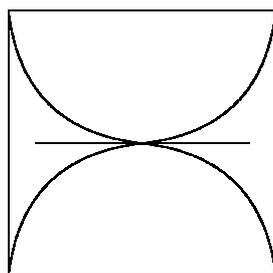


**FORENINGEN AF  
MATEMATIK-ØKONOMER**



**STUDY TOUR  
FRANKFURT AM MAIN**

**SEPTEMBER 2005**



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# 1 Introduction

Every year the Society of Mathematics and Economics Students at the University of Aarhus in Denmark plan an educational trip with the purpose to gain knowledge on how different corporations operate in relation to our education, with the main fields being Operational Research and Finance. Every second year we travel abroad to visit foreign companies. We have formerly visited cities like London, New York, Bangkok and Brussels and this year we decided on Frankfurt am Main.

There were 34 students participating in the educational trip lasting from September 26th to October 2nd. Each participant visited between 3 and 5 of the following companies.

- Allianz Global Investors
- Deutsche Bank
- Nordea Germany
- Frankfurt Airport
- D-Fine
- The European Central Bank
- DUSS
- Industrie- und Handelskammer

This booklet contains a summary of each visit. We would like to thank the above mentioned companies for their kind cooperation and for the time spent on our visits. We would also like to thank the following companies and foundations for their financial support:

- Tuborg Fondet
- MØF
- M.C. Holst
- Institut for Matematiske fag, Aarhus Universitet

On behalf of the Society of Mathematics and Economics Students: Annette Schmidt, Louise Sievers, Irene Nielsen, Anne Kirk, Thomas Kokholm, Lars Thorhauge, Tue Christensen og Mads Fog.

## 2 Allianz Global Investors

Wednesday the 28th of September we visited Allianz Global Investors, Frankfurt. We were welcomed by Ulrich Trauner (Vice President of Allianz Global Investors).

Mr. Trauner gave an introduction to the Allianz Group. Allianz was founded as an insurance company in 1890 and was listed on the Berlin Stock Exchange in 1895. The group is headquartered in Munich and employs approximately 180.000

people worldwide. In 1998 asset management was established as a core business activity and has through acquisitions (PIMCO, Nicholas Applegate, Dresdner Bank etc.) grown to be the second largest asset manager in the world. PIMCO was purchased in 1999 and leads the fixed income part of the business. It manages over 490 bn USD and is thereby one of the leading fixed income managers worldwide. The equity platform of the business is built around RCM who manages approximately 110 bn USD. In the year 2000 Nicolas Applegate, an asset manager for individual as well as institutional investors, was purchased as part of the equity platform. Dresdner Bank was purchased in 2001 and strengthened the position on the German home market considerably.

Dr. Reinhold Hafner, who was our second speaker, is Managing Director of Risklab Germany. Risklab has been owned by Allianz Global Investors since 2003 and has currently 12 investors employed. The company provides and implements investment solutions for institutional investors based on quantitative capital market research. Among their clients are banks, insurance companies, pension funds as well as churches and foundations. Risklab solutions are developed either in close cooperation with the individual client, in cooperation with selected clients or developed solely by Risklab and then provided to the client. Risklab has a wide range of partners among others the Technical University of Munich that enables Risklab to incorporate the latest theoretical research in their solutions. Frequently Risklab issues publications that can be viewed on their home page.

There are employment opportunities in Risklab for professionals, graduates as well as students. It is possible for a student to write a dissertation in collaboration with a university or to become a trainee. As a graduate you will start as an analyst.

Finally Dr. Klaus Telöken of CIO Systematic Products Style Strategies gave a presentation of RCM, systematic products and strategies. RCM is one of the most prominent quantitative asset management teams in Europe, with 22 portfolio managers and researchers in Frankfurt and London. Their product range is equity, bonds and absolute return. Dr. Klaus Telöken gave us an excellent overview of how to implement investment ideas based on option strategies. He showed how to avoid risk by generating skewed distributions by combining equities with equity options. This makes the probability of large negative returns smaller and is very attractive for risk averse investors. Furthermore we were introduced to different volatility products and strategies. Since the VDAX is currently traded at a historically low level it makes investing in the VDAX very attractive.

We were very impressed with our visit at Allianz Global Investors which indeed was exciting, educational and relevant for our studies. Allianz Global Investors definitely woke our interest of working in Germany one day.

### **3 Deutsche Bank**

We were visiting Deutsche Bank, Thursday the 27th of september 2005.

#### **3.1 Deutsche Bank - a global player**

We started with a short introduction of Deutsche Bank, by Corinna Fernando. The firm was founded in 1870 in Berlin. After World War II DB was split up in 10 separate banks and in 1957 DB was recentralized with a new headquarter in Frankfurt am Main. Two years later DB was going from having only business clients and to having retail banking business as well. In the 80's and 90's DB went from being a typical German bank to a more aggressive global player by acquisition of several foreign banks and credit companies - and finally in 2001 a DB share was traded on NYSE for the first time.

DB consists of two main divisions

- Corporate & Investment Bank
- Private Clients & Asset Management

DB is the largest German bank and the third largest Investment Bank in the world. DB is experiencing greater competition from other global players, e.g. DB were the 4th largest bank measured by the market capitalisation in 1995 - and today DB is only ranked 22.

What does the future hold for DB? DB believes that the Asian markets will have the largest growth in the next decades, therefore DB expands their business in Asia.

#### **3.2 Portfolio Management**

This presentation was given by Christian Nolting.

He started by telling that the yield return has decreased the last 20-25 years. Some of the reasons are the following:

- Technical factors
- Development in emerging markets
- Geopolitical risks
- Anticipated economic downturn
- Expansive monetary policy → possible inflation

Subjects that has an influence on the above mentioned factors could be the new Chairman in FED after A. Greenspan and the evolving oil prices. According to the latter, China is important. In light of the size of the population and the enormous growth in the area, as mentioned before, the country will be a significant part of the economic future. A solution to the decreasing reserves of oil could be the possibility of oilsand.

What does a Portfolio Manager do? Asset allocation, helps client's to choose a

valuable portfolio. In that perspective a PM uses consulting firms as Blomberg, which has informations about companies' growth, returns, management etc. Attribution Analysis is another part of the job, where you are analysed in your performance in different markets.

We would like to thank Deutsche Bank for a pleasant and informative presentation.

## **4 Nordea Bank Finland Plc Germany Branch**

On Friday the 27th of September the students of mathematics and economics of the University in Aarhus visited Nordea in Frankfurt am Main.

We were welcomed by Gunnar Volkers. He started out by telling us about the German economy and the German Market in general.

The German market is mainly driven by a very strong export. This means that the growth in the internal market primarily comes from foreign demand. The problem in the German economy is not that the companies are not making money. In fact they are producing some of the highest profits since World War 2. The problem is that there is a great insecurity and the consumers are saving a large portion of their income. The reason for the high savings rate is the world situation with the volatile oil prices and the fact that the German people are very cautious.

Like all other banks Nordea is making rating systems to implement Basel 2

In the Nordic countries Nordea is quite a big player in the market but the German branch is relatively small. They are only 35 employees and they are only dealing business clients no private customers. They recognize that they can not compete with others more established German banks for the German clients they do however have an advantage in comparison to the German banks when it comes to Nordic companies who want to expand their business to Germany. So this is where they have put most of their energy since they started the German branch in 1985.

The German banking system is very different from the Danish. In Denmark a few large banks including Nordea have most the market while in Germany the large banks only have a small part and the majority of the market is controlled by over 3000 independent banks. The number of banks is however decreasing due to rationalization but German legislation makes it difficult.

Then we heard about one of their main working areas Cash Management and what sort of solutions and product they could offer their clients.

Next we heard the German Energy market. Like in Denmark the German consumers are free to choose among the different power suppliers. In practice how-

ever it is not that easy because the actual cables are still owned by the old companies and they charge a high price for others to lead power through their cables. This issue will probably be handled by legislation after which the energy markets will become liquid. Nordea's role is clearing of the energy contracts.

Thanks to Gunnar Volkers and the entire staff at the German branch of Nordea.

## **5 Frankfurt Airport**

Frankfurt Airport is the biggest airport in Germany and the third largest airport in Europe.

The owner of Frankfurt Airport is Fraport. Fraport is a share company, where 71% of the shares is owned by the city of Frankfurt, the state and the government. The rest is traded on the stock market.

The airport and its related companies employ 86000 people.

### **5.1 Flight Operations**

The first visit of the day was at the office of Flight Operations. The manager of the office told about the daily routines. The office connects the flight companies and the airport. They do briefing of the pilots about the weather conditions, time schedules etc.

### **5.2 Emergency and the Central Computer Center**

We got a guided tour in the inner parts of the airport where we saw the Emergency Computer Center and got an impression of the great computer power of the airport.

In the basement of the Central Computer Center we saw the big diesel generator which could provide power for 90 minutes in case of emergency.

### **5.3 Guided bus tour**

At the end of the visit we got a guided bus tour in the airport area. Here we saw the two terminals from the outside, the parking positions for the aircrafts and take offs and landings. We got a good impression of how busy the airport is.

## **6 D-fine**

On Wednesday the 28th of September we visited the HQ of D-fine in Frankfurt. We were met by Managing Director Dr. Hans-Peter Deutsch, who gave a brief introduction to the history and profile of the company. In 1996 the predecessor to D-fine, the "Financial and Commodity Risk" Department (FCRC) was founded

by Dr. Hans-Peter Deutsch as a specialty consulting service of Arthur Andersen.

In 2002 as a consequence of the collapse of Enron, Arthur Andersen was practically destroyed within weeks. For that reason, FCRC Germany was transformed into a legally independent company, D-fine.

Today D-fine has more than 150 highly educated consultants and it is one of the leading consulting firms in Europe dedicated to financial industry. The core of the services supplied to their clients consists of risk management (e.g. development of rating systems in compliance with the Basel II regulations), quantitative analysis (e.g. independent valuation of financial products) and IT-integration (e.g. implementation of models and software building). Most clients are banks and insurance firms.

Following the introduction of Dr. Deutsch an employee from D-fine, Dr. Jürgen Topper introduced us to the pricing of Passport options. Dr. Topper dealt with this topic in his master thesis in Mathematical Finance, at Oxford University. Passport options are a new type of options which can be thought of as a call option on a trading account. An investor pays a premium to a bank. In return they are allowed to follow the trading strategy of their choice (subject to some pre-specified position limits) and at maturity they receive either the gains from their trades (if they have made a profit) or zero (if they have made a loss). To make passport options cheaper, or to reduce the risk to the writer, certain exotic features such as caps, floors and barriers have been employed.

Except for special cases passport options and general options on trading accounts do not have closed-form solutions. For that reason Dr. Topper showed us how to compute approximate solutions using several finite element methods (FEM).

The second and final lecture was about "Reinsurance Treaty Cut-Off". This lecture was held by the employees Dr. Karina Schreiber and Kuno Linder. The lecture consisted of a real case with a client reinsurance company who had to make a reinsurance treaty cut-off with an insurance firm stopping their business. A cut-off is a contract stipulating that the reinsurer shall not be liable for loss as a result of occurrences taking place after the date of termination or after an agreed-upon date following termination. A cut-off normally involves return of unearned premium in force at the cut-off date. The task for D-fine was to determine the size of this premium by estimating future claims from the insurance company on the policies already sold.

There are two types of insurance policies: "claims made" policies and "occurrence" policies. A "claims made" policy covers claims made during the policy period, whether or not the actual activity which gives rise to the claim occurred before the policy came into effect. An "occurrence" policy covers material published during the policy period. If the policy is a "claims made" policy, if a lawsuit or claim is brought the day after your policy expires, the insurance policy will not cover the claim even though the acts giving rise to the claim occurred while

your policy was in effect. Alternatively, with an occurrence policy, it doesn't matter when the claim is made. It is these "occurrence" policies that give rise to the biggest difficulties in valuating the size of the future claims because there can be some accidents during the policy period which are not observed before several years after (e.g. asbestosis victims). The case was further complicated by the fact that there only was reliable data for 6 years, due to a new accounting system in the insurance company. Several techniques (the "chain ladder" and "cape cod") were applied to forecast future payments.

We thank D-fine, especially those persons involved in our visit, for an exciting and challenging visit.

## 7 European Central Bank

On thursday 29th september we visited The European Central Bank, ECB. We were welcomed with a securitycheck and then guided to the conferenceroom. In the conferenceroom Matteo Ciccarelli, directorate general research, from the Econometric Modelling Division was ready to make a presentation about econometric models used in ECB.

### 7.1 Models

He introduced the following models:

- Area Wide Model
- Multi Country Model
- Coenen-Wieland Model
- Smets-Wouters Model
- Christiano-Motto-rostage

ECB uses the models to forecast future economic states. Mr. Ciccarelli is "playing" with the parameters in the models, such as the interest rate. He gives advice to the board of directors, this is a guideline for them, so they can try to make the right decisions.

The background for modelling was that ECB needed to have a broad range of econometric tools to work with, and the euro area was a new economic entity. There are a lot of factors that can be included in a model, e.g. unemployment rate, interest rate, oil prices, export, import, labour, wages, investments, GDP, consumption and income. The models have a demand side and a supply side, where the parameters are included.

ECB uses more than one model, because there are a lot of different questions to answer. Eg. macroeconomic forecasting, policy analysis (monetary policy) and stress testing. A successful monetary policy is based on all relevant information to understand the factors (parameters) in the economic development, and this can not rely on a single model. There are different theoretical frameworks and empirical approaches to consider.

He paid most attention to the Area Wide Model and the Multi Country Model. The Multi Country Model takes care of cross country differences, whereas the Area Wide model thinks of the euro area as one single economy. No one can predict a natural disaster or an Al Qaida attack, therefore they have incorporated an uncertainty factor or a shock in the models. After a shock the models move toward a steady-state.

The models are being improved continuously over time.

We would like to thank Mr. Ciccarelli for a very interesting visit, and for taking the time to see us.

## **8 DUSS Terminal, Frankfurt**

On Tuesday the 27th of September we visited DUSS, short for Deutsche Umschlaggesellschaft Schiene-Strasse. DUSS is a container terminal with 50 employees. It is an important cross point in combined traffic and is a 100% daughter of German Railways since 1968. DUSS container terminal cooperate with other terminals all over Germany, and the DUSS terminal itself deals with 100.000-120.000 containers a year. When we arrived we were greeted by Günter Brucksch and he started by telling us about DUSS in general, and how the terminal operated when the containers needed to be transferred from the railway to the flat trucks. One of the noticeable things he told was that the terminal has four different lanes for trains, but only one train enters and leaves each train lane per day.

After the traditional introduction, we were able to ask Günter Brucksch a couple of questions. There were some questions about the organisation and planning between the trains and flat trucks, but DUSS only took care of the container switch between train and flat trucks. The planning was outsourced to external companies dealing with the flat trucks and trains. Afterwards we were taken on a tour around the terminal, so we could see how the company worked in practice.

## **9 Industrie- und Handelskammer**

Wednesday the 28th of September we visited Industrie- und Handelskammer. We were welcomed by Uwe Hiltman. He introduced us to the CCI-system of Germany, which has over 3 millions member companies. All businesses are bound by law to become members, which should guarantee a balanced and democratic representation of interests. The Frankfurt am Main Chamber of Commerce and Industry has over 77000 member companies and cover an area of 248 km<sup>2</sup> and almost 650000 inhabitants. Small and medium-sized firms comprise by far the largest group among the members. IHK Frankfurt was founded in 1808 by Baron von Dahlberg and operates in line with the 1956 Law of Chambers of Commerce and Industry.

The work is governed by three strategic objectives: strengthening the regions in-

ternational link, a commitment to the future of young people, and promoting business and jobs. The goal is to get Germany to rank amongst the top three business locations in the world and the task is to optimize the economic policy. They are financed by companies due to profit.

There are six business areas of the CCI in Germany:

1. Locational policy
2. Start-up support & business development
3. Initial and continuing training
4. Concrete: Innovation & environment
5. Concrete: International affairs
6. PR: Performance survey

After the presentation of CCI we had a discussion about the political and economic situation in Germany.

We would like to thank Uwe Hiltman for an interesting visit.