

# Swiss Doctoral Workshop in Finance, Gerzensee, June 12/13 2006

## List of Abstracts (23.5.)

Maria Cecilia Bustamante

### **The Dynamics of going Public**

This paper develops a real options framework for analyzing the firm's decision to raise public equity. Firms performing an IPO face a static trade-off between issuance costs of public capital and enhanced liquidity of equity. Firms with several growth options also face a dynamic trade-off between doing a single offering with high underpricing costs and doing further SEOs subject to additional underwriting fees. The model derives the optimal time for shelf registration, the optimal time to do a public offering and the optimal amount of shares to issue. It also generates asset pricing predictions concerning short run abnormal returns and long run underperformance. Calibration of the model with real data closely matches the empirical evidence.

Gorazd Brumen

### **Pricing of Corporate and Portfolio Securities in Buyer-Supplier Networks**

The paper investigates how buyer-supplier firm-specific relationships affect security prices. Starting from the empirical inconsistencies in some standard structural models we propose a structural model of firm dependence in a vertically connected network of firms based on cash flow transfers between the buyers and the suppliers. A closed economy network completeness depends only on the topology of the network. We develop analytical formulas for corporate debt, credit default swaps and collateralized debt obligations. We prove that network disintegration does not necessarily reduce corporate and portfolio yields. In fact, it can raise them if the externally generated cash flows and internal network flows are positively correlated.

Dominik Colangelo

### **Multivariate Functional Gradient Techniques for Implied Volatility Surfaces**

This project aims to develop a set of multivariate methods for modelling and forecasting the dynamics of implied volatility surfaces. In particular for this purpose, a large dataset of implied volatilities on S&P 500 options will be examined. Due to a changing number of options with different strikes and maturities, the implied volatility is first estimated on a fixed moneyness and time to maturity grid. In this way, a high dimensional time series is obtained. Starting from a simple diagonal VAR(1)CCCGARCH(1,1) model, functional gradient descent techniques for estimating the conditional mean and variance are used in order to take into account crosscorrelations and autocorrelations, also allowing for time varying conditional correlations and variances. At this stage, the joint dynamics of all implied volatilities are able to be considered – looking simultaneously at all available maturities and moneyness parameters – without resorting to variance reduction techniques.

Kremena Daminova

### **Guiding analysts and rational autocorrelation in forecast errors**

Empirical investigations of analysts' forecast surveys concerning financial or macroeconomic variables find significant time varying biases such as autocorrelation in the time series of forecast errors. This fact is usually attributed to behavioral biases of analysts. We develop a random dynamical system describing the evolution of forecasts, actual outcomes and fundamental values, when insiders manipulate analysts' forecasts to minimize short-term variation in the actual outcomes. Studying optimal control, we can show that autocorrelated forecast errors are induced and, hence, rational. The Reuters survey of institutional euro-dollar forecasts reveals, that the central bank has tried to control the volatility of the external value of Euroland's assets and autocorrelated forecast errors are created.

Christian Hopp

### **Chance favours the Prepared Mind: The Determinants of Monitoring and Staging in Venture Capital Financing**

In this paper I analyze the driving forces of Venture Capital staging. I find that staging is more pronounced for younger firms with higher agency problems. Moreover, the duration of financing rounds is shorter for seed and early stage financing indicating that monitoring is paramount to cope with the higher level of uncertainty at these stages of investment. The data reveals that in the earlier years of collaboration between the Venture Capital provider and the financed firm the need for monitoring and staging is significantly more pronounced. In addition, I investigate the relationship between staging and syndication of VC investments and find that Syndication of venture capital investments alleviates agency problems between the venture capitalist and the entrepreneur. Consequently, VC firms that make use of staging are also more open to syndication. Furthermore there is evidence for Lerner's Selection Hypothesis. The findings suggest that joint decision making can improve deal selection and reduce information asymmetries.

Amine Jalal

### **Shortfall Aversion, Potential Seeking and Asset Prices**

I propose a methodology, economically meaningful, that takes foundations in behavioral finance and actual risk management practices, to estimate and quantify the behavior of a representative investor facing extremal outcomes. I propose a new utility function that conciliates between expected utility maximization and tailrelated performance measures. Using a Generalized Method of Moments (GMM), I estimate the model and show that the representative agent's preferences, when faced to extremal outcomes and measures like VaR and its positif counterpart, belongs to the class of reverse Sshaped utility functions. It is also shown that the implied Stochastic discount factor satisfy the Hansen-Jaganathan bounds. Using a general equilibrium setup, I find that the model can help explain the equity premium.

Alexandre Jeanneret

### **Doest exchange rate volatility really depress Foreign Direct Investment in OECD countries ?**

The effect that exchange rate uncertainty might have on outward Foreign Direct Investment (FDI) flows has become a highly debated topic. However, most of the existing empirical studies are based on a small set of non-representative countries and therefore highlight contradictory results. This paper shows that, by using a very broad data set of OECD countries over the period 1982-2002, this relationship is on average negative and signi.cantly different from zero. Nevertheless, the effect appears to be non-linearly decreasing over time and to even become insignificant today. We thus argue that multinationals do not present risk-aversion towards currency risk any more. Therefore, policies aiming at attracting Foreign Direct Investment through a stabilization of relative exchange rates appear to be ineffcient today.

Semyon Malamud

### **Asset pricing for idiosyncratically incomplete market**

We present a rigorous analysis of idiosyncratically incomplete markets with heterogeneous agents. Our model is an extension of Constantinides and Duffie (1996) that, among other important differences, allows for trade. We directly solve the utility maximization problem and construct the unique optimal consumption stream of an agent exposed to idiosyncratic risk in closed form; no hidden approximations! We exploit our construction of the optimal consumption stream to explicitly calculate its derivatives with respect to idiosyncratic risk and state price densities. We prove that for sufficiently weak idiosyncratic risk and sufficiently weak heterogeneity there exists a globally unique equilibrium that depends smoothly on all relevant parameters. Consequently, it is possible to rigorously expand asset returns in the idiosyncratic risk and heterogeneity and then extract interesting economic information from the coefficients. There is a threshold time period after which heterogeneity washes out and idiosyncratic risk dominates. Below this threshold, there is a subtle play between heterogeneity and idiosyncratic risk. On both sides of this threshold, we can calculate the response of some twelve well known stylized facts to both idiosyncratic risk and heterogeneity. Among other results, we show that, above the threshold time period, the equity premium increases relative to the "background complete market" when the "idiosyncratic risk process" is *procyclical* and its growth rate is above an explicit threshold, surprisingly close to the growth rate of "observed idiosyncratic risk". This result contradicts the "financial folklore" that the equity premium increases only when the idiosyncratic risk is countercyclical. We also show that, above the threshold time period, countercyclicity of the idiosyncratic risk process forces term premia to be negative, contrary to empirical data, and also forces countercyclicity of price dividend ratios, again, contrary to empirical data.

Boris Nikolov

### **Investor Protection and Financing Decisions: Theory and Evidence**

This paper examines the impact of investor protection on financing decisions. We build a dynamic contingent claim model in which financing policy results from a trade-offbetween tax benefits, contracting costs and agency costs. In our setup, controlling shareholders can divert part of the firms' cash flows at the expense of minority shareholders. In addition, shareholders as a class can behave strategically at the time of default leading to deviations from the absolute priority rule. Our analysis generates new predictions on the relation between corporate governance and dynamic capital structure choice. It also allows us to derive the conditional distribution of leverage and to perform a structural estimation of the model. Based on the resulting estimation, we quantify the proportion of cash flows diverted by controlling shareholders and the bargaining power of shareholders at time of default.

Emilio Osambelo

### **Exploiting Volatility Timing**

This paper proposes a stochastic realized volatility in mean (SRV-M) model and studies the economic value of volatility timing, by analyzing how the dynamic portfolio choice of investors in a multiperiod setting is affected by volatility. The SRV-M model captures both the time-varying risk premium hypothesis and the leverage effect, U compute the hedging demands that arise in the time-varying investment opportunity set, and measure the utility gains of exploiting volatility timing both in a SRV-M and GARCH and both of these models significantly outperform strategies based on the iid returns model. At least partly, the economic gains from the SRV-M model come from its ability to generate positive intertemporal hedging demands. The obtained results hold out-of-sample, and are robust to borrowing constraints.

Jörg Osterrieder

### **A theoretical model of the limit orderbook and some applications**

Random measures are used to describe the evolution of the limit order book. A new model for limit order arrival is proposed which enables us to construct a model of the order book. Our model is flexible enough to take into account various empirical observations. It turns out that the limit order book will be a mixed Poisson process at every point in time. We describe the behaviour of the order book in the long run. Some applications to the optimal liquidation of a large position of stock holdings are given. A limit order strategy and a market order strategy are compared and conditions are given as to which one should be given priority. Finally, we show that naturally a new type of options occurs, a reverse Asian fixed strike lookback option.

Augusto Perilla

### **Modeling Duration Through the ARG(p)**

In this paper we study the general properties of the trade duration process for two stocks (CNIM Construct.frf 10 and Sodexo Alliance) traded at Paris Stock Exchange. These stocks correspond to a very illiquid stock (CNIM Construct.frf 10) and to a relatively liquid stock (Sodexo Alliance). We estimate a class of autoregressive gamma process with conditional distributions from the family of none central gamma (up to a scale factor). This process was introduced by Gouriéroux and Jasiak (2005). We also evaluate the ability of the process to fit the data. For this purpose we use the Diebold, Gunther and Tay (1998) test; and the capacity of the model to reproduce the moments of the observed data, including the serial correlation and the partial serial correlation functions. The moments and its confidence intervals are estimated based on simulation.

Florian Peters

### **Asset Substitution: An Empirical Investigation**

Asset substitution, the notion that leverage induces shareholders to increase risk at the expense of debtholders, is one of the most discussed agency conflicts in corporate finance. Yet, by examining whether the asset substitution problem is reflected in capital structure, empirical research has largely provided indirect evidence on this agency problem. In contrast, this paper investigates the direct causal effect of leverage on risk policy accounting for the endogeneity of leverage. It further examines the role of other firm characteristics for risk shifting incentives, in particular shareholder-manager alignment.

Rodolfo Prieto

### **Asset prices in a production economy with continuous and discrete technology shocks**

This paper examines the asset pricing implications of continuous and discrete technology shocks within a production economy model in continuous time, in which the discrete shocks mark irreversible shifts in the parameters of the production technology. The problem can be solved as a sequence of infinite horizon problems in which the agent derives utility from consumption and wealth. Results show that in equilibrium the risk premia and the risk free rate are time varying. The equity premium can be represented as the sum of two components: a continuous shock premium and a discrete shock premium, present only if both, wealth and consumption, are negatively impacted by them. To illustrate the implications of the model, I perform a numerical example that uses the behavior of aggregate per capita consumption in U.S. data as steady state parameters for the drift and volatility of the production technology and the assumption that technology changes are welfare neutral. Results show that the discrete shock premium does not play a significant role in the size of the equity premium, however the presence of technology changes increases the fraction of capital that is optimally consumed, lowering the current expected consumption growth and consequently, the risk free rate. One of the extensions of the model considers controlling the intensity of the Poisson process that drives technological progress, connecting this work to the equilibrium models of irreversible investment, allowing for multiple technological changes.

Giovanni W Puopolo

### **International Equity Correlations and Phase Incongruity of the Business Cycle**

This paper proposes an equilibrium model of asset pricing to explain why international equity correlations are higher when countries are simultaneously in economic recession and lower in economic booms or when the countries' cycles are out of phase. I assume that the business cycle component, which affects the drift rates of fundamentals of international economies, is an unobservable country-specific variable. As investor attempts to learn the current regime, his uncertainty fluctuates. This time-varying uncertainty of the whole economy is affected by the country-specific uncertainties and leads to time-varying comovements across assets'. Regimes synchronization plays a crucial role in determining some persistence in correlations changes. I calibrate the model with empirical data and show that it fits well the historical pattern of stock returns comovements.

Benedetto Raccuglia

### **How to Include Market Activity in Stock Price Dynamics and Option Pricing**

The time changed Lévy processes represent a substantial progress made by the financial in developing more realistic option pricing models. The merit of these models is to internalize the market activity in the stock price evolution, by a stochastic arrival rate of stock price shocks. In this work we provide a complete picture of the pricing skills associated with option pricing models based on different versions of a new time changed Lévy process. For the first time, a jump component is included in the specification of the stochastic time, which allows the models to account for various relations (leverage effects) between the stock returns innovations and both market activity shocks emerging from our theoretical framework, i.e. temporary and permanent shocks. By comparing the option pricing performances of the best time changed Lévy model identified in the first stage of our analysis, and the most close jump diffusion stochastic volatility model, we answer also to the open question concerning the most consistent way to include the stock market activity in stock price dynamics; whether by a stochastic arrival rate of price shocks, or by a random scaling of price movements.

Nikolay Ryabkov

### **The Abstract of the Paper for the 5th Swiss Doctoral Workshop in Finance Ambiguity Aversion and Learning in Executive Compensation Contracts**

The paper studies the effect of model uncertainty or ambiguity averse preferences on optimal structure of equity based executive compensation contracts. The standard principal-agent models for optimal contract design poorly explain the existing practice of executives pay, in particular a large holding of executive stock options. In order to capture those recent trends in executive compensation design, my paper proposes to consider ambiguity averse managers who possess higher overall aversion to risk and ambiguity as compared with a standard risk averse agent. Therefore the optimal contract structure for ambiguity averse executives will contain more risk incentive instruments favoring larger stock option holdings. This paper analyzes the optimal contract for constant relatively risk and ambiguity averse utility of a manager and a risk neutral principal in continuous time moral hazard model. The manager chooses the optimal volatility and his effort level having an impact upon the stock price dynamics while shareholder chooses the parameters of compensation contract. The paper compares the compensation contracts in a form of stock and stock options. The numerical simulations of the model produce quantitative results that indicate significance of ambiguity aversion in the optimal contract structure. The basic model can be extended to take into account the vesting restrictions in stock option or restrictive stock evaluation. The final part of the paper elaborates on the extension of the model that incorporates the dynamic learning mechanisms to the executive contract design from both side of a manager and a shareholder. The manager learns about his ability to influence the expected stock price over time. The shareholder has an opportunity to adjust the contract structure in the long term learning about parameter uncertainty of expected returns. Numerical simulations illustrate the effect of learning on the value and structure of optimal compensation.

Lukas Schmid

### **Aggregate Dynamics and Capital structure**

We study a model of Firm dynamics, investment decisions and capital structure which highlights dynamic effects in a fully rational neoclassical framework. In the model a continuum of firms dynamically choose optimal financial and investment policies facing an environment with aggregate and idiosyncratic uncertainty, timevarying interest rates and timevarying cost of capital. Firms can finance their expenses from retained earnings and from external funds. External finance however is costly: Issuing bonds leads to increased bankruptcy risk and issuing equity carries fixed and proportional costs. The bankruptcy process leads to a industry equilibrium with entry and exit. The model is solved numerically. Simulated data exhibit properties which are qualitatively and quantitatively in line with the data in both a time series as well as a crosssectional sense. In particular the model can replicate recent empirical evidence concerning the effect of macroeconomic conditions on capital structure choices and allows to address recent capital structure theories from a dynamical equilibrium point of view. Current extensions include an investigation of capital structure and the crosssection of asset returns and the impact of monetary policy on firm's capital structure and financing policies.

Bogdan Stacescu

### **Dividend and Investment Decisions under Managerial Discretion**

Traditional signalling models that Managers act in the best interest of existing shareholders. Moreover, they assume that there is a one-to-one relationship between dividends and some indicator of firm quality, such as future earnings. For instance, in Miller and Rock (1985), growth opportunities are assumed to be identical and publicly known for all firms and as a result dividends help rank firms according to the quality of their earnings. The present paper examines a framework where managers' incentives are not necessarily aligned with those of the shareholders, and where the investment opportunities of various firms are different and not known. As a result, dividends become an imperfect indicator of firm quality. While higher dividends still show better average quality, this "average" includes heterogeneous firms. When one includes investors that can obtain information on the true growth opportunities, there can be a positive effect in terms of reducing investment, but the problem is not completely solved. This is due to the fact that informed investors get their profits by exploiting firm heterogeneity rather than by increasing mean firm quality.

Martin Vlcek

### **Does Prospect Theory Explain the Disposition Effect?**

The disposition effect is the observation that investors hold losing stocks too long and sell winning stocks too early. A standard explanation of the disposition effect refers to prospect theory and in particular to the asymmetric risk aversion according to which investors are risk averse when faced with gains and risk-seeking when faced with losses. We show that for reasonable parameter values the disposition effect can however not be explained by prospect theory. The reason is that those investors who sell winning stocks and hold losing assets would in the first place not have invested in stocks. That is to say the standard prospect theory argument is sound ex-post, assuming that the investment has taken place, but not ex-ante, requiring that the investment is made in the first place.

Nimrod L. Vulkán

### **Macrofactors in Term Structure Models structural versus nonstructural approaches in a DSGE framework**

In the literature on the relation between macroeconomic developments and the term structure of interest rates, two approaches coexist. The first one derives all the consequences of the macro model for the pricing kernel, while the second relies on the noarbitrage assumption to obtain the pricing kernel. We show that the former can be viewed as a constrained version of the latter and therefore that it can be explicitly tested. We derive the stochastic discount factor from a Dynamic Stochastic General Equilibrium model with nominal rigidities and habit persistence that is nested by nonstructural affine term structure models and use it to develop a test of their relative performance. The ability of reproducing stylized features of the term structure in a micro founded general equilibrium model is investigated. We use MCMC-MLE results for frequentist (classical) testing, i.e. a likelihood ratio test based on Bayesian estimates.