants. By construction, the leverage of calls will be higher than the leverage of puts after recent declines in the underlying. Hence, investors will take a long position after declines in the underlying and a short position after increases in the underlying, on average. This behavior is equivalent to betting on price reversals. We present supporting empirical evidence for our predictions. Using a unique, proprietary data set obtained from a bank, we are able to compute the aggregate position of retail investors who hold knock-out warrants. We speculate that this might be beneficial for banks' liquidity management if banks act as market makers on the underlying asset's market.

Curriculum Vitae

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Education

2011-present	Central European University, PhD Candidate in Economics
2009-2011	Central European University, MA in Economics (with distinction)
	Title of Thesis: Housing Demand and Demographic Trends: Evidence from Hungary
2004-2009	Corvinus University of Budapest
	Major: Macroeconomic Analyst and Forecaster Minor: Applied Statistics
	Title of Thesis: Interrelated Factor Demand in Hungary: a Microeconometric Approach.
2006-2009	Széchenyi István College for Advanced Studies, Hungary
	Specialization: Financial Economics

Professional Interests

Financial Economics, Applied Econometrics

Research Experience and Other Employment

2013-2016	Research Assistant, Central European University. Project leader: Peter Kondor (Associate Professor, Central European University)
	Conducted literature reviews, checked proofs, organized datasets.
2013, Spring	External Research Assistant, OECD Development Centre. Project leader: Margit Molnar (Researcher, OECD)
	Conducted microeconometric analysis of productivity for developing countries.
2010–2011	Junior Researcher at ELTEcon Center for Real Estate Research (ELTINGA)
	Developing statistical valuation models and house price indices.

Teaching experience

2013-	Lecturer at Eötvös Loránd University, Budapest
	Course: Investments.
2010-2013	Instructor at Széchenyi István College for Advanced Studies,
	Courses: Financial Economics I-II.
2012–2014	Teaching Assistant at the Department of Economics, Central European University. Delivered seminars in Mathematical Statistics, Introductory Microeconomics and Mathematics for Economists.
2005–2008	Teaching Assistant at the Department of Microeconomics and at the Department of Macroeconomics at Corvinus University of Budapest. Delivered seminars in Introductory Microeconomics, Intermediate Microeconomics and Introductory Macroeconomics.

Working Papers

Credit Rating Catering

The Benefits of Loose Rating Standards

Individual Investors Exposed (joint with Kata Váradi)

Publications

The link between past informal payments and willingness of the Hungarian population to pay formal fees for health care services: results from a contingent valuation study. (Jointly with Petra Baji, Milena Pavlova, László Gulácsi and Wim Groot.) *The European Journal of Health Economics* , 15(8), 2014

Spatial structure of the Budapest office market (Jointly with Aron Horvath, Norbert Czinkan, Stefania Danko, Laszlo Gondor, Gabor Revesz and Gabor Sooki-Toth.) *Space and Society*, 27(1), 2013 (Written in Hungarian.)

Financial Applications of Markov Chains. (2008). In: Major, K. (Ed.) (2008) Markov Models. Budapest, ELTE, Regional Science Studies 14. pp. 72-87. (Written in Hungarian.)

Presentations

2017	ESSEC Business School; Tilburg University; McGill University; BI Norwegian Business School; Deutsche Bundesbank; University of Bristol
2016	9th RGS Doctoral Conference; HEC Lausanne
2014	Warsaw International Economic Meeting
2013	Annual Conference of the Hungarian Society of Economics

Awards, grants

2017	Award for Advanced Doctoral Students, Central European University
2016	Write-up Grant, Central European University

2014	Doctoral Research Support Grant (Visiting scholar at Columbia Business School during the fall of 2014.), Central European University
2013-2014	CERGE-EI Teaching Fellow
2013	Honorary Professor of Széchenyi István College for Advanced Studies
2012	Academic Achievement Award for First-Year Doctoral Students, CEU
2011	"Outstanding MA Thesis Award" by the Department of Economics, CEU

SUMMER SCHOOLS

2015	Summer School on Financial Intermediation and Contracting, Washington University, St. Louis
2013	4th PhD Summer School in Dysfunctional Financial Markets, Paul Woolley Centre, London School of Economics

SKILLS

Languages:	Hungarian (native), English (fluent), German (fading)
Softwares:	STATA, EViews, MATLAB, Python.