Column: TI: the next challenge
Structured products and the financial crisis
An interview with Ton Vorst
Why do top executives receive option pay?
Terrorism and Economics
In this issue

Column
TI: the next challenge
Arnoud Boot .......................... 4

Up close
Structured products and the financial crisis
*Interview with Ton Vorst*
Marloes Lammers .......................... 5

In depth
Why do top executives receive option pay?
Ingolf Dittmann .......................... 9

Terrorism and economics
Aico van Vuuren .......................... 13

Letters from Alumni
Ioulia Ossokina .......................... 17

In short
Papers in journals .......................... 18
Discussion papers .......................... 18
Theses ........................................ 20

References .................................... 21
TI: the next challenge

By Arnoud Boot*

*Arnoud Boot is Professor of Corporate Finance and Financial Markets at the University of Amsterdam and director of the Amsterdam Center for Law & Economics (ACLE).

As one of the directors of Tinbergen Institute in the 1990s, I enjoy seeing the marvelous success that TI has had over time. But a column written in praise of the institute cannot be right. And complacency, in any case, is almost always misplaced. The competitive field in which TI operates is developing rapidly, and we cannot assume, necessarily, that Tinbergen Institute can hold onto its position. After all, not only the Netherlands, but also its neighbors in Europe, are realizing that in the knowledge society of tomorrow they have to be at the top. The Netherlands opened up to the international academic world rather early—and that put us in the lead—but we are hampered now by lagging investments in higher education. Many of the Continental European countries that were lagging behind by being insulated are now making massive investments.

How should TI respond to this challenge? Tinbergen Institute should be a catalyst of change. Having a consortium PhD program between the Amsterdam and Rotterdam universities is an excellent concept and a unique characteristic of Tinbergen Institute: that should not be changed, please. But what we must do is strengthen the universities in both Amsterdam and Rotterdam. Dutch universities optimized in the late 1980s until early 2000 within the boundaries of the Dutch public university system. We did that very well—much better than most countries around us.

The limits of the optimization within those boundaries have been reached, however. For the sake of brevity, I'll focus in this column on Amsterdam, and let others fill in the gaps for Rotterdam. What is needed? Indeed, much more funding and entrepreneurship. A look around at both University of Amsterdam and VU University reveals that it has become increasingly difficult in the last few years to continue the progress and be really competitive in the international market for faculty. The most appalling example in Amsterdam is the lack of a top business school. Internationally, many of best economists are linked to business schools. The spin-offs are enormous. Obviously, a field like finance—a field in which Tinbergen Institute recently has invested heavily—ultimately fully depends on having a top business school.

The University of Amsterdam has a top finance group, with representatives from 12 nationalities—it couldn't be any more international. However, expanding on (or even preserving) this position requires massive investments. This is feasible only if there is a top business school and the funding that comes with it. Nobody, however, is taking the initiative to join forces in the Amsterdam arena to get to a top business school. Why are VU University and University of Amsterdam not joining forces to create such a business school? Why is Tinbergen Institute not encouraging this? Why is the Duisenberg Initiative not pressuring the faculties to do this, rather than trying to set up something new, and (further) Balkanizing the Amsterdam scene?

I see a total lack of leadership. There are excuses. Private funding, we need to go after that—but doing this (and giving money) is not (yet) in our culture. And indeed, the Dutch Central Bank instead of spending 45 million on a Mondriaan painting—the *Victory Boogie Woogie*—could have created a real top economics institute in Amsterdam. But let's look forward. Above all, we need to be pragmatic. We do not need leadership that tries to put the whole country behind one joint initiative. That will never work. There's nothing amiss with a little competition between Amsterdam and Rotterdam—and this is also the challenge for Tinbergen Institute. Encourage collaboration between Amsterdam and Rotterdam for the PhD program, but encourage competition (and initiative!) for the rest.
Structured products and the financial crisis

An interview with Ton Vorst*

*As of June 2008, Ton Vorst is Group Head of Risk Analytics at Royal Bank of Scotland (RBS) in London and Amsterdam. He has been working in the banking industry since his appointment with ABN AMRO in August 2000. Prior to that, Vorst was a full professor at Erasmus University Rotterdam. Today he is still an active researcher, holding a part-time position at VU University Amsterdam and lecturing at the Duisenberg School of Finance and the Tinbergen Institute. This interview reflects his personal views and not necessarily those of his employers.

Your career seems to have taken you from more theoretic work to more applied work and from being more of an academic to more of a practitioner. Could you shed some light on what motivated you to go through these stages in your career?

When I started doing mathematics at the University of Utrecht, it was most prestigious to do pure mathematics. Pure mathematicians were proud of being so pure that the work they did could never be applied. I liked being on the prestigious side so I chose what I saw as a challenge.

When I was doing the PhD I was also studying econometrics on the side. After my PhD I went to the Econometric Institute at Erasmus University. There were not a lot of places for mathematicians in academics, so that was a good opportunity. My colleagues there were of course dealing with more applied problems than pure mathematics, but I could apply my mathematical skills to those problems and that’s why I finally moved into finance.

During my time at Rotterdam, I was a consultant for four months at Goldman Sachs in New York, which gave me a window into the financial world. As I became more interested in finance, I introduced financial econometrics in Rotterdam. Until the ‘80s you studied either general econometrics or business econometrics (operations research). In the ‘90s we began to introduce more financial econometrics courses. When I left EUR in 2006 there were 30-35 students in financial econometrics and only eight in general econometrics and the same number in operations research.

During the ‘90s I also had my own research institute, Erasmus Center for Financial Research at EUR, which was sponsored by a number of banks and other financial institutions. In 2000 I decided to see for myself what the work at a real bank was like.

You wrote a paper on the valuation of options.1 This paper appeared around the time that quantitative finance and option pricing became more important in the financial sector. What motivated you to do research in this area?

My experience working at Goldman sparked my interest in really applied problems and applying math to solve them. I think one of the most influential papers we wrote was on average rate options with
The method we introduced was subsequently used in practice by a number of companies. Also my other research was very much inspired by getting a solution to a particular problem. It should have some practical relevance at that time.

You have trained quite a number of financial econometricians and some of them are now professors themselves. What can you tell us about your approach to training PhD students?

I think it’s important to have them focus on some problems that can be attacked. I point them in the direction of the relevant literature and put them in contact with people who do similar kinds of research. In any case they shouldn’t work in isolation too much. Especially in the initial stages of their research I brought my students into contact with the financial industry. What is also important is that we got new databases from the industry, which provided the starting point for a great deal of new research. For example, we had access to CDS-premia (credit default swaps) and bond data so we could do research on how these are related. The CDS market just developed in the early 2000s, so there wasn’t any academic research on that.

Did most of your PhD students also go to work for banks and other companies in the financial sector?

Yes indeed, most of them did and they were in high demand.

You mentioned you would like to talk about structured products. Could you explain what structured products are and what is their relevance?

So many things are called structured products, which complicates definition. But a structured product is something that is not a straight bond or a stock. So options on stocks can already be seen as structured products, although they are very easy to explain. These have been quite successful and have been used a lot. Then we’ve got interest-rate structured products, which have also been successful in a large market. They help people to offset risks to other parties who would like to accept that risk. Then later came the structured credit derivatives, and these also allowed people to transfer and restructure risks. Unfortunately, these credit derivatives came at a time when we saw a large decrease in credit spreads. But when the mood turned and we went into the credit crisis these products accelerated the downturn. So the structured credit products have been part of the credit crisis. But there have been a lot of other structured products that did very well and are important to the markets.

Could the mortgage bundles in the US also be called structured products?

Yes, they are an example of CDOs (collateralized debt obligations). You pick a portfolio of a 10,000 mortgages on which you earn interest. You split this portfolio among different investors. The first tranche of the investors are the first to take credit losses on the portfolio. Of course they also get the largest part of the interest payments. If the first group of investors have lost their notional investment the remainder of the credit loss goes to the second group of investors and so on. This is how the credit losses are divided over different groups. But these structured products also enormously helped the US housing market in the ‘80s and ‘90s, because they could transfer risks from banks to other parties. This implied that banks could take on other risks and more mortgages could be given. That clearly was a wish of society: more mortgages. That, in turn, increased house prices. Then things went wrong: house prices went down and the mortgages went sour.
these banks would thus have run the risk of being taken over. So there was also a strong preference from stockholders that led banks to go for short-term profits. It was therefore not only the banks themselves but also the stockholders of banks, who were interested in short-term profits.

Consider the example of UBS (Union Bank of Switzerland), which is one of the largest losers in all of this. UBS went into certain products because they followed the advice of a consultancy company that they asked to look into what the bank could do to rank up to their peers. The consultancy company reported that their competitors were doing particular kind of trades that UBS wasn’t doing. UBS consequently built up a portfolio in certain products, which later on made huge losses. So peer pressure plays an important role.

But I read that there is now more pressure, which might be natural, to go back to the core business of the bank.

Definitely—especially with the governments as stakeholders.

What is your opinion on governmental regulation with respect to the financial crisis? At the G20 meeting, for example, governments decided to pump billions and billions into the economy worldwide.

It is clear that they have to stimulate the economy. Regulators are faced, however, with an interesting issue at the moment: while they want to put a higher capital requirement on banks, they are also aware that if they set the capital requirements too high, then banks can not lend money anymore (for mortgages and to companies). Overly strict capital regulations will slow down the economy even further, and capital regulations that are too weak run even more risk. Regulators are in a difficult position.

One other thing that I would like to mention is that society is a bit split with regard to these kinds of things. If you look at what happened last year with the Icesave bank—a lot of people just wanted to go for 50 basis points more (so ½ percent more interest), and they went to Icesave. They could have seen that in the financial markets, Icesave would have needed to pay 600 basis points more, (so 6 percent instead of ½ percent). Hence, although there was something wrong with Icesave, everyone still put their money with the bank because they

Would you say, then, that the structured products drove the crisis?

In my view the drivers of the crisis have more to do with an imbalance of savings in the US and the UK in that people did not save enough. At the same time, there was a lot of money saved in Asia; the exchange rate did not adjust for that, and these people started to invest more. This made credit become very cheap. Structured products definitely allowed us to leverage this credit. But at the same time I want to indicate that all of the grief cannot be conveniently ascribed to the structured products. The prevailing attitude of the community—that everyone should own his own house through a mortgage, which was stimulated by low interest rates in the US—was a more fundamental driver. The structured products helped to even further increase the size of mortgage portfolios. But when things went wrong, because interest rates went up they also accelerated the pace of the downturn. So without structured credit products, the crisis might have been less abrupt than it is now. However, the bubble in the US housing market had to burst at some point.

What are your ideas about the current crisis? Do you have some idea about when the stock market, at least, will go up again or when the real economy will recover?

It is very hard to say. The stock market going up again and the crisis being resolved: these are quite different things. What we have seen is that while stock markets have decreased in value, bank stocks have lost the most over the years. That is of course not only because they lost money but also because they might play a different role in society. There will be fewer ways for banks to make money, which implies that their stock prices might remain low. But none of that implies that the credit crisis can’t be resolved.

Do you think that before the financial crisis, banks’ stocks reflected their real value? And did their true value change so much, or was it also kind of a bubble?

The prices at the time seemed to be reasonable, but what I think is important is that shareholders were looking for banks that made high profits. So if banks hadn’t gone into these more complicated products, then their stock prices wouldn’t have gone up, the shareholders wouldn’t have been happy—and
would get ½ percent more. It indicates that society in general goes for a slightly higher return without considering the risks carefully. For example, the treasurer of the province of North-Holland invested in 13 different foreign banks, most of which ended up needing state support.

*What is your opinion about the pension funds being in trouble and getting extra time to recover to the 105% cover factor?*

It’s a very difficult question, I must say. Why is it difficult? Because people think that pension funds will recover. I cannot, however, predict what will happen with stock prices. If stock prices recover, then we can go on with the pension funds as before. If they do not recover, and we keep on paying the same amount of pensions (making no reductions in pensions and also giving inflation payments), then the position will deteriorate for the people that still need to have a pension. People are now talking about raising the pensions age to 67. It is somewhat complicated by the fact that in some jobs you cannot go on until 67. What I haven’t seen anywhere, but what has crossed my mind often is the possibility of reducing the pension over time for people—in the sense that the older you get, the less pension you get. Some older people will have less opportunity to spend, because they become less active. That would reduce the pension liabilities of the pension funds—not as strongly as bringing the eligible age up from 65 to 67, but at least in part. I am not sure that there are a lot of studies that explore what the actual needs of people over a certain age are, whether they are decreasing or increasing with age.

---

**Reducing pension payments over time for people — in the sense that the older you get, the less pension you get ... would reduce the pension liabilities of the pension funds.**

---

**Notes**

Why do top executives receive option pay?

Calibrating principal-agent models

In addition to their fixed salary, top executives usually receive large variable payments. These variable payments come in two forms: (1) restricted stock, i.e. shares of their own company, and (2) options on their company’s stock. Both stocks and options must be held by the executive for a fixed period of time before they can be sold or exercised. There is a vivid debate in the financial literature over why executives receive option pay—or put differently, whether executives should receive options.

Some researchers argue that current executive compensation schemes are efficient. They rationalize options with principal-agent models that describe the negotiations between shareholders and managers. The most common argument in what we refer to as the “efficient contracting” view is that executives are effort-averse, and that options provide effort incentives. Other arguments are that stock options provide incentives to invest in risky projects, or that these options help to retain talented staff (see Murphy, 1999, and Edmans and Gabaix, 2009). Other researchers (supported largely by public opinion) oppose this view, arguing that options are simply a way for executives to extract rents from the firm (the “rent extraction” view; Bebchuk and Fried, 2003).

Distinguishing between these two views is clearly an empirical question, and many empirical papers test the qualitative implications of the different models. Yermack (1995), for example, runs regressions of option awards on firm characteristics in order to test nine different hypotheses that predict which firms should rely more on option pay. However, these qualitative implications are rather general, so that such traditional empirical research often cannot distinguish between different models. In our own research, we developed and applied a new empirical method that allows us to test the...
quantitative implications of different models of executive compensation: we calibrate a model to the data of an individual CEO, derive quantitative predictions from the model, and then test these quantitative predictions across CEOs. This test is more powerful, because the quantitative predictions of such models are much stronger than their qualitative implications.

The key idea is to specify the type of incentives that shareholders want to provide the manager with, and then to ask whether there is an alternative contract to the observed contract that achieves three things: (1) it provides the same incentives as the observed contract, (2) it provides the agent with at least as much utility as the observed contract, and (3) it is cheaper for the principal than the observed contract. Formally, this is an optimization problem that can be calibrated to the data of an individual CEO and solved numerically. This procedure yields the optimal contract (i.e., the optimal amounts of fixed salary, stocks and options) that has the same effect on the agent’s behaviour as the observed contract. If the underlying model is correct, then this optimal contract must be very similar to the observed contract. If the two contracts differ substantially, then the observed contract cannot be rationalized by the proposed model. If that were generally the case, it would tend to support the second view on options (rent extraction), rather than the first view (efficient contracting).

In our first paper, Dittmann and Maug (2007), we applied this method to the most popular model in the literature, which is the principal-agent model with a risk-averse and effort-averse agent (Holmström, 1979). We show that this model fails spectacularly to rationalize option pay. According to this model, it is almost always optimal to pay no options and instead provide compensation in the form of more stock. Stock (or more generally: a linear payout scheme) is a cheaper way to provide incentives to a risk-averse agent, because options are much riskier than shares. Whereas a risk-averse agent may not be willing to forgo very much of her fixed salary for an option grant, she will probably consider accepting a reduction in salary for a grant of less risky restricted...
Executive compensation, with its detailed disclosure of executive pay packages and publicly observable performance measures, provides a unique chance for researchers to validate principal-agent models with real-world data.

stock. We also derive and estimate the optimal “general” contract that is not restricted to be a combination of fixed salary, stock and options. This optimal general contract is depicted in Figure 1 for a representative CEO from our sample, together with the observed contract (consisting of fixed salary, stock and options). The figure shows the end-of-period payoff the manager receives, depending on the stock price at the end of the period. The optimal contract (dashed line) is strictly concave and obviously cannot be approximated with stocks and options (at least not with positive option holdings that make the contract convex). This result is robust to many alternative specifications of the model, which allows us to conclude that the standard principal-agent model is not descriptive of executive compensation practice.

Dittmann, Maug and Spalt (2009) and Dittmann and Yu (2009) analyze two alternative models and show that they—in contrast to the standard model—can potentially explain option compensation. Dittmann, Maug and Spalt (2009) assume that the manager is loss-averse instead of risk-averse. Loss aversion is an alternative model of human preferences that has proven its superiority (over the traditional expected-utility framework) at explaining human choices under uncertainty. Loss aversion assumes that the manager evaluates the payout from her compensation contract relative to some reference wage. Payouts below the reference wage are coded as losses, payouts above the reference wage considered to be gains, and losses receive a higher weight than gains. Our research shows that this model can explain convex contracts if the reference wage is at or slightly above last year’s base salary. Figure 2 illustrates this result for a representative CEO. The optimal contract has two regions: below a critical stock-price level, the CEO is dismissed and receives the lowest possible payout—whereas she receives a payout above the reference wage if the end-of-period stock price is above this critical stock-price level. In this second region, the contract is increasing and convex in the stock price. This contract can be easily approximated with stock- and option holdings similar to those observed in practice. When the reference wage is higher, however, the model does not work as well. Then the critical stock price is much higher, and the contract is dominated by the discontinuous drop at the critical stock price, which is not descriptive of compensation practice.

Taking a different route to “fix” the standard Holmström (1979) model, Dittmann and Yu (2009) assume that the CEO must perform two tasks: She exerts costly effort (as in the standard model) and has to make investment decisions that have an effect on the value and the riskiness of the firm. In this setting, providing effort incentives in the form of stock has an important drawback: If a large part of the CEO’s wealth is invested in her own firm’s stock, she will have a strong interest to reduce the riskiness of the stock—even if this comes at the cost of a reduced stock price. She would, for instance, pass up a profitable investment project if this project would increase firm risk too much. The shareholders, on the other hand, are typically well diversified, so that they do not mind any additional risk—as long as it leads to an increase in firm value. As a consequence, shareholders might want to provide risk-taking incentives to the CEO in order to motivate her to also invest in (profitable) risky projects. Options with their limited downside are instruments that provide not only effort incentives (as stock does) but also risk-taking incentives. Figure 3 depicts the optimal contract in the Dittmann and Yu (2009) model for a representative CEO. The contract is flat for low stock prices, and increasing and concave for high stock-price outcomes. This contract can best be approximated with in-the-money options, where the exercise price is below the current stock price—although a mix of stocks and options (as observed in practice) is also a good approximation.

The principal-agent model is ubiquitous in modern (business) economics. It is one of the most important frameworks used to understand an economic system that is based on the division of labour. However, it is difficult to obtain data that are suitable to test these models, because effort and output measures are usually unobservable for the researcher. Executive compensation, with its detailed disclosure of executive pay packages and publicly observable performance measures (i.e. market and accounting data), provides a unique chance for researchers to validate principal-agent models with real-world data. Our research therefore not only helps to explain why executives are awarded stock options, but also contributes to the development of better principal-agent models for other areas of economics.
Figure 1 shows end-of-period wealth $W_T$ for the observed contract (solid line) and the optimal contract (dashed line) for a representative CEO whose parameters are close to the median of a sample of 598 US CEOs from 2000. The horizontal axis shows the end-of-period stock price $P_T$ as a percentage of the beginning-of-period stock price $P_0$. See Dittmann and Maug (2007) for more details about the underlying assumptions.

Figure 2 shows end-of-period wealth $W_T$ for the observed contract (solid line) and the optimal contract (dashed line) for a representative CEO whose parameters are close to the median of a sample of 595 US CEOs from 2005. The horizontal axis shows the end-of-period stock price $P_T$ as a percentage of the beginning-of-period stock price $P_0$. $w_R$ is the agent's reference wage, and $W$ is the minimum payout. See Dittmann, Maug and Spalt (2009) for more details about the underlying assumptions.

Figure 3 shows end-of-period wealth $W_T$ for the observed contract (solid line) and the optimal contract (dashed line) for a representative CEO whose parameters are close to the median of a sample of 737 US CEOs from 2006. The horizontal axis shows the end-of-period stock price $P_T$ as a percentage of the beginning-of-period stock price $P_0$. See Dittmann and Yu (2009) for more details about the underlying assumptions.

References


Dittmann, I., E. Maug and O. Spalt (2009), Sticks or carrots? Optimal CEO compensation when managers are loss-averse, ECGI - Finance working paper no. 193/2007.

Dittmann, I. and K.-C. Yu (2009), How important are risk-taking incentives in executive compensation? Evidence from model calibrations for US CEOs, discussion paper.


Terrorism and economics

How the fiscal plans of EU member states influence the plans of other member states

What is the economic impact of terrorism? Although newspapers typically give terrorism a lot of attention, economists find it rather difficult to answer such a straightforward question. Even for relatively well-defined research questions, such as the economic impact of the 9-11 attacks on the World Trade Center in New York, finding the direct economic impact is difficult. Consideration must be taken not only of the deaths of the more than 2000 people during this event, but also of the fear that such an event may repeat itself—a fear that may reduce people’s quality of life. In addition, companies may become reluctant to have their offices in high-rise buildings where their employees may face a potential threat in case of a similar event. Another example is the Theo van Gogh murder that took place in November 2004 in Amsterdam. Also for this event the economic impact of the murder extended beyond the loss of the life of a columnist, TV-show host and moviemaker. The murder also increased the public’s fear that someone can be killed due to his or her opinion. Moreover, the general public’s perception of immigrants from Muslim countries may have changed due to the murder. This may have affected the willingness of certain individuals to live in neighborhoods in Amsterdam with relatively many Muslims.

All of these aspects are typically difficult to measure. The traditional way to measure them is by subjective responses. For example, survey evidence subsequent to the murder of Theo van Gogh suggests that people believed the murder affected interracial relations (see SCP 2006). While only 33% responded that they believed that the murder directly affected their lives, 86% believed that it affected the relationship between Muslims and non-Muslims. However, there are two problems related to these subjective responses. First, it is relatively difficult to validate the responses, and second, it is also relatively difficult to quantify the impact.

One recent approach is to investigate whether a change in opinion can have an impact on demand in the real-estate market. For example, Abadie and Dermisi (2008) find that the events of 9-11 still have an impact on office vacancy rates in high-rise buildings in Chicago. In a paper together with Gautier and Siegmann (2009), I look at the impact of the murder on Theo van Gogh on listed house prices in Amsterdam. Specifically, we compare posted house prices in Amsterdam neighborhoods with more than 25% inhabitants of Moroccan and Turkish background (which we label type-I neighborhoods) before and after the murder with house prices in the other (type-II) neighborhoods.
We developed and applied a new empirical method that allows us to test the quantitative implications of different models of executive compensation.

The difference-in-difference (DID) approach that we use to identify the impact of the murder has become very popular in labor and development economics. DID implies that we assume the trend of the control group to be a good predictor of the trend of the treatment group in case the treatment had not taken place. This is usually defended by three additional assumptions: (1) there is no mobility between the treatment group and the control group, (2) the treatment is not anticipated, and (3) the difference between the treatment group and the control group is exogenous from the outcome variable (Blundell and Costa-Dias, 2000). Under these assumptions, the difference between before and after treatment and between the treatment and control groups gives a valid predictor of the treatment effect. There are few papers that apply DID to the housing market. Examples include Abadie and Dermisi (2008) and Chay and Greenstone (2005). However, in many situations the assumptions made above are more likely to hold for the housing market than for other markets. This is due to the fact that houses are fixed and cannot move between neighborhoods. In addition, the murder can be regarded as an unanticipated and exogenous event.

Multi-listing services
A considerable disadvantage to studies involving the housing market has always been data availability. This changed recently because of the introduction of multi-listing services on the Internet that represent a large part of the market. To explain the usefulness of multi-listing services, I will focus here on a dataset that we constructed in Gautier et al. (2009). The data were collected on a weekly basis from the largest online multi-listing service in the Netherlands called Funda. Funda contains at least 70% of the supply of owner-occupied homes for sale at any moment in time. For the Amsterdam region, it has a typical stock of 3700 houses for sale in any given week.

Results
DID
Figure 1 shows the results of our estimations using DID. Our first estimate is based on fixed-week effects, while the second estimate is based on a linear approximation. The main reason for using a linear approximation is that the fixed-week-effects model has very large standard errors. In general, the linear approximation fits the model of fixed-week effects very well. The weeks after the murder are the weeks counting from week 45 of 2004. Hence, negative numbers imply that the murder had yet to take place. The fixed effects as well as the linear approximation are normalized to zero in week 0. Since the fixed effects are in comparison to the control group (type-II neighborhoods), an increasing trend means that the type-I neighborhoods performed relatively well against the type-II neighborhoods, while a decreasing trend means that they did relatively poorly. In that sense, we see a rather sharp difference between the periods before and after the murder, with an increasing trend before and a decreasing trend after. In total, the decrease is about 3 percent after one year.

Synthetic control groups
One of the problems related to the specification as in Figure 1 is that it is not clear why the type-II neighborhoods would be good predictors of the price developments for the type-I neighborhoods when the murder had not yet taken place. For example, Figure 1 shows that the type-I neighborhoods actually did better than type-II neighborhoods. This might suggest that these neighborhoods (before the murder) were catching up their prices— a process that was stopped abruptly due to the murder. While this implies that our results in the previous section are upper bounds of the actual effects (or lower bounds in absolute terms), it may also suggest that market prices in the type-II...
neighborhoods were affected by market indicators that were independent of those that influence the market prices in type-I neighborhoods. In order to investigate this, we use the synthetic control-group method originally developed in Abadie and Gardeazabel (2003). In this method, the control group is a weighted average of the type-II neighborhoods. The weights are chosen such that the house prices of the synthetic control group match the pre-trend of our treatment type-I neighborhood to the greatest extent possible. The underlying idea is that this also implies that the post-trend can be determined well by the synthetic control group before the murder had taken place. The results of this exercise are presented in Figure 2. The line labeled as *prediction* is the difference between the development of prices in the type-I neighborhoods and the corresponding development of the synthetic control group. This difference is small before the murder, indicating that the synthetic control group was able to mimic the price developments in the type-I neighborhoods before the murder had taken place. However, the prices in the synthetic control group increased more rapidly after the murder, which is reflected in the sharp decrease in our line. The results are similar to those of the difference-in-difference method. The line labeled as *linear approximation* comes from assuming linear effects over time.

**Explaining our results**

If valuations for houses in type-I and type-II neighborhoods diverge after the murder because of ethnic preferences, we should see this in the ethnicity of buyers and

---

**Figure 2: Estimated effects using synthetic control groups**

The changes in house prices seem to have been driven mainly by changes in the preferences of natives, rather than those of Turkish or Moroccan homeowners.
sellers. Table 1 lists the fraction of transactions that involved a buyer or seller of Turkish or Moroccan background, both before and after the murder. Note that the percentages indicate that 9 percent of the buyers and 4 percent of the sellers are from Turkish or Moroccan origin. This is very low, given the fact that at least 25 percent of the inhabitants fall into this category. This indicates that the changes in house prices are driven mainly by changes in the preferences of natives, rather than those of Turkish or Moroccan homeowners.

Table 1: Buyers and sellers, before and after the murder

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Before</th>
<th>After</th>
<th>T-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type-I neighborhoods</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buyers</td>
<td>9.29</td>
<td>8.12</td>
<td>9.87</td>
<td>1.88</td>
</tr>
<tr>
<td>Sellers</td>
<td>4.25</td>
<td>5.14</td>
<td>3.75</td>
<td>-1.64</td>
</tr>
<tr>
<td><strong>Type-II neighborhoods</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buyers</td>
<td>1.97</td>
<td>1.88</td>
<td>2.04</td>
<td>0.31</td>
</tr>
<tr>
<td>Sellers</td>
<td>0.59</td>
<td>0.81</td>
<td>0.42</td>
<td>-1.16</td>
</tr>
</tbody>
</table>
Letters from Alumni
life after the PhD thesis defense

On the interface of policy and science
Ioulia Ossokina*

Since my early undergraduate years I have been interested in applying scientific insights to solving real-world policy problems. This interest grew during my PhD years, when I built theoretical models to explain why politicians sometimes make policy choices that are not seen as optimal by economists, and also worked on several empirical projects for Dutch ministries. After I finished the PhD, it therefore seemed to be a logical step to apply for a job at CPB Netherlands Bureau for Economic Policy Analysis, an independent thinktank for the Dutch government and the official body for economic policy analysis in the Netherlands.

For the last six years my work at CPB has involved research in the domain of regional and spatial economics. During this time I have worked on various research projects: construction of CPB scenarios for long-term regional development; project appraisal of large land development initiatives that are to be financed with public money; analysis of demand and supply in the higher segments of the urban housing market, etc. Furthermore, I was part of a team that started a new research direction aiming at empirically estimating the geographical range of the benefits of local public goods. What all of these studies (some of which provided an answer to a question posed by a ministry, others initiated by CPB) have in common is that they aim at providing information that supports the policymaking process.

Six years is actually quite a lot of time. Several fresh PhD graduates that started together with me have left in the meantime. Some went back to academia, as they longed for more freedom of research. Others became civil servants at different ministries or moved to the more dynamic world of consultancy, with short deadlines and higher pay. However, many PhDs (and I am one of these) chose for a long-term employment relationship with CPB. What makes CPB attractive for us? I think the main factor is the possibility to perform academic research that is socially relevant, has exposure in the policy world and has impact on policymakers. Other important factors include high quality requirements with regard to the output, a stimulating research environment with like-minded colleagues and access to academic journals and libraries, and at the same time the possibility to combine work on short-term policy-initiated projects with long-term academic research.

Let me assure you that my connection with Tinbergen Institute is still strong. As a TI alumnus and chair of the board of the TI alumni association I appreciate and enjoy greatly the many business and personal contacts CPB has with Tinbergen Institute. TI courses are open to CPB employees, for example, and joint seminars and conferences are regularly organized. Moreover, many CPB colleagues share the same TI past—and even CPB director Coen Teulings used to be director of Tinbergen Institute not so very long ago.
alternative hypotheses suggest themselves from the data: The phenomenon can either be captured by a simple imitation model or clarified by a focal point explanation. For the long run, the imitation model predicts that prices converge to the perfectly competitive outcome. Data from three new treatments are then used to properly test the influence of imitation and focality. Both forces are found to be present: The focal point prevails when it involves satisfying (although not maximum) profits. Its attraction lies in the avoidance of costly miscoordination in the price-finding process. If the focal point price is unattractive, then a dynamic imitation heuristic is used that leads to the price of 24. The subjects in the paper act in a boundedly rational, yet intelligent way. Further, imitation dominates in large markets with a long interaction.

Klaus Abbink (UVA); Jordi Brandts (Universitat Autònoma de Barcelona), 2008, 24. Pricing in Bertrand competition with increasing marginal costs, Games and Economics Behavior, 63(1), 1-31.

Market liquidity, investor participation, and managerial autonomy: Why do firms go private?

Should corporations be exchange-listed (i.e. publicly held) or privately held? This is a crucial question both from an academic point of view (theories are scant) and from a practical point of view. Recent events have brought these ownership issues into the spotlight. The growth of the private equity industry has encouraged firms to de-list; simultaneously, the strict(er) regulation of public equity markets (e.g. Sarbanes-Oxley Act) may have elevated the costs of being listed. The paper develops a theory that assigns centre stage to the ‘elbow room’ that management needs to optimally manage the firm. Key in this work is how investor participation and the potential interaction between investor participation and firm participation affect a publicly traded firm’s choice of whether to stay public or go private. Investors have different beliefs about what is best for the firm, and this can lead to disagreement between (and among) investors and the firm’s management. Investors optimally give the manager some decision-making discretion or autonomy to pursue the project-choice decision he thinks is best. The “butter and knife” in the trade-off that determines ownership choice are essentially one and the same: namely, the greater liquidity of public ownership relative to private ownership. Whereas this greater liquidity generates a relative benefit for public ownership by lowering the firm’s cost of capital, it also generates a relative disadvantage for public ownership by creating greater uncertainty about the firm’s ownership base. This is the first paper that highlights the potential importance of stability in a firm’s ownership base. It helps explain private ownership and lock-up agreements for shareholders in publicly held firms. Several predictions follow about the likelihood of publicly traded firms going private relative to their share price and volatility, stock price effects resulting from privatisation announcements, the impact of enlarging investor participation in the public equity market, premia above the pre-transaction stock prices upon going public, and the age of firms going public.

and smoother recursions. The methods can be implemented in a computationally efficient way; see Jungbacker and Koopman (2008). However, these model representations are not valid in the presence of missing data; see also the discussion in Banbura and Modugno (2008). This paper addresses this problem by developing a low-dimensional linear state space model with time-varying state dimensions. It allows the Kalman filter and related smoothing methods to produce optimal estimates in a computationally efficient way in the presence of missing data. The model is discussed in detail, together with the implementation of methods for signal extraction and parameter estimation. The computational gains of the new devices are presented based on simulated datasets with varying numbers of missing entries.

References:


By Borus Jungbacker (VU A); Siem Jan Koopman, (VU A), Michel van der Wel, (EUR and CREATE), Dynamic factor analysis in the presence of missing data TI 09-010/4

Labour supply and commuting:
Implications for optimal road taxes

Does the number of hours worked depend on the commuting costs of the workers concerned? The answer to this question is relevant because commuting is one of the main contributors to road congestion. Economists usually advocate the use of road pricing to address the external costs of congestion. In an economy with distortionary income taxes, workers supply fewer hours than would be the case if there were no distortionary income taxes. One of the main consequences is that the introduction of road pricing may not be such a good idea if the revenues of road pricing are not used to reduce the level of distortionary income taxes, because the road tax reduces the number of hours worked even more. The main finding of the current study using data for Germany is that higher commuting costs do not reduce the number of hours worked per week. Evidence is found that workers facing high commuting costs reduce the number of days worked, but simultaneously increase the number of hours worked per day. This finding suggests that recycling of revenues of road pricing to decrease the income tax level is not essential when road pricing is introduced.

By Eva Gutierrez-i-Puigarnau and Jos van Ommeren (VU A), Labour Supply and Commuting: Implications for Optimal Road Taxes TI 09-008/3

Socioeconomic differences in health
over the life cycle in an egalitarian country

A strong relationship between health and socioeconomic status has been firmly established in the literature. Yet, partly due to the multi-dimensional and dynamic nature of both variables, the causal mechanisms connecting them are poorly understood. Does low economic status in early life lead to the development of health problems in middle and later life? Or, does poor health interfere with the acquisition of education and, subsequently, the chances of securing, or holding onto, a well-paid job? A life-cycle perspective is necessary to address such questions and allows investigation of whether the socio-economically disadvantaged not only start with a lower health status, but also experience more rapid deterioration in health as they age.

The analysis demonstrates that in the Netherlands socioeconomic differences in health widen until late middle age before narrowing in old age. This is remarkably similar to the US, despite the stark differences that exist in social welfare and health insurance systems. This suggests that fundamental mechanisms linking age, health, income and education, which are relatively unresponsive to policy parameters, may be responsible for these relationships. Two mechanisms are emerging as particularly important in understanding socioeconomic differences in health. First, there is a large effect of health on income that operates through employment and grows with age until voluntary retirement begins to dominate health as the main reason for labour-force withdrawal. Second, there is a life-long effect of education on health.

The paper also asserts that although socioeconomic differences in health first diverge, then reach a peak around retirement age, and then converge in old age, there are clear signs that the socioeconomically disadvantaged in practice suffer a double jeopardy in health. The convergence after retirement partly stems from selective mortality—only the robust group in the lower socio-economic classes survive, so that health differences seem to converge. It also reflects the fact that relatively high incomes are less strongly related to health after middle age, due to withdrawal from the labour force for non-health-related reasons.

By Hans van Kippersluis (EUR), Owen O’Donnell (University of Macedonia, Thessaloniki), Eddy van Doorslaer (EUR), Tom Van Ourt (EUR), Socioeconomic differences in health over the life cycle in an egalitarian country TI 09-006/3

Firm formation with complementarities:
The role of the entrepreneur

Bill Gates, Steve Jobs, Henry Ford—entrepreneurs with creativity, foresight and managerial talent that allowed them to build large enterprises employing thousands of workers in complex hierarchies. The kebab seller in front of our university, however, is an entrepreneur running his stand not because of his outstanding talents, but because this is probably the only way for him to make a living. Earlier economic theories treated occupational choice, job matching and the emergence of different types of firms separately. As a result, they have trouble explaining a number of real-
world phenomena. For example, why do Bill Gates and the kebab seller both choose to become entrepreneurs? And why can Bill Gates hire highly skilled, creative and productive managers who prefer working for Microsoft rather than starting their own firm? This article proposes a model that makes it possible to analyse simultaneously the occupational choices of heterogeneous individuals (i.e. entrepreneurship or wage employment), the firms that come into existence, job matching (i.e. which worker works in which firm in which job), and the payoffs of entrepreneurs and employees. Equilibrium firms are efficient and turn out to vary in size and organisational complexity, maximising complementarities among workers as a result of profit-maximising entrepreneurial choices. The model provides unique insights into the compensation of managers at different levels of a firm’s hierarchy and how these payoffs compare to entrepreneurial profits. Furthermore, the model can explain why and under which circumstances workers within a firm will be substitutes or complements to each other. The model takes William Baumol’s call for introducing entrepreneurship into economic theory seriously. It allows studying the origins and consequences of entrepreneurship simultaneously in an equilibrium model of rational choice.

By Christian Roessler (Rice University and University of Queensland, Australia), and Philipp Koellinger (EUR).

Firm formation with complementarities: The role of the entrepreneur TI 09-003/3

Poverty, risk and insurance: Evidence from Ethiopia and Yemen

The thesis explores three issues that are essential for economic development: Poverty, risk and insurance. Poverty is one of the world’s biggest problems. In 2001, about one-fifth of the world’s population (1.1 billion people) lived on less than one dollar per day, and about 2.7 billion people lived on less than two dollars per day. Risk, which is one of the causes and aspects of poverty, is the main issue investigated. The analyses are from a micro point of view and in the setting of rural areas in developing countries. The findings in the thesis provide theoretical and empirical evidence addressing the question whether and to what extent risk-reduction strategies (such as insurance) help rural households in developing countries improve their welfare and stimulate growth.

One important risk-coping strategy for rural households is getting transfers from their friends and relatives. However, empirical evidence in the thesis suggests that rural households in Ethiopia are not able to cope with risk through their own risk-sharing networks. Another important strategy is asset accumulation. This strategy has its limitations and comes at a great cost. It is found that the expected value of household assets in households under risk at the end of a 90-year simulation period is 46% lower than it would be in the risk-free case. Risk therefore not only brings volatility in consumption but also lowers growth on average and has a persistent effect on household welfare. These findings support the implementation of an insurance scheme in rural areas of developing countries. The last part of the thesis is on a different topic. It investigates an issue in poverty measurement and explores several methods to improve the measurement of poverty at disaggregated levels.

Thesis: ‘Poverty, risk and insurance: Evidence from Ethiopia and Yemen’ by Lei Pan
Published in the Tinbergen Institute Research Series #448

Essays on endogenous economic policy

Policies often seem to disregard public welfare and favour instead specific narrow interests. A frequent explanation is that policymaking can be influenced by the strategic activities of specific interest groups, or lobbies. Essays presented in this thesis show that the ability of the latter to affect the political outcome depends heavily on the institutional framework. Most economic models restrict the influence of interest groups to a single agent. However, public policies are shaped by the choices of more actors interacting at the same political or administrative tier, or across different tiers (e.g. central and local governments, legislators and bureaucrats). The existence of several political decision-makers gives the interest groups more opportunities for lobbying but also makes lobbying at a single tier less decisive. A key result is that the existence of multiple tiers of decisions often reduces the overall gains from lobbying and, therefore, the incentives for interest groups to exert influence.

An additional essay investigates the impact of immigration on the political influence of interest groups and on redistributive policies. In the model, immigrant workers have a negative impact on labour price and a positive one on capital price. Regarding the political effects, immigrants have an ambiguous impact on the political weight of the labour union: they increase the size of the union, making it more relevant for the government, but also reduce union homogeneity, weakening its ability to organize for lobbying. The concession of voting rights may favour integration between immigrants and native workers and strengthen the political influence of labour. In such a case, immigration may be beneficial overall both for workers and capital owners. In particular, workers gain political influence and may obtain, through a policy of redistribution, a compensating share of the economic benefits that capital owners get from immigration.

Thesis: ‘Essays on endogenous economic policy’ by Isidoro Mazza,
Published in the Tinbergen Institute Research Series #443
**Theses**

441 MONIQUE DE HAAN (12-04-2008), Family Background and Children’s Schooling Outcomes

442 TIBOR ZAVADIL (01-13-2009), Dynamic Econometric Analysis of Insurance Markets with Imperfect Information

443 ISIDORO MAZZA (01-16-2009), Essays on Endogenous Economic Policy

445 AMY WONG (01-29-2009), Derivatives in Dynamic Markets

446 RENE SEGERS (01-29-2009), Advances in Monitoring the Economy

447 FERDINAND VIEIDER (02-13-2009), Social Influences on Individual Decision Making Processes

448 LEI PAN (02-27-2009), Poverty, Risk and Insurance: Evidence from Ethiopia and Yemen

449 BERT TIEBEN (03-12-2009), The Concept of Equilibrium in Different Economic Traditions: A Historical Investigation

450 PETER HEEMEIJER (01-29-2009), Expectation Formation in Dynamic Market Experiments

451 ADAM BOOIJ (04-09-2009), Essays on the Measurement Sensitivity of Risk Aversion and Causal Effects in Education

452 MARTA LOPEZ (27-04-2009), Four Essays on Applied Microeconometrics

453 SELMAR MEENTS (08-05-2009), The Influence of Sellers and the Intermediary on Buyers’ Trust in C2C Electronic Marketplaces

454 SUN ICA VUJI (07-05-2009), Econometric Studies to the Economic and Social Factors of Crime

455 FLORIS HEUKELOM (29-05-2009), Kahneman and Tversky and the Making of Behavioral Economics

456 GABRIELLA BUDAI-BALKE (04-06-2009), Operations Research Models for Scheduling Railway Infrastructure Maintenance

457 TIJMEN DANIELS (12-06-2009), Rationalised Panics: The Consequences of Strategic Uncertainty during Financial Crises

**Papers in TI-ranked journals by TI fellows**

**AA-ranked journals**


**A-ranked journals**


**B-ranked journals**


**TI-ranked (chapter(s) in)**

**books**


**Discussion papers**

**Institutions and Decision Processes**

*08-115/1*

René van den Brink, VU, and Frank Steffen, University of Liverpool and University of Hamburg, *Axiomatizations of a Positional Power Score and Measure for Hierarchies*

*08-116/1*

Riemer P. Faber, EUR, Maarten C.W. Janssen, University of Vienna and EUR, *On the Effects of Suggested Prices in Gasoline Markets*

*09-004/2*

Julian Emami Namini, Enrico Pennings, EUR, *Horizontal Multinational Firms, Vertical Multinational Firms and Domestic Investment*

*09-018/2*

Chris Elbers, VU, *Solving the Discrete-Time Stochastic Ramsey Model*

*09-019/2*

Stefan Arping, UVA, Gyöngyi Lóránth, Judge Business School, University of Cambridge, Alan Morrison, Said Business School, University of Oxford, *Public Initiatives to Support Entrepreneurs: Credit Guarantees versus Co-Funding*

*08-117/1*

Adriaan R. Soetevent, UVA, Marco A. Haan, University of Groningen, Pim Heijnen, UVA, *Do Auctions and Forced Divestitures Increase Competition?*

*08-120/1*

Harold Houba, Evgenia Motchenkova, VU, Quan Wen, Vanderbilt University, Nashville (TN), *Maximal Cartel Pricing and Leniency Programs*

*09-007/1*

Iwan Bos, Maarten Pieter Schinkel, UVA, *Tracing the Base: A Topographic Test for Collusive Basing-Point Pricing*

*09-020/1*

Julian Emami Namini, EUR, *International Trade with Firm Heterogeneity in Factor Shares*

*09-027/1*

Nick Vikander, EUR, *The Breakdown of Morale*

*09-029/1*

Harold Houba, VU, Hans Kremers, Deutsches Institut für Wirtschaftsforschung (DIW), *Environmental Damage and Price Taking Behaviour by Firms and Consumers*

*09-030/1*

Randolph Sloof, Joep Sonnemans, UVA, *The Interaction between Explicit and Relational Incentives: An Experiment*

*09-031/1*

Marco A. Haan, José Luis Moraga-González, University of Groningen, *Advertising for Attention in a Consumer Search Model*
Labour, Region and Environment
08-119/3
Andrea Caragliu, Politecnico di Milano, Peter Nijkamp, VU, The Impact of Regional Absorptive Capacity on Spatial Knowledge Spillovers

09-001/3
Sabien Dobbelaere, VU, Jacques Mairese, CREST, Institut National de la Statistique et des Études Économiques (INSEE), Merit, Maastricht University and NBER, Panel Data Estimates of the Production Function and Product and Labor Market Imperfections

09-002/3
Hervé Bouhliol, Université Paris-Panthéon Sorbonne, OECD, Sabien Dobbelaere, VU, Chent University, IZA Bonn, Sara Miaoili, Newcastle University Business School, Imports as Product and Labour Market Discipline

09-003/3
Christian Roessler, Rice University and University of Queensland, Australia, Philipp Koellinger, EUR, Firm Formation with Complementarities: The Role of the Entrepreneur

09-005/3
Andrew Burke, Cranfield University, UK, André van Stel, UvA, The Entrepreneurial Adjustment Process in Disequilibrium

09-006/3
Hans van Kippersluis, EUR, Owen O'Donnell, University of Macedonia, Thessaloniki, Eddy van Doorslaer and Tom van Oorti, EUR, Socioeconomic Differences in Health over the Life Cycle in an Egalitarian Country

09-008/3
Eva Gutierrez-i-Puigarnau and Jos van Ommeren, VU, Labour Supply and Commuting: Implications for Optimal Road Taxes

09-009/3
Jan K. Brueckner, University of California at Irvine, Erik T. Verhoef, VU, Manipulable Congestion Tolls

09-012/3
Frank A.G. den Butter, Seung-gyu Jo, VU, Pros and Cons of ‘Backing Winners’ in Innovation Policy

09-013/3
Frank A.G. den Butter, Marc de Graaf, André Nijsten, VU, The Transaction Costs Perspective on Costs and Benefits of Government Regulation

09-014/3

09-016/3
Ellen van de Poel, EUR, Owen O'Donnell, University of Macedonia, Thessaloniki, Eddy van Doorslaer, EUR, The Health Penalty of China’s Rapid Urbanization

09-021/3

09-022/3
Ceren Ozgen, Peter Nijkamp, VU, Jacques Poot, Population Studies Centre, University of Waikato, The Effect of Migration on Income Convergence: Meta-Analytic Evidence

09-023/3

09-024/3
Soushi Suzuki, Hokkai-Gakuen University, Peter Nijkamp, Eric Pels, Piet Rietveld, EUR, Comparative Performance Analysis of European Airports by Means of Extended Data Envelopment Analysis

09-025/3
Peter Nijkamp, Medihah Sahin, VU, Tüzin Baycan-Levent, Istanbul Technical University, Migrant Entrepreneurship and New Urban Economic Opportunities

09-026/3
Tüzin Baycan-Levent, Istanbul Technical University, Peter Nijkamp, Medihah Sahin, VU, The Urban Growth Potential of Second-Generation Migrant Entrepreneurs - A Sectoral Study on Amsterdam

09-028/3
Pieter A. Gautier, VU, Coordination Frictions and the Financial Crisis

Econometrics
09-010/4
Borus Jungbacker, Siem Jan Koopman, VU, Michel van der Wel, EUR and CREATES, Dynamic Factor Analysis in the Presence of Missing Data

09-011/4
Arco van Oord, Martin Martens, Herman K. van Dijk, EUR, Robust Optimization of the Equity Momentum Strategy

09-017/4
David Ardia, University of Fribourg, Lennart Hoogerheide, Herman K. van Dijk, EUR, To Bridge, to Warp or to Wrap?
Tinbergen Research Institute

Four themes distinguish Tinbergen Institute's research programme:
I. Institutions and Decision Analysis
II. Financial and International Markets
III. Labour, Region and the Environment
IV. Econometrics and Operations Research

Each theme covers the whole spectrum of economic analysis, from theoretical to empirical research. Stimulating discussions on theories, methodologies and empirical results arise from the interaction of the Institute's faculty comprised of approximately 130 research fellows. These fellows are faculty members with excellent track records in economic research, active in organising research activities, teaching graduate courses and supervising PhD students.

Discussion Papers
Research is pre-published in the Institute's own Discussion Paper Series. Download discussion papers at www.tinbergen.nl/ti-publications/discussion-papers.php. E-mail address for correspondence: tinbergen-magazine@tinbergen.nl.

Tinbergen Graduate School

The Tinbergen Institute offers two research master programmes (MPhil): one in Economics and one in Finance. Due to the demanding nature of the programmes, the MPhil programmes are open only to a rigorously selected group of students. An excellent preparation for PhD thesis research, the MPhil programmes are connected to three-year PhD positions in the economics departments of the Erasmus University Rotterdam, the Universiteit van Amsterdam, and the Vrije Universiteit Amsterdam.

The research master programme has been accredited by the Dutch and Flemish Accreditation Organization for higher education (NVAO), and eligible students can claim two years of financial aid (“studiefinanciering”). In addition, the Tinbergen Institute allocates scholarships each year based on academic merit.

Detailed information on the institute's graduate programme and the application procedure can be found in the Graduate School section of www.tinbergen.nl.

Please send any questions to applications@tinbergen.nl.

Board

General Director
H.K. van Dijk

Directors of Graduate Studies
A. Lucas, E.J.S. Plug

Research Programme Co-ordinators

Editorial Board
Tinbergen Magazine

How to subscribe?
Address for correspondence/subscriptions: Tinbergen Institute Rotterdam Burg. Oudlaan 50 3062 PA Rotterdam the Netherlands.
E-mail: tinbergen-magazine@tinbergen.nl. Address changes may be sent to the above e-mail address.
Column: Ti: the next challenge

Structured products and the financial crisis

*Interview with Ton Vorst*

Why do top executives receive option pay?

Terrorism and Economics

Letters from Alumni

Publications and references