Annual Report

2015

Centre for Finance
University of Gothenburg

GÖTEBORGS UNIVERSITET

VINNOVA

RESEARCH AND INNOVATION

FOR SUSTAINABLE GROWTH

Annual Report 2015

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University of Gothenburg

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Research 2015 – Annual Report

Centre for Finance research catalogue

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CONTENTS

1. Research at CFF

In 2010 the Centre for Finance (CFF) received a grant from VINNOVA to establish one of Sweden's three new research centers within finance. The Centre is also financed by the business community, the University of Gothenburg and the School of Business, Economics and Law.

CFF's mission is to contribute to a sustainable financial system through:

- Excellent research focusing on financial intermediation, specifically the interaction between financial institutions and business/households.
- An open and creative interdisciplinary research environment.
- Close interaction with practitioners, education and society at large.

CFF's vision is to advance the understanding and practice of financial intermediation and to be the leading Nordic research center in this field, with expertise in great demand. It is also to provide a highly regarded and exciting arena for collaboration among researchers, students, financial practitioners and policy makers.

We are now half-way through the 10 year programme. Below we elaborate on the major developments during the first five years.

In the application for the VINNOVA grant the general objective of the Centre for Finance (CFF) in Gothenburg was to develop an internationally competitive research centre. The goal for the first years was to further improve the research environment by international recruitments, investments in research infrastructure, and increased quantity and quality of seminars and conferences. The grant has made it possible to make these improvements.

Other important developments are related to research grants, funding and collaborations with the finance industry, and increased interdisciplinary collaborations.

<u>Recruitments</u>

In 2010 most of the researchers affiliated with CFF had their PhDs from Gothenburg and many had not been active at any other University. Thus, in order to develop an internationally competitive research centre, international recruitments were priority one. This was also pointed out by the evaluation team at the hearing in November 2010.

In 2012 we were able to recruit a senior researcher with broad international experience. Erik Hjalmarsson graduated from Yale in 2005, and has worked at the Board of Governors of the Federal Reserve, Winton Capital Management, and Queen Mary University of London. Erik has published several papers in leading finance journals. Erik was the first CFF researcher to get a paper ("Rise of the machines: Algorithmic trading in the foreign exchange market") accepted for publication in *Journal of Finance* in 2013. His main research areas are financial econometrics, stock return predictability, and high frequency trading.

In 2014 we recruited an assistant professor from Stockholm School of Economics, Adam Farago. Adam's main research areas are asset pricing, portfolio choice and behavioral finance. Erik and Adam have started a joint research project.

We have also recruited six post-docs. Oege Dijk from European University Institute and Einar Bakke from the Norwegian School of Economics joined CFF in 2011. Oege received a tenured offer from University of Nijmegen in 2013 and chose to move back the Netherlands. Dawei Fang from Oxford joined CFF in 2013 and Naoaki Minamihashi from Boston University and Bank of Canada joined in 2014. In 2015 Sara Lundqvist from Lund and Anders Carlander from Psychology in Gothenburg joined as CFF post-doc researchers. With the recruitment of Sara and Anders CFF now has affiliated post-docs from Economics, Business Administration (Sara), and Psychology.

Overall, we think that our recruitments can be considered as strategic and successful. All post-docs have research profiles that fit ongoing research at the Centre. Oege does behavioral and experimental finance, Einar works on venture capital and private equity, Dawei's main research areas are contest and contract theory, Naoaki does banking research, Anders has several project related to individuals' saving decisions, and Sara works on Enterprise Risk Management (ERM). Sara is financed by Volvo and SKF and works with them on research related to ERM.

The recruitments of Erik Hjalmarsson and Adam Farago widened existing research interests at CFF in strategically important ways. Additionally, Erik has by far the strongest publication record within financial economics of all CFF researchers and is important for building the reputation of the Centre. Indeed, our experience is that junior researchers and PhD students now apply for positions at CFF in order to work with Erik.

In terms of PhD students, five PhD students affiliated with CFF have successfully defended their theses since 2011. At the same time, four new PhD students have been recruited to the Centre. Natalia Kostitcyna will continue the project related to the new bank regulations and this is done in collaboration with the independent savings banks in Western Sweden. Parviz Alizada will also work on banking. Tamàs Kiss is primarily interested in financial econometrics. Youngju Nielsen is working on high frequency trading. Both Tamas and Youngju are working with Erik Hjalmarsson. Youngju has extensive experience from the finance industry, e.g. as a hedge fund manager. None of the four has a bachelor or master degree from Gothenburg.

CFF was also able to get one of the School's visiting professorships financed by the industry. Ron Kaniel from Rochester University is therefore a regular CFF visitor 2015-2017. Ron's research focuses on theoretical and empirical asset pricing with an emphasis on implications of how incentives of intermediaries in financial markets (such as fund managers) impact portfolio choice decisions and asset pricing, and implications of endogenous relative wealth considerations.

<u>Improvements of Research Infrastructure</u>

We have improved the research infrastructure by investments in several new databases. Together with the economics library and the Economics department we acquired access to WRDS, CRSP and Compustat in 2014. Before that CFF had acquired access to Capital IQ, Morningstar, Bloombergs, and the Swedish Serrano database. Starting in 2016, CFF will have access to the TruCost data. TruCost is a world-leading environmental metrics that facilitates measurement of firms' and financial institutions' environmental foot-prints.

Furthermore, the infrastructure for economic experiments is now complete and the first papers based on experiments conducted at the CFF Finance Laboratory have been published in good international journals.

Conferences, Workshops, and Seminars

We have organized three major conferences. Together with the Second Swedish National Pension Fund (AP2) we organized a conference with the title "Stock Markets in Transition" in 2013. During the conference researchers and practitioners discussed e.g. high frequency trading, dark pools, short-selling restrictions, and financial transaction taxes. Academic key-note speakers were Charles Jones (Columbia), Ingrid Werner (Ohio State), and Albert Menkveld (VU University Amsterdam). Speakers from the industry were Olof Neiglick, CEO Burgundy, and Brian Levine from Goldman Sachs.

Since we received positive feedback from both researchers and practitioners we (AP2 and CFF jointly) ran a follow-up conference in 2014. The title was "Credit Markets in Transition". The theme was motivated by new banking regulation which changes banks' lending behavior, reducing the ability of firms to finance themselves with bank loans. For large firms this may not be a major problem, since they are already financing themselves with corporate bonds. Small and medium sized firms, on the other hand, have historically relied on bank debt and must now find new sources of financing, also in the form of marketable securities. At the same time, the current low return environment is causing investors to search for yield in credit, creating opportunities for the development of new markets and instruments. The changing financing behavior will affect the European and Swedish credit markets and create new opportunities for debtors and investors. However, it may also lead to changes in how credit risks, liquidity risks, and systemic risks impact financial markets and the real economy. The academic key-notes were given by Lasse Pedersen and David Lando, both Copenhagen Business School. Speakers from the regulatory authorities and the finance industry were Peter Norman, Cecilia Skingsley, and Michael Bogdan (Goldman Sachs).

In June 2015 we organized a conference on "Bank Stability and Regulation". It was mainly an academic conference but Hampus Bodén (SEB) and Martin Blåvarg (SHB) were among the speakers. Research presentations were done by e.g. Anjan Thakor (Washington University in St Louis), Joao Santos (Federal Reserve Bank of New York), Nittai Bergman (MIT), Paolo Fulghieri (University of North Carolina), V. V. Chari (University of Minnesota and Federal Reserve Bank of Minneapolis), and Debbie Lucas (MIT).

The complete programs for these three conferences are attached as appendix to this report. Looking forward we are in the process of setting the schedule for a third AP2-CFF conference in June 2016. The preliminary title is "return predictability". We are also discussing a follow up conference on Banking and Regulation in 2017.

We have also ran several workshops focusing on e.g. i) the effect of new banking regulation on Swedish saving banks organized jointly with the saving banks, ii) "Pensions in the Future" organized together with the National Government Employee Pension Board (SPV), and "Financial Literacy and Household Indeptedness".

The quantity and quality of seminars have also increased. We now run two separate seminar series. The "Professional" seminar series typically have speakers from industry. Several CEOs and Chairmen of listed firms have presented their views on e.g. corporate governance, entrepreneurship, and globalization.

Within the "Research" seminars series international and national scholars present ongoing research. Visiting scholars have scheduled individual meetings with many of the faculty members and PhD students.

Research grants

CFF faculty members have been successful in terms of receiving funding from research foundations. Erik Hjalmarsson received SEK 2.9 million from the Swedish Research Council (VR) in 2014 for his project "High-Frequency Trading: Empirical Evaluations of Regulatory Measures and Herding Behavior among High-Frequency Traders". Martin Holmen received SEK 4.5 million from VR in 2015 for his project "Incentive Structures in the Finance Industry and the Behavior of Financial Markets".

Hjalmarsson and Holmen have also received funding for international recruitments of Browaldh fellows from Handelsbanken Research Foundations. These funds finance Einar Bakke and Naoaki Minamihashi. Ted Lindblom also received funding from Handelsbanken for his project "Young Adults' Credit Financed Consumption and Housing". Other projects have received funding from VINNOVA and The Foundation for Economic Research in West Sweden.

Funding and Collaboration with the Finance Industry

The independent Saving Banks in Western Sweden have financed two PhD students working on the effects of the new bank regulation on saving banks. Viktor Elliot graduated in 2015 and Natalia Kostitcyna is continuing this line of research in collaboration with the Saving Banks.
Starting in 2015, Volvo and SKF are financing a post-doc researcher working on Enterprise Risk Management. We were able to recruit Sara Lundqvist from Lund to this position. Sara started in August and she has had a couple of meetings with Volvo's corporate finance department and SKF's treasury department.

The "Trust and Affect" project and the "Individual's Financial Choices: Security, Risk and the Digital Challenge" project are done in collaboration with Skandiabanken.

We have continued financial support from AP2 and Handelsbanken. SEB financed part of Martin Holmen's professorship in 2011-2012. The Neubergh foundation finances part of Erik Hjalmarsson's professorship. Other co-financing stems from in-kind contributions in terms of substantial discounts on the data-services provided by Bloomberg and Reuter.

Interdisciplinary collaborations

The Centre has affiliated researchers from Economics, Business Administration, Psychology, and Applied Mathematics. Especially the collaborations between researchers from economic psychology and marketing/ financial consumer behaviour have been successful in terms of publications. Furthermore, the project funded by VR ”Incentive Structures in the Finance Industry and the Behavior of Financial Markets” includes researchers from financial economics, applied mathematics, and economic psychology. Other research applications that are capitalizing on CFF’s interdisciplinary profile are pending at various foundations.

Published works during 2015

<u>Journal articles</u>

Andreasson, J., W. Faber, S. Gangopadhyay, C. Martinsson, and S. Sjögren. Prioritet för köpare — en fråga om tradition eller princip? ***Svensk Juristtidning*** 9.

Carlsson Hauff, J., A. Carlander, A. Gamble, T. Gärling and M. Holmen. Breaking the ice of low financial involvement: Does narrative information format from a trusted sender increase savings in mutual funds? ***International Journal of Bank Marketing***, forthcoming.

Dijk, O. and M. Holmen. Charity, Incentives, and Performance. ***Journal of Behavioral and Experimental Economics***, forthcoming

Gärling, T., M. Andersson, T. M. Hedesström and A. Biel. An experimental study of influences of performance-related payments on timing of delegated stock purchases. ***Journal of Behavioral Finance***, forthcoming.

Hedesström, M., T. Gärling, M. Andersson and A. Biel. Effects of bonuses on diversification in delegated stock portfolio management. ***Journal of Behavioral and Experimental Finance*** *7,* 60-70.

Holmen, M. and P. Wang. Pyramid IPOs on the Chinese Growth Enterprise Market. ***Emerging Markets Finance and Trade*** 51, 160-173.

Lindblom, T. Hur lönsam är du som bankkund – om kostnadsstrukturer och prissättning på bankmarknaden. ***Konsumentverkets Rapport: Långsiktigt sparande – viktigt men svårt***, 24-31.

Mavruk, T. and E. Carlsson. How long is a long-term-firm investment in the presence of governance mechanisms? ***Eurasian Business Review*** 5, 117—149.

Mavruk, T. and H. N. Seyhun. Do SEC's 10b5-1 Safe Harbor Rules Need to Be Rewritten? ***Columbia Business Law Review***, forthcoming.

Minamihashi, N. Discussions on Hedge Fund Regulations. ***Finance Journal*** (***Kinyu Journal***, in Japanese), February

Minamihashi, N. The Validity of Main Bank in Syndicated Loans. ***Nikkei Business*** (in Japanese), September.

Peterson, D., A. Carlander, A. Gamble, T. Gärling and M. Holmen (2015). Lay people beliefs in professional and naïve stock investors' proneness to judgmental biases. ***Journal of Behavioral and Experimental Finance*** *5,* 27-34.

Sjögren,S. Modelling airline efficiency – A comparison of international airlines using data envelopment analysis. ***Advances in Airline Economics*** 5, forthcoming.

Books and book chapters

Agmon, T. and S. Sjögren. ***Venture Capital Industry and the Inventive Process – VC Funds and Ideas-Led growth***. Palgrave, forthcoming.

3. Presentations at scientific conferences, symposiums, workshops etc, 2015

Elliot, V. European Association of University Teachers of Banking and Finance, Wolpertinger, Granada September 2-5.
Paper: *Basel III liquidity risk and regulatory arbitrage.*

Fang, D. Experimental Finance Society Annual Meeting, Nijmegen, June 17-19.
Paper: *The Impact of Tournament Incentives on Asset Markets: Theory and Experiment*

Fang, D. European Financial Management Association Annual Meeting, Amsterdam, June 24-27.
Paper: *Skewing the Odds: Strategic Risk Taking in Contests*

Fang, D. IFABS Oxford Corporate Finance Conference, Oxford, Sept 12-13.
Paper: *Dry Powder and Short Fuses: Private Equity Funds in Emerging Markets*

Farago, A. The Arne Ryde Workshop in Financial Economics, Lund, May 27-28
Paper: *Asymmetries and Portfolio Choice*

Farago, A. BI-SHoF Conference, Oslo, June 5-6
Paper: *Downside Risks and the Cross-Section of Asset Returns*

Farago, A. 30th Annual Congress of the European Economic Association, Mannheim, August 24-27.
Paper: *Downside Risks and the Cross-Section of Asset Returns* (Presented by co-author)

Farago, A. 7th McGill Global Asset Management Conference, Montreal, June 4-5.
Paper: *Asymmetries and Portfolio Choice* (Presented by co-author)

Hjalmarsson, E. 4-nations Cup, Rome, May.
Paper: *The Need for Speed: Minimum Quote Life Rules and Algorithmic Trading*

Hjalmarsson, E. CREATES workshop, Aarhus University, November 2015
Paper: *Stock-price co-movement and the foundations of pairs trading*

Holmen, M. Financial Management Association European Meeting, Venice, June 11-12.
Paper: *Convex Incentives in Financial Markets: an Agent-Based Analysis*

Holmen, M. Financial Management Association Annual Meeting, Orlando, October 15-17.
Paper: *Convex Incentives in Financial Markets: an Agent-Based Analysis*

Holmen, M. Conference on “Ownership, State and Institutional Shareholders in Corporate Governance” hosted by Seoul National University, October 29-31.
Paper: *Foreign Investors and Dual Class Shares*

Lindblom, T. Europeisk Integration i Svensk Ekonomisk Forskning, Mölle, May 19-22.

Paper: *Transport Intermediaries: New Node in the Network of Evolving International Trade Finance*

Lindblom, T. MISUM Research Seminar, Stockholm, October 20
Paper: *Corporate Governance and Sustainability*

Mavruk, T. Conference on “Institutional and Individual Investors: Saving for Old Age”, University of Bath, UK, June 22-23.
Paper: *The Birthplace Bias of Individual Investors*

Minamihashi, N. Financial Management Association European Meeting, Venice, June 11-12
Paper: *How Would Hedge Fund Regulation Affect Investor Behavior? Implications for Systemic Risk*

Minamihashi, N. International Banking, Economics, and Finance Association Meeting, Honolulu, June 28-July 2.
Paper: *The Effect of Bilateral Lending Relationships on Syndicated Loans: Evidence from Japan*

Minamihashi, N. Workshop Federal Reserve Bank San Francisco, June 25.
Paper: *The Effect of Bilateral Lending Relationships on Syndicated Loans: Evidence from Japan*

4. New Working Papers 2015

Benos, E., J. Brugler, E. Hjalmarsson, and F. Zikes. Interactions among High-Frequency Traders. *Bank of England Working Paper* No. 523.

Elliot, V. and T. Lindblom. Basel III liquidity risk and regulatory arbitrage. manuscript Centre for Finance, University of Gothenburg.

Elliot, V. and T. Lindblom. Funds Transfer Pricing in Banks under Different Market Structures. manuscript Centre for Finance, University of Gothenburg.

Elliot, V. and A-K Stockenstrand. Performance Management Systems: Reintroducing the role of coupling. manuscript Centre for Finance, University of Gothenburg.

Fang, D. and T. Noe. Skewing the Odds: Taking Risks for Rank-Based Rewards. manuscript, Centre for Finance, University of Gothenburg.

Fang, D. Dry Powder and Short Fuses: Private Equity Funds in Emerging Markets. manuscript, Centre for Finance, University of Gothenburg.

Fang, D. Credible and Efficient Selection Contests. manuscript, Centre for Finance, University of Gothenburg.

Fang, D., M. Holmen, M. Kirchler, and D. Kleinlercher. The Impact of Tournament Incentives on Asset Markets: Theory and Experiment. manuscript, Centre for Finance, University of Gothenburg.

Farago, A. and E. Hjalmarsson. Stock-price co-movement and the foundations of pairs trading. manuscript Centre for Finance, University of Gothenburg.

Gangopadhay, S., C. Martinsson, and S. Sjögren, Priority rules for ownership transfer of products – effects on capital structure. manuscript Centre for Finance, University of Gothenburg.

Mavruk, T. What signals do insiders provide outsiders when backdating executive stock option exercise dates? manuscript Centre for Finance, University of Gothenburg.

Mallios, A., T. Mavruk, and S. Sjögren. 2015. Empirical testing of option to delay irreversible investments in the presence of risk-averse managers. manuscript Centre for Finance, University of Gothenburg.

Stockenstrand, A-K. and V. Elliot. *Understanding the role of performance management systems in the reporting practices of organisations - the case of fair values*. manuscript Centre for Finance, University of Gothenburg.

5. Ongoing research projects

Price War Financing (Dawei Fang)
In many high-tech industries, firms often engage in price wars in order to win the market. We model this competition as an all-pay auction in which firms can potentially relax their capital constraints by raising external capital. In contrast to the pecking order theory, we find that equity is preferred by the competing firms to bank loans. More surprisingly, we find that banks are often unwilling to finance a competing firm even if banks know that the firm is the strongest competitor, with the lowest marginal bidding cost. Our theory explains why many high-tech firms are financed by private equity rather than by banks.

Risk-Taking in Selection Contests with Incomplete Information (Dawei Fang and Thomas Noe)
We study selection contests in which a principal aims to select high-ability agents when low-ability agents can potentially outperform high-ability agents by taking risks. We show that, contrary to the risk-taking-and-ruin intuition, low-ability agents do not always gamble on high-risk strategies. In fact, when low-ability agents are much weaker than high-ability agents, low-ability agents play low-risk strategies that never top high-ability agents' performance, ensuring that the equilibrium is perfectly selection efficient. In contrast, when low-ability agents are not too weak compared to high-ability agents, low-ability agents challenge high-ability agents by high-risk strategies. In this case, selection is not efficient. Introducing a penalty on low performance improves selection efficiency.

Disappointment Aversion, Stock Market Participation and the Demand for Put Options (Adam Farago)
I study the portfolio choice of an investor with asymmetric attitudes towards gains versus losses who invests in a stock, a bond and a put option. I demonstrate that a generalized disappointment-averse investor, who is loss averse around a reference point that is lower than her certainty equivalent, optimally holds long positions in put options. This resolves the puzzling finding in previous literature that a wide range of expected and non-expected utility functions fail to generate demand for put options. Moreover, I demonstrate that this investor always holds risky securities, independently of her degree of loss aversion. This is in stark contrast to previous findings on market non-participation of a sufficiently disappointment-averse investor, who is loss averse around her certainty equivalent. My results highlight that the endogenous reference point distinguishing gains and losses plays an important role in determining the optimal asset allocation.

Asymmetries and Portfolio Choice (Adam Farago, Magnus Dahlquist, and Romeo Tedongap) Revise and Resubmit at the *Review of Financial Studies*
We examine the portfolio choice of an investor with generalized disappointment aversion preferences who faces returns described by a normal-exponential model. We derive a three-fund separation strategy: the investor allocates wealth to a risk-free asset, a standard mean-variance efficient fund, and an additional fund reflecting return asymmetries. The optimal portfolio is characterized by the investor's endogenous effective risk aversion and implicit asymmetry aversion. In empirical applications, we find that disappointment aversion is associated with much larger asymmetry aversion than are standard preferences. Our model explains patterns in popular portfolio advice both across different risk appetites and investment horizons.

Stock-price co-movement and the foundations of pairs trading (Adam Farago and Erik Hjalmarsson)
We study the theoretical implications of cointegrated stock prices on the profitability of pairs-trading strategies. It is shown that under otherwise empirically reasonable assumptions, the presence of cointegration implies very high pairs-trading Sharpe ratios. In particular, in a setting where stock returns are fairly weakly correlated across time, and stock prices thus behave similar to random walks, the existence of cointegration among pairs of stock prices imply very quick convergence whenever the prices deviate from each other; this fast convergence pattern result in very profitable pairs-trading strategies. To the extent that the theoretical Sharpe ratios are "too large", this suggests that either (i) our standard notion of the dynamic structure in stock returns is incorrect, and that there are stronger and, in particular, longer-lasting dependencies in returns than is usually assumed, or (ii) that cointegration does not exist pairwise among stocks, and that pairs-trading profits are a result of a less stable, or weaker, dependency structure. Empirical results mostly stress that (stable) cointegration patterns among stock prices appear empirically elusive.

Downside Risks and the Cross-Section of Asset Returns (Adam Farago and Romeo Tedongap) Revise and Resubmit at the *Journal of Financial Economics*
In an intertemporal equilibrium asset pricing model featuring disappointment aversion and changing macroeconomic uncertainty, we show that besides the market return and market volatility, three disappointment-related factors are also priced. We refer to these as the disappointment factor, the market downside factor, and the volatility downside factor. We find that expected returns on different asset classes reflect premiums for bearing undesirable exposures to these factors. The signs of estimated risk premiums are consistent with the theoretical predictions. Our most general, five-factor model is very successful in jointly pricing stock, option, and currency portfolios, and provides a considerable improvement over nested specifications previously discussed in the literature.

Credit Value Adjustment of CDS-contracts in contagion models (Alexander Herbertsson)
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. Roughly speaking, counterparty credit risk in derivatives can be measured with the concept of credit value adjustment (CVA). CVA is a way to include counterparty credit risk or default risk in the price of the derivative in order to cover for potential losses due to future default events of the counterparty in a derivative transaction. In the new Basel III accord CVA is mandatory in reporting tier-1 regulatory capital. We have initiated a research project connected to the topic of counterparty credit risk and credit value adjustment with a focus on portfolio modeling and dynamic dependence modeling. The purpose is to better understand the CVA-value and its impact on regulatory capital from a portfolio point of view, especially as function of different model parameters. By using previously developed contagion models as in e.g. Herbertsson (2008) we investigate the impact of contagion and network size among financial institutions, on CVA for derivatives such as credit default swaps.

Pricing CDS index options under incomplete information (Alexander Herbertsson and Rüdiger Frey)
We derive practical formulas for CDS index spreads in a credit risk model under incomplete information. The factor process driving the default intensities is not directly observable, and the filtering model of Frey & Schmidt (2012) is used as our setup. In this framework we find a computationally tractable expression for the payoff of a CDS index option which naturally

includes the so-called armageddon correction. The correction is obtained without introducing a change of pricing measure, which is the case in the previous literature. A lower bound for the price of the CDS index option is derived and we provide explicit conditions on the strike spread for which this inequality becomes an equality. The bound is computationally feasible and do not depend the noise parameters in the filtering model. We outline how to explicitly compute the quantities involved in the lower bound for the price of the credit index option as well as implement and calibrate this model to market data. Finally, a numerical study is performed where we show that the lower bound in our model can be several hundred percent bigger compared with models which assume that the CDS-spreads follows a log-normal process. Also a systematic study is performed in order to understand the impact of various model parameters on CDS index options (and on the index itself)

Interactions among High-Frequency Traders (Erik Hjalmarsson, Evangelos Benos, James Brugler, and Filip Zikes)
Using unique transactions data for individual high-frequency trading (HFT) firms in the UK equity market, we examine the extent to which the trading activity of individual HFT firms is correlated with each other, and the impact on price efficiency. We find that HFT order flow, net positions, and total volume exhibit significantly higher commonality than those of a comparison group of investment banks. However, intraday HFT order flow commonality is associated with a permanent price impact, suggesting that commonality in HFT activity is information-based and so does not generally contribute to undue price pressure and price dislocations.

The Need for Speed: Minimum Quote Life Rules and Algorithmic Trading (Erik Hjalmarsson, Alain Chaboud and Clara Vega) This project is financed by The Swedish Research Council (Vetenskapsrådet)
We study the impact that a minimum-quote-life (MQL) rule of 250 milliseconds in the euro-dollar currency pair had on trading volume, bid-ask spreads, market depth, and adverse selection costs for "slow" traders. We find that the MQL rule causes trading volume to decline in the EBS trading platform, suggesting that some market participants may have moved to other trading venues without MQL rules. In addition, we find that the MQL rule did not have an impact on average bid-ask spreads, which suggests that the counterbalancing effects of lower adverse selection costs and higher market-making costs for HFTs play a role in a way that they cancel each other out. However, the MQL might have increased bid-ask spreads in volatile times. The impact on depth is inconclusive. We also find some (weak) evidence that HFTs are less willing to provide liquidity during volatile times after the MQL rule was implemented. Finally, consistent with the recent theoretical literature on HFT, we find that "slow" traders pay a premium (adverse selection cost) when they transact with better informed high-frequency traders, and that these costs declined after the MQL rule was implemented.

Stock-price co-movement and the foundations of pairs trading (Erik Hjalmarsson and Adam Farago)
We study the theoretical implications of cointegrated stock prices on the profitability of pairs-trading strategies. It is shown that under otherwise empirically reasonable assumptions, the presence of cointegration implies very high pairs-trading Sharpe ratios. In particular, in a setting where stock returns are fairly weakly correlated across time, and stock prices thus behave similar to random walks, the existence of cointegration among pairs of stock prices imply very quick convergence whenever the prices deviate from each other; this fast convergence pattern result in very profitable pairs-trading strategies. To the extent that the theoretical Sharpe ratios are "too large", this suggests that either (i) our standard notion of the

dynamic structure in stock returns is incorrect, and that there are stronger and, in particular, longer-lasting dependencies in returns than is usually assumed, or (ii) that cointegration does not exist pairwise among stocks, and that pairs-trading profits are a result of a less stable, or weaker, dependency structure. Empirical results stress that (stable) cointegration patterns among stock prices appear empirically elusive.

Employees on Corporate Boards (Martin Holmén and Tom Berglund)
The fact that Swedish law gives the right for employees to choose whether they want be represented on the board or not, and that this option hasn't been used in a considerable part of Swedish firms allows us to analyze why employees choose to be represented on some corporate boards while they abstain from using that option in other firms. We use a simple framework in which we assume that employee representation reflects a rational choice on behalf of employees eligible to sit on the board. Our results are broadly in line with our predictions. We find no indications that employee board representation impact firm performance positively or negatively. The main driver of employee board representation appears to be the number of eligible employees. Furthermore, we find that the likelihood of employee board representation decreases with, i) firm risk, and ii) slow growth, and iii) internationalization. We conclude that employee representation can at least partly be seen as the outcome of rational choice by employees eligible for board seats.

Convex Incentives in Financial Markets: an Agent-Based Analysis (Martin Holmén, Annalisa Fabretti, Tommy Gärling and Stefano Herzel)
What is the influence of convex incentives, e.g. option-like compensation, on financial markets? We use agent-based simulations to replicate and extend the results of a laboratory experiment performed by Holmen et al. (2014). By replicating the experiment we identify some behaviors among participants which deviate from expected utility maximization and point out how they affected the outcomes of the experiment. By extending the simulations to a more general setting we show that convex incentives produce higher prices, lower liquidity and higher volatility. We also show that the influence of convex incentives on the decisions of the traders is much stronger than that of their risk preferences and that increasing the number of agents with convex incentives has a similar effect as that of increasing the inequality between agents' endowments.

Incentive Structures in the Finance Industry and the Behavior of Financial Markets (Martin Holmen, Tommy Gärling, Stefano Herzel, Michael Kirchler) This project is financed by The Swedish Research Council (Vetenskapsrådet)
This project aims at investigating whether incentive structures in the finance industry lead to increased risk-taking, mispricing of financial assets, more volatile markets and ultimately financial bubbles and crashes. Researchers from financial economics, applied mathematics, and psychology will use economic experiments with finance professionals, agent-based models, and data from financial markets to investigate these issues. Previous research in this area is mainly theoretical. The project has bearing on the international policy discussion about regulation of investment managers' incentive schemes.

Supply Chain Finance (Ted Lindblom, Parviz Alizad, Abhinayan Basu, Viktor Elliot, Lars-Göran Malmberg, Johan Woxenius)
This project focuses on the implications of the financial flows for the efficiency of the overall supply chain. By jointly studying the legal, financial and logistic aspects of the supply chain this multidisciplinary project aims to identify and analyze theoretical and empirical problems related to cash management, efficiency and performance in trade.

Transport Intermediaries: New Node in the Network of Evolving International Trade Finance (Ted Lindblom and Abhinayan Basu)
International trade has in the past few decades become increasingly dependent on international supply chains where corporations divide the production of goods and services among many countries to reduce overall costs. It is now well known to both the business community and policymakers that the financial profile of the weakest link in the international supply chain impacts the integrity of the entire chain. This paper explores the role of supply chain finance in international trade transactions and the potential to lower the cost of financing such transactions by utilizing electronic trade documents and IT-systems adopted by transport intermediaries in the supply chain. The authors especially study the possibility to combine new maritime law and developing e-commerce law and practices with the practical financial needs of exporters and importers in order to fill the credit gap in international trade. The focus of the inquiry is on the emerging practice of creating integrated physical, financial and information supply chains. Specifically, this paper examines in contextual detail the role of micro, small and medium-sized enterprises (MSMEs) which drive a substantial portion of commercial activity in the developing world where a sizeable portion of global manufacturing takes places. Such an examination is necessary because the varying commercial and financial profiles of MSMEs have an impact on the overall nature, robustness and sustainability of international supply chains which fulfil the consumption needs of Europe and North America. The paper investigates if there are strategic areas of opportunity and actions for the transportation and logistics industries to use electronic trade documents and IT-systems to forge closer relationships with their customers as part of an evolving business relationship and to play a greater role in financially securing international supply chains.

Over-indebtedness among young adults (Ted Lindblom, Anders Carlander, Viktor Elliot, Amelie Gamble, Tommy Gärling, Jeanette Hauff, Jonas Nilsson)
We investigate the economic and physiological problems related to over-indebtedness among young adults. The project focuses on three levels; the regulatory tools to mitigate over-indebtedness and its implications, the relationship between the supply-side actors and borrowers and the implications of over-indebtedness at an individual level.

Funds Transfer Pricing in Banks under Different Market Structures (Ted Lindblom and Viktor Elliot)
Funds transfer pricing (FTP) is widely acknowledged as an important part of banks' asset and liability management (ALM). This paper develops existing FTP-theory also to cover the case of kinked demand and supply curves on oligopolistic and oligopsonistic competition, respectively.

How do Intellectual property law regimes within the EU affect innovation activity? (Claes Martinson, Taylan Mavruk, and Stefan Sjögren)
This paper examines the relationship between patent law regimes and innovation activity. We use an index of patent strength developed by Ginarte Park (1997) and regress this against two proxies for innovation activity: patent applications and patent grants. We control for legal origin, and conduct partial analyses for EU and non-EU countries. We find that the patent strength has an inversed U-shaped relation with innovation activity. We observe that this inversed U-shaped relation is stronger for abroad patent applications than domestic innovation activity. We observe the opposite effect within the EU countries sample. The relation between the patent strength and the innovation activity is U-shaped. We observe also that this relation is driven by the abroad patent applications. Our conclusions are that patent regimes seem to

be more effectual on attracting abroad innovations and that integration, common agreement and strong patent law within the EU countries induce innovators to apply for abroad patents. We obtain similar results in our robustness analyses when we use patent grants as proxy for the innovation activity and re-run our regressions.

Individual investor's portfolio choice (Taylan Mavruk, Ted Lindblom, and Stefan Sjögren) Revise and Resubmit at the *Journal of Banking and Finance*
We introduce the concepts of "birthplace bias" and "counterfactual bias" to examine individual investors' bias towards their birthplace and to the new location after they move from their birthplace. We also measure the capital invested in the average portfolio of proximity biased investor. We find that the proximity bias phenomenon is largely an urban phenomenon. We also find that individuals who move to a new district tend to increase their local bias, in the new location, overtime while their birthplace bias remains more or less constant. None of the proximity biased portfolios earn abnormal returns. We partly explain this by the familiarity hypothesis, but we cannot rule out "overconfidence". Moreover, we find that the average proximity biased portfolio does not underperform the market. Individual investors who face equal costs may simply prefer the familiar stocks. This implies "indisputable preference" among investors, which supports rationality of the average individual investor.

Keeping it real or keeping it simple? Ownership concentration measures compared
(Taylan Mavruk, Conny Overland, and Stefan Sjögren)
Based on a sample of 240 Swedish firms listed at the Stockholm Stock Exchange as of year-end 2008 we analyze measures of ownership concentration found in past governance literature. We find that although measures are significantly correlated, they show different distributional properties. We also identify the best underlying distribution for each concentration measure, and we are able to distinguish between measures in terms of what dimensions of ownership they describe. Finally, we document that inferences regarding the association between ownership concentration and firm performance are contingent on the choice of concentration measure.

How Would Hedge Fund Regulation Affect Investor Behavior? Implications for Systemic Risk (Naoaki Minamihashi and N. Wakamori)
We estimate an investors' demand model for hedge funds to analyze the potential impact of leverage limits in the industry. Our estimation results highlight the importance of heterogeneous investor preference for the use of leverage, i.e., 20% of investors prefer leverage usage while others do not. We then conduct a policy simulation in which regulators put a cap on allowable leverage, as proposed by the Financial Stability Board in 2012. Simulation results suggest that the 200% leverage limit would lower the total demand (assets under management) for hedge funds by 10%. In particular, the regulation would lead to lower investments in highly leveraged funds and to lower investments in risky strategies, which, in turn, would reduce systemic risk.

The Effect of Bilateral Lending Relationships on Syndicated Loans: Evidence from Japan (Naoaki Minamihashi and F. Akiyoshi)
This paper studies the effect of bilateral lending relationships on syndicated loans by matching syndicated loan data with unique bilateral loan data from Japan. We find that past bilateral lending relationships significantly affect the arranger choice of syndicated loans, particularly for informationally opaque firms. Additionally, a firm can secure a larger loan and more participants if the firm's largest bilateral lender becomes its arranger. Finally, those

syndicated loans arranged by the largest bilateral lenders are less likely to default. Overall, our empirical results suggest that bilateral lending relationships can be used to mitigate information asymmetry in the syndicated loan market.

Natural Monopoly and Distorted Competition: Evidence from Unbundling Fiber-Optic Networks (Naoaki Minamihashi)
Can regulation solve problems arising from a natural monopoly? This paper analyzes whether "unbundling," referring to regulations that enforce sharing of natural monopolistic infrastructure, prevents entrants from building new infrastructure. It models and estimates a dynamic entry game to evaluate the effects of regulation, using a dataset for construction of fiber-optic networks in Japan. The counterfactual exercise shows that forced unbundling regulation leads to a 24% decrease in the incidence of new infrastructure builders. This suggests, therefore, that when a new technology is being diffused, regulation to remove a natural monopoly conversely involves risks that incumbent monopolists' shares will increase.

Less Informed Lenders and Signaling: Evidence from Syndicated Loans (Naoaki Minamihashi, F. Akiyoshi, and K.Shimizu)
This paper empirically studies how less informed lender wins the position of lead arranger in syndicated loans. We investigate the hypothesis that such lender signals loan quality by restricting deal size to less than that of the most informed lender. Since the less informed lender has smaller stakes in outstanding sole-lender loans than the most informed does, a large deal size may signal that the deal is excessively risky. Deal size works as a signaling device because cost of originating risky loans depends on each lender's amount of outstanding loans. We provide supportive evidence and argue that substantial signaling cost is the impediment to the less informed arrangers.

6. CFF Seminars and Conferences

CFF Research Seminars 2015

January 29
Nicolas Salamanca Acosta, Melbourne Institute of Applied Economic and Social Research
How Individuals React to Defined Benefit Pension Risk

March 5
Yury Kucheev, KTH
Star sell-side analysts listed by Institutional Investor, Wall Street Journal and StarMine. Whose recommendations are most profitable?

March 19
John Quah, Oxford University
Revealed preferences over risk and uncertainty

March 26
Frederik Lundtofte, Lund University
Institutional Quality, Trust and Stock-Market Participation: Learning to Forget

April 23
Roméo Tédongap, Swedish House of Finance and Stockholm School of Economics
Solving Models with Disappointment Aversion

May 7
Kebin Ma, Warwick Business School
Bank Information Sharing and Liquidity Risk

May 21
Anders Vilhelmsson, Lund University
Ownership Determinants of Stock Return Volatility

May 27
Henrik Cronqvist, China Europe International Business School in Shanghai (CEIBS)
Shaped by Their Daughters: Executives, Female Socialization, and Corporate Social Responsibility

September 10
Teodora Paligrova, Bank of Canada
Non-bank Loan Investors and Borrowers' Renegotiation Prospects

Sepember 17
Ron Kaniel, University of Rochester
Relative Pay for Non-Relative Performance: Keeping up with the Joneses with Optimal Contracts

September 24
Martin Strieborny, Lund University
Suppliers, Investors, and Equity Market Liberalizations

October 1
Michael Halling, Stockholm School of Economics
The Mutual Fund Fee Puzzle

October 8
Hanna Halaburda, Bank of Canada
Competition in the Cryptocurrency Market

October 15
Liyan Yang, University of Toronto
Back-Running: Seeking and Hiding Fundamental Information in Order Flows

October 22
Carl Lindberg, AP2 and Chalmers
Game intelligence and statistics in team sports – a game theoretic approach

November 4
Mats Persson, Stockholm University
Neubergh Lecture: Greece, the eurozone and the European Central Bank's monetary policy

November 19
Daniel Ferreira, London School of Economics
Creditor Control Rights and Board Independence

November 26
Timo Korkeamäki, Hanken School of Economics
Managerial entrenchment and matching leverage preferences

December 10
Sören Christensen, University of Gothenburg – Mathematics
Are American options European after all?

Professional Seminars 2015

February 4
Kjell Nilsson, Chairman Semcon
Consequences of Globalization - perspective from the Automotive Industry and Semcon

February 18
Tomas Hedberg, VD Swedbank Robur
1000 Bln SEK under management - challenge or opportunity?

February 25
Torbjörn Iwarson, Head Structured Finance, Carnegie
Shale Revolution

March 4
Anne-Marie Pålsson, Lund University
Finansinspektionens Ingripanden 2004-2014

March 11
Hans Oscarsson, CFO Volvo Cars
Change is the new constant - Volvo Cars and the continuous journey as an industrial high tech company

May 5
Monica Nelson Edberg, Avdelningschef, Chefekonom Nationalräkenskaper Statistiska Centralbyrån
National Accounts in a global world - challenges and possibilities

May 20
Sören Höjgård, SLU
The Common Agricultural Policy - why was it introduced? - how has it worked? - why is it still around?

May 27
Christina Ståhl, VD MQ
MQ - Ett modeföretag i konstant förändring

October 14
Mats Henricson, Chairman Svenska Bitcoinföreningen
Bitcoin - the future of internet-based money and assets

October 21
Henrik Saxborn, VD Castellum
Fastighetsvärderingar och IPO-flöden

November 11
Alexander Hellervik, Trafikanalytiker vid Trafikverket
Värdet av Västlänken

November 17
Håkan Svärdman, Välfärdsanalytiker på Folksam
Skillnader i pensionsutfall och förslag till reformer av den allmänna pensionen.

November 18
Knut Samset, NTNU Trondheim
Megaprojects: Front-end governance, costs and benefits

November 25
Sven Kristensson, VD Nederman
The Nederman Transition from Local to Glocal

December 2
Lars Backsell, Chairman Recipharm
From an Idea via an Entrepreneur to the Stock Exchange

December 9
Kerstin Valinder-Strinnholm, board-member Corline Biomedical and Camurus
Creating Value through M&A in the Pharma Industry - some cases

<u>CFF Conference on Bank Stability and Regulation</u>

June 1

Session 1: Bank Incentives, Capital Structure and Associated Externalities
Session chair: Philip Molyneux, Bangor University

9.00-10.00 *Banks' Incentives and the Quality of Internal Risk Models*
Joao A. C. Santos, Federal Reserve Bank of New York and Nova School of Business and Economics

Discussant: Espen Eckbo, Dartmouth College

10.00-11.00 *Bank Capital, Bank Credit, and Unemployment*
Giorgia Piacentino, Washington University in St Louis

Discussant: Peter Englund, Stockholm School of Economics

11.30-12.30 *Capital Structure, Investment, and Fire Sales*
Piero Gottardi, European University Institute and University of Venice

Discussant: Ron Kaniel, University of Rochester

Session 2: Propagation of Risk
Session Chair: Richard Sweeney, Georgetown University

13.30-14.30 *Financial Accelerator at Work: Evidence from Corn Fields*
Nittai K. Bergman, MIT

Discussant: Manju Puri, Duke University

14.30-15.30 *Uncertainty Aversion and Systemic Risk*
Paolo Fulghieri, University of North Carolina

Discussant: Fenghua Song, Penn State University

Session 3: Regulators' and Practitioners' Views on Bank Stability and Regulation
Session Chair: Martin Holmén, University of Gothenburg

16:00 – 18:00 *Risk-Based vs. Non Risk-Based Capital Requirements*
Martin Blåvarg, SHB

Regulating Financial Systems vs Regulating Banks
Hampus Brodén, SEB

Resolution
Lars Hörngren, Swedish National Debt Office

June 2

Session 4: Regulatory/ Government Role in Credit Markets
Session chair: John Knopf, University of Connecticut

9.00-10.00 *Bailouts, Time Inconsistency, and Optimal Regulation*
V. V. Chari, University of Minnesota and Federal Reserve Bank of Minneapolis

Discussant: Giorgia Piacentino, Washington University in St Louis

10.00-11.00 *Virtuous Selection, Market Unfreezing, and Government Intervention*
Anjan Thakor, Washington University in St Louis

Discussant: Mariassunta Giannetti, Stockholm School of Economics

11.30-12.30 *Toward More Comprehensive Measures of the Costs and Risks of Development Banks*
Deborah Lucas, MIT

Discussant: Karin Thorburn, Norwegian School of Economics

<u>Workshop: Financial Literacy and Household Indebtedness</u>

May 6

13.00-13.45 Dilan Ölcer, Riksbanken
Households´ indebtedness in Sweden

13.45-14.30 Gianni Nicolini, University of Rome Tor Vergata
Financial literacy in European countries

15.00-15.45 Emanuele Bajo, University of Bologna
Financial literacy and mortgage refinancing

7. Visiting Researchers 2015

Professor Tamir Agmon, College of Management, Tel Aviv
April–May and September
Invited by Stefan Sjögren

Professor Shubhashis Gangopadhyay, India Development Foundation
May and September-October
Invited by Stefan Sjögren

Professor Stefano Herzel, University of Rome
September
Invited by Martin Holmen

Professor Ron Kaniel, University of Rochester
May/June and September
Visiting Professor Programme

Professor Michael Kirchler, University of Innsbruck
April and August
Invited by Martin Holmen

Professor John Knopf, University of Connecticut
June
Invited by Martin Holmen

Professor Richard Sweeney, Georgetown University
May-June
Invited by Martin Holmen