Annual Report

2013

Centre for Finance
University of Gothenburg

GÖTEBORGS UNIVERSITET

VINNOVA

RESEARCH AND INNOVATION

FOR SUSTAINABLE GROWTH

Annual Report 2013

Centre for Finance
University of Gothenburg

Visiting address:
Vasagatan 1, D5

Postal address:
Box 640
405 30 Göteborg, Sweden

Tel: +46-31-786 52 40
Fax: +46-31-786 51 14
cff@handels.gu.se
www.cff.handels.gu.se

Research 2013 – Annual Report

Centre for Finance research catalogue

University of Gothenburg, September 2014

CONTENTS

1. Research at CFF

The centre for Finance at University of Gothenburg has an interdisciplinary and collaborative ambition and methodology to address the critical challenges of financial intermediation of the day as those challenges impact on the national and global financial system, the larger economy and society at large. The objective is to conduct high-quality research and analysis about the proper role and functioning of financial intermediation in local and global economies and societies.

Financial intermediaries are firms that borrow from consumers/ savers and lend to companies that need resources for investment. Thus, financial intermediaries are central institutions for economic growth since the savings/ investment process is organized around them. However, before the financial crisis in 2008, there was a widespread view that financial intermediaries could be ignored because they had no real effect. Our view is that the savings-investment decision, the working of capital markets, corporate finance decisions, and financial consumer choices cannot be understood without studying financial intermediaries. Furthermore, the relationship between bank health and business cycles motivates the widespread government policies concerning bank regulation and supervision, deposit insurance, capital requirements, the lender-of last-resort role of central banks and so on. Thus, the design of public policies depends on our understanding of the problems with intermediaries (Gorton and Winton, 2002).

The major research areas at the Centre are financial consumer behavior (behavioral finance), credit risk modelling (financial mathematics), studies of limit order books and high frequency trading (financial econometrics), bank regulation (bank management and law), delegated portfolio management (economic contract theory and experimental finance), and venture capital (law and finance). During 2013, roughly 20 people were actively involved in research projects at the Centre. Affiliated researchers come from the departments of Business Administration, Economics, Mathematics, and Psychology.

A more detailed report on past and present research activities, published works, participation in conferences and current research projects is given below in Sections 2-4.

<u>Research organization</u>

The research activities at the Centre are organized in three levels. The primary level is the individual project, which of course may involve several people. The next level is the research group, which has regular informal meetings and discussions. Four such groups are active: Behavioural Finance/Economic Psychology, Banking and Financial Institutions, Private Equity/ Venture Capital, and Financial Econometrics. A researcher may of course belong to more than one group. The research groups have one or two research leaders, and the research leaders form CFF’s management team. The management team proposes research activities, conducts supervision of the different research projects, and plans and coordinates other CFF activities such as conferences and seminars. The team is also responsible for recruitment of researchers.

The third level is the centre’s seminars, common to all researchers. The CFF seminars are typically reserved for invited speakers from the financial industry or other academic institutions. The lunch seminars are reserved for CFF researchers or researchers from other academic institutions who are interested in presenting work in progress. A list of seminars 2012 is given below (see Section 5).

An interdisciplinary centre

In October 2011, CFF officially became one of the interdisciplinary (across faculties) research centres within the University of Gothenburg. The objective of the research centres is to provide an organizational structure that enables interdisciplinary research. The faculties involved in CFF are the School of Business, Economics and Law, the Faculty of Social Sciences (Psychology) and The Faculty of Science/Chalmers (Mathematics). CFF has its administrative base at a "host department", which is the Department of Economics and Statistics.

The organization is built on the principle that the researchers, doctoral students and administrative staff keep their positions at their "mother departments" within the university. This structure has several advantages. First, it makes interdisciplinary research strategies possible without losing contact with the development in the different disciplines involved. Second, the arrangement is likely to facilitate collaborative efforts between the centre and other departments within the university. Third, the organization is likely to reduce the risks of CFF being isolated from other departments within the university. Fourth, it facilitates flexibility with respect to personnel.

The steering group (the board of CFF) consists of representatives from the involved faculties. The steering group also has one representative and one substitute from the business community. The tasks of the steering group have bearing on the strategic management and the development of the Centre. This includes decisions concerning annual and long-term planning and the budget.

The Centre also has a scientific advisory board. The functions of the advisory board are to advise and give support to the steering group and the management team. This includes assessing progress, providing quality control and acting as a link to the international research community. The advisory board consists of Professors Sudipto Dasgupta, Hong Kong University of Science and Technology, Erich Kirchler, University of Vienna, Phil Molinuex, Bangor University, Anjan Thakor, Washington University, and Karin Thorburn, Norwegian School of Economics and Business Administration.

Research Resources

The researchers at the Centre have access to international company and market data via Thomson Datastream and Bureau van Dijk's Orbis. Company events and corporate governance information is available in Capital IQ. Data on banks is available via Bureau van Dijk's Bankscope and information on investment funds is available in Morningstar. During 2014 we have also acquired access to Wharton Research Data Services (WRDS), Compustat, and CRSP.

In the finance lab all 15 stations have access to Bloombergs and Thomson Reuters. The finance lab is also equipped with partition walls etc such that it can be used for economic experiments.

2. Published works during 2013

Journal articles

Carlander, A., D. Peterson, A. Gamble, T. Gärling, L. Johansson, M. Holmén (2013). Choices of savings options related to investor-skill beliefs and trust in banks. *Journal of Financial Services Marketing*, 18(2), 121-136.

Dijk, O., M. Holmen, M. Kirchler (2014). Rank Matters - The impact of social competition on portfolio choice. *European Economic Review*, 66, 97-110.

Dijk, O., R. Frank, A. Levine (2013). Expenditure Cascades. *Review of Behavioral Economics*, 1, 55-73.

Gärling, T. M. Andersson, M. Hedesström (2013). A social-psychological perspective on herding in stock markets. *Journal of Behavioral Finance*, forthcoming

Bielecki, T., A. Cousin, S. Crépey, A. Herbertsson (2013). Dynamic Hedging of Portfolio Credit Risk in a Markov Copula Model. *Journal of Optimization Theory and Applications*, forthcoming

Bielecki, T., A. Cousin, S. Crépey, A. Herbertsson (2013). A Markov Copula Model of Portfolio Credit Risk with Stochastic Intensities and Random Recoveries. *Communications in Statistics - Theory and Methods*, forthcoming

Bielecki, T., A. Cousin, S. Crépey, A. Herbertsson (2013). In search of a grand unifying theory. Creditflux Newsletter, July, 20-21

Frey, R., A. Herbertsson (2013). Parameter estimation in credit models under incomplete information. *Communications in Statistics - Theory and Methods*, forthcoming.

Chaboud, A., B. Chiquoine, E. Hjalmarsson, C. Vega (2013). Rise of the machines: Algorithmic trading in the foreign exchange market. *Journal of Finance*, forthcoming.

Holmen, M., M. Kirchler, D. Kleinlercher (2014). Do Option-like Incentives Induce Overvaluation? Evidence from Experimental Asset Markets. *Journal of Economic Dynamics and Control*, 40, 179-194.

Hamberg, M., T. Mavruk, S. Sjögren (2013). Investment allocation decisions, home bias and the mandatory IFRS adoption. *Journal of International Money and Finance*, 36, 107-130.

Mavruk, T. (2013). Local Bias and Indisputable Preference. *International Journal of Economic Perspectives*, 7(1)**.**

Books and book chapters

Elliot, V. (2013). Performance Management Systems in Swedish Savings Banks: A Longitudinal Study through the First Quarter-Century of Deregulation. In *Bank Performance, Risk and Securitisation,* Palgrave Macmillan.

Gärling, T. (2013). Understanding beneficiaries' attitudes: Should fiduciary duty include social, ethical and environmental concerns? In *Cambridge Handbook of Institutional Investment and Fiduciary Duty*, Cambridge University Press. Forthcoming.

Bielecki, T., A. Cousin, S. Crépey, A. Herbertsson (2013). A bottom-up dynamic model of portfolio credit risk - Part I: Markov copula perspective. In *Recent Advances in Financial Engineering 2012,* World Scientific, forthcoming

Bielecki, T., A. Cousin, S. Crépey, A. Herbertsson (2013). A bottom-up dynamic model of portfolio credit risk - Part II: Markov copula perspective. In *Recent Advances in Financial Engineering 2012,* World Scientific, forthcoming

Lindblom, T., M. Willesson (2013). Basel III and Banking Efficiency. In *Bank Performance, Risk and Securitisation,* Palgrave Macmillan.

Lindblom, T., G. Sandahl (2013). The Role of Trade Credit and the Cost of Capital. In *Bank Stability, Sovereign Debt and Derivatives,* Palgrave Macmillan.

Sjögren, S., G. Bergendahl (2013). The Management of Foreign Exchange Exposure. In *Bank Stability, Sovereign Debt and Derivatives,* Palgrave Macmillan.

Lindblom, T., S. Sjögren, M. Willesson (editors) (2013). *Governance Regulation and Stability,* Palgrave McMillan, forthcoming

Lindblom, T., S. Sjögren, M. Willesson (editors) (2013). *Financial systems, markets and institutional change,* Palgrave McMillan, forthcoming.

3. Presentations at scientific conferences, symposiums, workshops etc, 2013

Bakke, E. *American Finance Association Meeting*, San Diego. Paper: Public information and IPO underpricing

Carlander, A. *European Association of University Teachers of Banking and Finance*, Wolpertinger conference, Gothenburg, Paper: Trust-mediated effects of personal services on satisfaction with banks.

Carlsson Hauff, J. *European Association of University Teachers of Banking and Finance*, Wolpertinger conference, Gothenburg, Paper: Effects of format of financial information to bank customers – narrative versus analytical processing.

Elliot, V. *European Association of University Teachers of Banking and Finance*, Wolpertinger Conference, Gothenburg. Paper: Funds Transfer Pricing in Swedish Savings Banks - A survey

Gamble, A. *SABE/IAREP/ICABEEP Conference*, Clayton State University, Atlanta. Paper: Beliefs in differences between professional and lay stock investors' proneness to judgmental biases.

Gärling, T. *Behavioural Finance Research Group Conference*, Queen Mary University of London. Paper: Affect account of disposition effect and consequences for stock prices.

Gärling, T. *Experimental Finance Symposium*, Tilburg University. Paper: Experienced utility, current mood, and recalled current moods: How people in general (as well as investors?)

Holmén, M. *European Economic Association Annual Meeting*, Gothenburg. Paper: Rank Matters - The impact of social competition on portfolio choice.

Holmén, M. *Nordic Behavioral and Experimental Economics Conference*, Stockholm. Paper: Rank Matters - The impact of social competition on portfolio choice.

Lindblom, T. *15h Annual SNEE European Integration Conference*, Mölle, Sweden. Paper: Individual Investors' Portfolio Choice and Birthplace Bias Evidence from portfolios of European investors – the case of Sweden.

Mavruk, T. *15h Annual SNEE European Integration Conference*, Mölle, Sweden. Paper: How do intellectual property law regimes within the EU affect innovation activity?

Sjögren, S. *Entrepreneurship and Finance Conference*, Lund, Sweden. Paper: Market Structure and the Value of an Idea.

Zhang, J. *55th Annual Conference of the Academy of International Business*, Istanbul, Turkey. Paper: Macroeconomic Fluctuations as Sources of Luck in CEO-compensation.

4. Ongoing research projects

A. <u>Economic Psychology and Experimental Finance</u>

Research in economic psychology and experimental finance covers questions such as i) how investment decisions are influenced by the frequency of performance-related rewards and punishments, ii) what factors account for the degree of trust in financial institutions and how this trust influences financial consumers' decision making process, iii) how investors can be made to choose socially responsible investments (SRI) funds for their retirement savings, iv) what drives the positive link between Corporate Social Responsibility (CSR) and firm performance, documented in the literature, and v) how do convex and tournament type incentives contracts in the financial industry affect risk-taking and the behavior of financial markets.

Subproject 1: Impact of incentive system and monitoring frequency on portfolio managers´ investment decisions (*Tommy Gärling is research leader)*
The project aims to explore how changes in how portfolio managers are incentivised and monitored are likely to affect their investment decisions. Counteracting short-termism within the finance sector is believed to facilitate for companies to manage their practices in a way reconcilable with sustainable development. Empirical evidence of whether prolonged monitoring intervals affect investment decisions is however largely lacking. We address this question experimentally, applying insights from psychological decision making research. Specifically, our aim is to investigate how the extent to which information about companies' environmental performance influences investment decisions depends on investment horizon, frequency of monitoring, size of performance-related rewards/punishments, and the introduction of a "green bonus" parallel with conventional performance-related rewards.

Subproject 2: Trust and affect (*Tommy Gärling is research leader*)
The purpose of the project is to identify critical steps in the interaction zone between financial consumers and financial service providers. These critical steps will then be analyzed using knowledge and analytical tools at the academic research frontiers of marketing, financial economics, and psychology. From society's point of view, an increased knowledge of individuals' financial decision-making is important. From the perspective of the finance industry, the low involvement in financial services and the resulting passivity of the financial consumer is a frequently recognized obstacle to rational decision making. Why does choice of retirement saving not attract more attention when it entails one of the most important financial decisions people make? A traditional marketing framework based on the view that financial consumers make rational decisions does not seem sufficient. Recent academic research bringing in other views of the financial consumer is needed and will be drawn on. Using surveys and experiments the project will investigate (1) the role trust in financial institutions play in consumers' decision- making process and what factors account for the degree of trust they have, (2) whether and how affect-inducing narrative messages would increase consumers' involvement as well as accurate pre-decision information acquisition about financial products, and (3) to which extent such more accurate information acquisition would increase consumers' trust.

Subproject 3: Promoting integration of environmental concerns in pension savings and stock market investment decisions (*Martin Hedesström is research leader)*

Any future change towards sustainable development must begin with corporations taking their environmental and social responsibility. One way of exerting pressure on companies to do so is by investing in Socially Responsible Investment (SRI) stock funds. Research shows no financial penalty for this. The project will investigate why a majority of investors still refrain from doing so and what may sway them change. This will be accomplished by means of a survey and follow-up experiments investigating the influence of "choice architecture", that is how people by the way of how choice options are designed and presented are helped to make choices better aligned with their values and preferences. Studies will be made of (a) the influence of beliefs, attitudes, and values on choice of investing/not investing in SRI, and (b) whether non-SRI investors who differ in these aspects also differ with respect to how susceptible they are to various measures aimed at increasing SRI investments, such as (i) providing information about SRI, (ii) structuring choice alternatives making SRI a salient feature, and (iii) providing information about other investors' choices of SRI funds. This project will take SRI research to the next level by determining how SRI may increase its share without evidence of financial outperformance.

Subproject 4: Convex and tournament incentives in financial markets *(Martin Holmén is research leader)*
The objective of this subproject is to explore the combined effect of convex and tournament incentives on investment managers' risk-taking and ultimately the behavior of asset markets. It has been argued that convex and option-like incentive schemes in financial institutions leads to excessive risk-taking and asset market bubbles. In the first part within this sub-project we ran laboratory asset markets and investigated the impact of option-like incentives on price formation and trading behavior. The main results were that we observed significantly higher market prices with option-like incentives than linear incentives. We further found that option-like incentives provoked subjects to behave differently and to take more risk than subjects with linear incentives.

Besides option-like and convex incentives for portfolio managers, there is also a tournament among portfolio managers for capital inflow into the fund. Furthermore, since the managers' compensation is a function of fund size, fund managers face tournament incentives. In the second part of this project we focused on the effect of tournament incentives schemes on risk-taking behavior. In laboratory experiments we investigated how relative performance-based incentive schemes and status concerns for higher rank influenced portfolio choice. We documented that both underperformers and over-performers adapted their portfolio-risk to their current relative performance.

In the third ongoing part of this project we will examine the combined effect of convexity and tournament on risk taking. We note that a convex payoff-rank relationship is not equivalent to a convex payoff-performance relationship. In fact, any payoff-rank relationship that satisfies monotonicity, including the convex one, always leads to a (weakly) concave payoff-performance relationship in equilibrium. Thus, when the explicit convex compensation is already in place, introducing the tournament concavifies the payoff-performance relationship and attenuates, as oppose to exaggerates, risk taking induced by explicit convex compensation. The next step will be to test these theoretical predictions using laboratory asset markets.

Productivity: Economic psychology and experimental finance

During the past three years research within economic psychology and experimental finance has generated eight publications in refereed journals in economics (e.g. *European Economic Review, Journal of Economics Dynamics and Control,* and *Journal of Socio-Economics*) and finance (e.g. *Review of Behavioral Finance* and *Journal of Investing*) but also marketing (*Journal of Financial Services Marketing).* Furthermore, four papers are under review at international journals and two papers have been published as book chapters.

B. Financial Institutions, Instruments, and Regulation

The financial markets have changed considerably over the past decades. Financial institutions in general and banks in particular are exposed to increasing globalisation, changing regulations and, recently, a world-wide financial crisis. The last years the financial system has gradually recovered after massive Government interventions both in the US and in the EU. In Scandinavia, banks and insurance companies are reporting increasing returns. In other parts of Europe the picture is more mixed. Although countries like Greece, Ireland, Italy, Portugal and Spain are showing early signs of recovery there are still huge social problems and the situation is very unstable. The response from Governments and regulatory authorities has been to introduce new and stricter capital adequacy and liquidity requirements for banks, but also for other financial institutions. Our research address questions related to the underlying arguments for such requirements and the potential implications for the operations and viability of financial institutions but also their financial performance and management more in general. The subprojects are described below.

Subproject 1: Basel III and Banking Efficiency *(Ted Lindblom is research leader)*
This study aims at examining Basel III's likely impact on banking efficiency. An analysis based on afictitious bank, which is operating at the very edge of the Basel II regulatory capital requirement and gradually adapts to the new regulatory framework is presented in **Lindblom and Willesson** (2013). The overall aim of the Basel III accord is to minimize and preferably eliminate the risk of global financial turmoil's in the future. The accord is emphasising the importance of increasing the capitalization of banks and their liquidity. This analysis demonstrates that the new liquidity and capital adequacy requirements of Basel III are likely to have substantial effects on both the returns and risk exposures of banks. The higher liquidity requirement will not only lower the bank's liquidity risk, which will lead to less interest revenue, but the bank will also lower its interest rate risk exposure. The sharpened capital adequacy requirements will on one hand result in lower return on equity. On the other hand, the return on assets will increase due to a lower proportion of debt in the bank's funding. The analysis also implies that Basel III will cause a large price effect if market competition is too weak to make banks price-takers. Hence, a bank's customers will have to pay higher prices for loans of the same risk class and/or get paid lower interest rates on their savings and deposits.

Subproject 2: Financial crisis and EU banks' performance (*Ted Lindblom is research leader*)
This study aims at examining the impact of the financial crisis on the profitability and risk-taking of banks within the EU. Particular emphasis is put on analyzing how the crisis affected banks' profitability with respect to their exposures to different kinds of financial risk, i.e. to credit risk, liquidity risk, interest rate risk and capital risk. Comparisons are made between banks in different regions in the EU as well as between different types of banks in order to explore whether there are differences in the financial performance and risk-taking of the banks with respect to their geographical operations area (nationality) and association form.

The analysis shows that the banks' overall profitability in terms of return on equity (ROE) was clearly affected by the financial crisis on the EU level as well as in most of the regions. Many banks seem to have suffered severely; particularly in the West European region. Savings banks did, on average, manage the crisis better than commercial banks. This might be explained by that the banks were exposed to different types of risks. These exposures did change during the time period studied; regionally as well as with respect to association form.

Subproject 3: European savings banks and Basel III *(Ted Lindblom is research leader)*
The Basel III regulations are believed to hamper small business lending by forcing banks to reduce their exposure to credit risk. This survey aims to document the effects from the Basel III regulation on small business lending. In addition, views from the European savings banks community about the prospect of their future business environment will be documented to gain further knowledge about the consequences of regulation.

This subproject also investigates the potentially isomorphic effect of regulation and the consequences for diversity on the financial markets. The cost of the new bank regulations is estimated to have a large societal impact in Europe but is still motivated by the creation of a more robust financial system. However, there are some recent concerns that imposing the same regulation on all banks may, in fact, increase systemic risk if banks and bank practices becomes too similar.

Subproject 4: Performance management systems in Swedish banks (*Viktor Elliot is research leader*)
The project first analyses how Swedish banks have adapted their strategies, organizational structures and risk management practices over the past 25 years. The project contributes to our understanding of how banks respond to external pressures and the potential consequences of imposing a stricter regulation.

The second part of the project aims to investigate what type of Fund Transfer Pricing (FTP) practices small and local banks use and how the information gained from the FTP system is utilized in the performance management systems of these banks. The financial crisis resulted in a large critique against bank risk management practices. FTP was identified as an important area for improvement by both international regulators and the Swedish Financial Supervisory Authority.

Productivity: Financial Institutions, Instruments, and Regulation
During the past three years research within financial institutions has generated several book chapters and working papers. Furthermore, CFF researchers are the editors of two forthcoming Palgrave Macmillan volumes: *Governance, Regulation and Bank Stability* and *Financial Systems, Markets and Institutional Change*.

C. <u>**Credit Risk Modelling**</u>

Research in credit risk modelling covers the areas of default contagion models, modelling and pricing basket credit derivatives, modelling credit risk under incomplete information, ratings of asset backed securities, credit VaR-applications, counterparty credit risk, clearing houses and systemic risk. The subprojects are described below. These projects are done by CFF researcher Alexander Herbertsson together with various co-authors.

Subproject 1: Dynamic modeling of portfolio credit risk with common shocks

In this project we have developed a model for heterogeneous credit portfolios that allows for separate calibration of the individual default times and the common default dependence, a so called Markov copula model. These features in a model are highly desired when for example hedging a heterogeneous CDO portfolio, but also for realistic counterparty risk management of portfolios on derivatives involving counterparty risk.

Subproject 2: Credit models under incomplete information
In this project we have derived practical formulas for CDS index spreads and options on these instruments in the filtering model of Frey & Schmidt (2010). Further, we have also outlined a novel approach for estimating the parameters in the filtering models by using time-series data of CDS index spreads and classical maximum-likelihood algorithms. The calibration-approach incorporates the Kushner-Stratonovich SDE for the dynamics of the filtering probabilities.

Subproject 3: Rating asset backed securities using intensity based models
Rating asset backed securities (ABS) is an important topic which became clear during the financial crises 2007-2009. In a project we have developed an intensity based model for rating ABS-s. The model simultaneously incorporates default and prepayment curves into the calibration of the framework. Furthermore, the model includes a more realistic dynamic factor process which drives the intensities of the random default and prepayment times, as opposed to the more static copula approach often used in the industry when rating ABS-s.

Subproject 4: Counterparty credit risk
Since the default of Lehman Brothers and the following credit crises during 2008-2009, market participants have put a lot of focus on counterparty credit risk in their derivatives transactions. In this project we study different research questions connected to the topic of counterparty credit risk with a focus on portfolio modeling and dynamic dependence modeling.

Subproject 5: Clearing houses and systemic risk
In an attempt to find a remedy to the problems that emerged during the credit crises with systemic risk and counterparty risk on the derivatives markets, financial actors have recently together with regulators, established clearing-houses, also called Central Counterparties (CCPs) for all types of so called OTC-derivatives. A clearing-house (CCP) will hopefully eliminate all (or most of the) counterparty risk. However, there are concerns that the creation of a CCP will concentrate the systemic risk to one isolated institution, which in fact can create more financial damage than otherwise. In this project we study different questions regarding CCPS such as: How shall “optimal” Central Counterparties (CPPs) be constructed in order to minimize systemic risk?

Productivity: Credit Risk Modelling
During the past three years credit risk modeling research has generated five publications in refereed journals in finance, statistics and applied mathematics (e.g. *Review of Derivatives Research, Statistics and Probability Letters, Communications in Statistics - Theory and Methods* and *Journal of Optimization Theory and Applications*). Furthermore, three papers have been published as book chapters in books on Quantitative finance (*Oxford university press* and *World Scientific*). One paper have been published in a professional banking/finance magazine (*Creditflux Newsletter*).

D. <u>Private Equity and Venture Capital</u>

The research on private equity and venture capital covers i) the contractual relationship between the different players in the venture capital industry and the market for ideas. ii) The market for ideas project addresses the process that begins with allocation of savings by households for investment in what is defined as radical ideas that are not pursued by firms and other business organizations in the normal process of business. The projects aim to give contributions to our overall knowledge on the importance of innovative activity in a society. The research addresses questions such as: 1) What legal system of intellectual property law is likely to maximize the benefits of the contribution of ideas? 2) What are the necessary conditions for the market for ideas? 3) What is the contribution of ideas to future consumption in the aggregate? This research includes researchers from economics, finance, business and law captivating the advantage of the research structure at the School.

Subproject 1: Moral hazard and contracting in venture capital limited partnership *(Dawei Fang is research leader)*
In this project, the focus is on agency problems and contract designs in limited partnership agreement between the venture capitalist (VC) and investors. The VC-investor contract typically has a "debt" feature: the VC receives limited or no performance-based compensation unless the VC creates a profit for the fund. This "debt" feature can induce the VC to invest in risky but inefficient projects. Thus, why does the VC compensation has this feature? In the first part of this sub-project, we explain this feature by the VC's moral hazard of effort diversion: the VC cannot commit to putting effort in the existing fund and may divert effort from the existing fund to outside projects by raising new funds.

In the second part of this subproject, we study how to mitigate the risk-shifting problem induced by the "debt" feature of VC compensation. We find that agency conflicts are minimized if the VC-investor financing arrangement satisfies the following three conditions: (1) use portfolio financing rather than stand-alone financing; (2) use covenants to restrict the VC's investment duration; (3) restrict the convexity of the VC's upside sharing. However, to satisfy all the three conditions, the VC may have to offer investors rents and when the rents offered to investors are too large, the VC may use some less efficient but rent-saving arrangements by, for example, keeping the fund's size small or not using restrictive covenants.

Subproject 2: Intellectual property regimes and financing of ideas *(Stefan Sjögren is research leader)*
In this research the focus is on the innovative activity that takes place outside incumbents R&D activities. We recognize that different intellectual property law regimes both theoretically and empirically do impact the incentives to innovate and commercialize ideas. We ask how intellectual property law regimes affect the innovative activity and risk capital financing. The general issue is if a strong or a weak intellectual property law regime makes a difference. In particular we do ask if it matters to treat intellectual property in the legal sense or as a regulation of competition. Unlike the earlier studies on legal regimes and finance our aim is to investigate intellectual property law regimes and to characterize patent laws along different dimensions. We find that strong intellectual property law regimes will encourage patent activity and external financing levels up to a certain point. After this point patent activity and/or financing activity will decrease. Patent law can be extended too far and block creativeness thereby preventing those that recognize the value of combining ideas

Subproject 3: The role of new entrants in promoting innovation in monopolistic markets *(Stefan Sjögren is research leader)*

New ideas, once commercialized, are important ingredients in economic and social growth. As far as such ideas add to the value of existing assets, owners of these assets will implement new ideas whenever they can. However, if such ideas create value for new assets, and do so at the expense of existing activities and assets, owners of current assets will be less inclined to introduce them. Once a new technology is introduced by a new entrant everybody wins except the current firms and the owner of current technology. We have observed that incumbents do engage in patent trusts (see for example "the allied security trust") also called defensive patent organizations. These organizations purchase patents for their members, which pay subscription fees. The stated motivation for being a member of these defensive patent organizations is that they protect its members from infringement law suits from non-manufacturing patent purchasing entities, so called patent trolls. The results from our modelling suggest other motives for why incumbents may organize in these patent trusts. We also find that these patent trusts speed up innovative activity in a society by initiating the bidding process, and incentives commercialization.

Subproject 4: Financing innovation: Should you bet on the chef or the recipe? (*Einar Bakke is research leader)*

Using a Nordic Data Set of Venture Capital Exits we examine a twist on the classic analogy of whether to "bet the horse or the jockey". By using the intuition that the quality of human capital and know-how and investment stage ultimately will affect whether investors should invest based on the technology (patent) or the technologists (the know-how) to maximize chances of high Exit Returns. We are also interested in investors rent extraction by investment and exit stage as well as the use of angel financing.

Productivity: Private Equity and Venture Capital

During the last three years the research within the private equity area has resulted in 6 working papers presented at different research conference and a PhD dissertation (Hans Jeppsson). We expect the productivity within this research area to increase within the near future both in terms of published papers and new working papers.

E. Limit order books and high frequency trading

This is a new research area at the Centre and it is a result of Erik Hjalmarsson joining the Centre in 2013. The projects use state of the art econometrics techniques to analyse financial markets' micro-structure and the predictability of asset returns. The projects outlined below are done by Erik together with various co-authors unless other information is given. Details concerning co-authors involved in the different projects are reported in Table 5.

Subproject 1: High-frequency trading

Algorithmic trading (also known as computer-driven trading or robot trading) has become a dominant feature of many modern markets. In the first part of the project, we studied the impact of algorithmic trading in the foreign exchange market using a long time series of high-frequency data that specifically identifies computer-generated trading activity. Using both a reduced-form and a structural estimation, we found clear evidence that algorithmic trading causes an improvement in two measures of price efficiency in this market: the frequency of triangular arbitrage opportunities and the autocorrelation of high-frequency returns. Relating our results to the recent theoretical literature on the subject, we showed that the reduction in arbitrage opportunities is associated primarily with computers taking liquidity, while the reduction in the autocorrelation of returns owes more to the algorithmic provision of liquidity.

We also found evidence that algorithmic traders do not trade with each other as much as a random matching model would predict, which we view as consistent with their trading strategies being highly correlated. However, the analysis showed that this high degree of correlation does not appear to cause a degradation in market quality.

In a follow up project we use a unique and proprietary data set on high-frequency trading (HFT) in the UK stock markets. In particular, we are able to identify individual HFT firms, and analyze how they interact with each other, as well as with other major players in the market, such as the large investment banks.

Subproject 2: The need for speed: Minimum quote life rules and algorithmic trading
We study the impact of a minimum quote life rule imposed on the foreign exchange interdealer platform operated by EBS/ICAP. In particular, on June 15, 2009, EBS Imposed a Minimum-Quote-Life (MQL) rule of 250 milliseconds. That is, after this date, any quote post on the trading platform, had to remain active for a minimum of 250 milliseconds. Theoretically, such a rule should have a detrimental impact on market liquidity, making it more costly (risky) to post quotes. This is work in progress, and we analyze the impact of the MQL rule on various measures of market quality.

Productivity: Financial Econometrics and Empirical Asset Pricing
The first subproject resulted in a *Journal of Finance* publication. The other subproject is in an early stage.

5. Seminars

<u>CFF Seminars 2013</u>

February 20
Casper Rose
Copenhagen Business School
Danish firms corporate governance compliance - how does corporate governance add value?

February 27
Hampus Ericsson, President and CEO
JCE Group AB IFN
Green Circle, Consafe Offshore, Good Morning Hotels - how to work in an entrepreneurial investment company

March 6
Mikael Carlsson
Riksbanken and Uppsala University
Firm-Level Shocks and Labor Adjustment

April 10
Ola Bengtsson
Lund University
Different Problem, Same Solution: Contract-Specialization in Venture Capital

April 24
Johan Tydén, advokat/partner
Bird & Bird
Intellectual Property Rights as an obstacle or support to technological innovation - examples from Telecom and the Music Industry

May 13
Paolo Sodini
Stockholm School of Economics
Consumers and Financial Markets

May 15
Robin Hogarth
Universitat Pompeu Fabra
The illusion of predictability How regression statistics mislead experts

May 28
Hans Hvide
University of Bergen
Do entrepreneurs matter?

September 18
Lars Nordén
Stockholm University
How aggressive are high frequency traders?

September 26
Elke Weber
Columbia University
Who Takes Risks When and Why? Determinants of Financial Risk Taking

October 23
Cristoph Bertsch
Riksbanken
A detrimental feedback loop: deleveraging and adverse selection

November 13
Martin Svalstedt, Managing Director
Stena Adactum
Value Creation through Long-term ownership

November 14 (Félix Neubergh Lecture)
Helene Rey
London Business School
Capital flows, exchange rates and the international monetary system

November 20
Jonas Zakrisson
Datscha
Valuation of commercial properties: Market data and analysis for investors and institutions

December 4
Rune Andersson
En ekonomisk utblick

December 11
Aleksandra Gregoric
Copenhagen Business School
Sharing voice with employees: Implications for firm behavior and performance

CFF Lunch Seminars 2013

February 22
Reda Moursli
CFF
Corporate governance and stock return predictability

March 15
Xunhua Su
Norwegian University of Science and Technology
Product Market Predatory Threats and Contractual Constraints of Debt

April 12
Jens Forsbaeck
Lund University
The Conditional Effects of Market Power on Bank Risk –Cross-Country Evidence

April 26
Gerrit Antonides
Wageningen University, The Netherlands
Mental-budgeting effects on tax compliance of Dutch self-employed people

May 17
Richard Sweeney
Georgetown University
Constitutional and Political Transparency

June 14
Tommy Gärling
CFF and Psychology Department, University of Gothenburg
Experienced utility, current mood, and recalled current moods: How people in general (and investors?) respond to sequences of potential gains and losses

September 20
Dawei Fang
CFF
A Theory of Investment Duration of Venture Capital Funds

October 4
Juha-Pekka Kallunki
University of Oulu
Do White Collar Employee Incentives Improve Firm Performance?

October 11
Anders Johansson
Stockholm School of Economics
Mixing Business with Politics: Political Participation by Entrepreneurs in China

6. Visiting Researchers

Professor Tamir Agmon from the College of Management, Tel Aviv, Israel, April–May and September
Visiting Professor Programme

Gerrit Antonides, Wageningen University, The Netherlands
April 24-26
Invited by Tommy Gärling

Professor Shubhashis Gangopadhyay from India Development Foundation and Shiv Nadar University, India, May and September-October
Visiting Professor Programme

Professor Stefano Herzel from University of Rome, Italy,
May
Visiting Professor Programme

Professor Robin Hogarth, Universitat Pompeu Fabra, Barcelona, Spain
May 14-16
Invited by Tommy Gärling

Professor Michael Kirchler from University of Innsbruck, Austria, five visits during the year.
Visiting Professor Programme

Professor Richard Sweeney from Georgetown University, U.S.,
May
Invited by Martin Holmen

Professor Elke Weber, Columbia University, New York, U.S.
September 25-27
Invited by Martin Hedesström