Interview with Xavier Gabaix:  
**The power of power laws**

Interview with Bauke Visser:  
**The best ideas emerge in conversations**

inDepth  
Cees Withagen:  
**Combating climate change**
Tinbergen Magazine

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Some decisions in life can be called “life-changing”, and despite the fact that they are easily recognizable when we look back in time, they are hardly known on the spot—when our bounded capacity to foresee the future can render only an incomplete set of benefits and costs upon which we make decisions.

Today, I can trace the beginning of such life-changing decisions to June 2006, a few months before the deadline for submitting my thesis. During a meeting with my advisors to evaluate what still needed to be done for my dissertation I had an apparent moment of insanity when I presented my travelling/conference plans for the summer: from June until September I was going to travel for conferences and workshops in Lisbon, Nottingham, Prague, Atlanta, Santa Monica and Melbourne. That would leave me with only three months for working on my dissertation. I will never forget the suspicious looks and the ironic smiles that accompanied the entirely correct but tough question: “do you think that that is a good decision? Will you have time to comply with the submission deadline?”

I remember that I mulled it over briefly, reckoning that if I were to work between 18 to 20 hours a day I would be able to multiply the three months left; since half a year seemed to be a sufficiently large amount of time, I just said “yes” to their question—and few days later I was landing in Australia.

The University of Melbourne had recently opened an experimental laboratory and was organizing a workshop/summer school on organizational incentives and experimental economics. Summer schools are among the best events I remember from my PhD life. They are a mixture of networking, work and fun in a kind of ‘big brother’ context, where in a few days students and professors can discuss ideas and establish productive co-authorships and friendships that may eventually last forever.

Melbourne had all of that plus something extra. After presenting my work and research agenda, John List offered me a two-year postdoc position at the University of Chicago to work on field experiments. And, one year later, I moved to the windy city to join a very exciting academic environment in a dynamic Economics department. One of the many academic highlights of my time in Chicago was working on field experiments with John List, Uri Gneezy and Steve Levitt. In 2008, with a team of co-authors, I travelled to Northeast India to investigate the interplay of nature and nurture on female and male behavior that could help us better understand gender discrimination.

During my postdoc, the financial crisis also hit the universities. The academic job market was tight, with many institutions closing positions. Nevertheless, I decided to go on the job market, fortunately got some job offers, and ended up accepting a tenure-track position at Purdue University.

Being an Assistant Professor at Purdue has been extremely rewarding. The opportunities for collaborative research are great. Here, I "returned" to the lab and my dissertation work on social preferences. I have been working on mechanisms underlying cooperation, reciprocity, fairness and morality on economic decisions, and on the effect of both formal and informal incentives on effort and motivation in organizations. The experimental lunch seminars I organize with Tim Cason remind me of those at CREED. And every time I conduct an experiment here with some of the PhD students I work with, I recall the full trust that Randolph Sloof and Joep Sonnemans had in me.

While I am not sure where I will be in some years from now, I am almost sure that another apparently minor event at a certain point in time will prove to be life changing.
column

Peter Boswijk

In the Dutch graduate education review *Keuzegids Masters 2011*, the MPhil program in Economics of the Tinbergen Institute scores 86 out of 100 points and is ranked first among all (three) research masters programs in economics in the Netherlands. This score, partly based on student interviews, nicely complements the very positive feedback we received from the Blundell committee last year and confirms our ambition to be ranked among the leading graduate programs in Europe and beyond.

The drive to rank and to be ranked is a pervasive phenomenon in academia. Directors of research institutes or educational programs are not taken seriously unless they formulate the ambition to reach a top-three position in their field within a few years; the abundance of different rankings usually guarantees that a list can be found where this ambition is realized. This tendency seems particularly strong in the field of economics, as testified, for example, by the many rankings of journals, institutes, programs and researchers collected on econometriclinks.com.

The most popular ranking of researchers in economics in the Netherlands is the annual Top-40 list published in *Economisch Statistische Berichten*. It is based on publications – weighted by ‘journal impact factors’ – and is the subject of much debate and ridicule, in particular among those who do not appear on the list. Currently (this may change in the near future), these journal impact factors are not corrected for field effects (that is, the different average impact factors in different disciplines). This has occasionally led to the peculiar situation that a researcher with one publication in a high-impact science journal appeared in the top five ‘out of nowhere’, stayed there for five years, and then disappeared again.

The pattern just described resembles a similar phenomenon in financial risk measurement, where risk measures are often based on the historical volatility of a rolling sample of daily returns. This implies that an extreme return on a single day (for example, a stock market crash) will lead to a sudden increase in the risk measure and a relatively constant high level of risk for as long as the extreme return remains in the sample, followed by an equally sudden drop back to normal levels. This ghosting feature was noticed in the financial econometrics literature in the 1990s and led to more widespread use of alternative volatility measures, such as exponentially weighted moving averages of squared returns or GARCH-based volatilities, which do not have this drawback.

This analogy suggests that ranking systems might exploit insights from the time-series econometrics literature more than they currently do. For example, it seems reasonable to suggest that research talentability is a latent variable that varies in a relatively smooth way over time. Presently used indicators, such as impact-weighted publications, are noisy (and substantially lagged) measurements of this latent variable. In fact, it is unnecessarily restrictive to consider only one measurement variable; why not combine publications with other indicators, such as editorships or keynote lectures at major conferences?

The final frontier in this process would be to include the market value of researchers, as measured by salaries or job offers (corrected for discipline and age effects). To deal with stale market prices, methods used in real estate valuation might prove useful. As a by-product, such an analysis could be used to test for the market efficiency of the academic job market – a topic that should appeal to any PhD student.

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Recently you received the Fischer Black Prize and the Bernacer Prize. Could you please tell us something about the purpose of these awards? What do they mean to you?

The Fischer Black prize is given every two years by the American Finance Association to an economist under 40 working in finance. It is an award with a great name. Let me cite the words of the prize committee: “Gabaix has many notable and highly original research contributions on a number of subjects in financial economics, including the level of compensation of corporate executives, and behaviorally

Xavier Gabaix is Martin J. Gruber Professor of Finance at the Stern School of Business, New York University. He is also a fellow of the Center for Economic and Policy Research (CEPR) and the National Bureau of Economic Research (NBER). Professor Gabaix will give the Tinbergen Institute Economics Lectures 2011 in June.
influenced decision making and its influence on asset market behavior. In some of his work, he has cleverly exploited axiom-based models of the shapes of the tails of probability distributions. A hallmark of Professor Gabaix’s research style is his propensity to take unexpected directions. The Bernacer prize is given to a European economist under 40 working in macro / finance. Both awards are meaningful to me because they affirm my efforts to do “out of the box” research (including interdisciplinary research with physicists in “econophysics”), which is sometimes hard to pursue. Hence, those prizes represent a reward of sorts for taking the risk. They send a healthy message to young economists: take the risks: the rewards are there in the long term.

**What do you feel is the most significant research you have conducted?**

My favorite papers are on the following topics: (1) the origins of power law ("Zipf’s Law for Cities: An Explanation", "A Theory of Power Law Distributions in Financial Market Fluctuations"), (2) the consequences of power laws for CEOs and aggregate fluctuations ("Why Has CEO Pay Increased So Much?", and "The Granular Origins of Aggregate Fluctuations"), and (3) bounded rationality (for example, "Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets"); and "A Sparsity-Based Model of Bounded Rationality").

**You have written extensively on the idea of “Power Laws” in economics and finance. What drove you towards this area of research?**

When I was a graduate student, I read Paul Krugman’s “The Self-organizing Economy”, which is a wonderful book, full of interesting ideas and conjectures. It presented Zipf’s law, which states that if you order cities by size (city #1 being the largest), then the size of city #n is proportional to 1/n, rather than 1/n^2 or any other proportion. This is such a beautiful fact; the fit of the city-size curve approaches the beautiful laws of physics. Krugman also showed why Zipf’s law was still an open puzzle. It intrigued me, and after working on it for some time, I hit upon the idea that was published later in 1999.

The concept that a wide range of economic variables exhibit heavy-tailed properties has existed for quite some time. However, the acceptance in academia (and to a much lesser extent in industry) of research and models that incorporates this idea has been very slow. How much of an impact do you think the latest Global Financial Crisis will have or already has had on this perception? Economists knew that the extremes existed, but didn’t think they were so terribly important. On the other hand, other academics (e.g., physicists working in “econophysics”) felt that the heavy tails were crucial, because they might be the tell-tale sign of important mechanisms in the economy. Because of the financial crisis, now many more people do think they are important.

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A popular opponent of models using the Normal distribution, Nassim Taleb, expressed concern over how the “Black Swan” is being portrayed as “an invitation for people to predict rare events”. Extreme Value Theory essentially offers a possibility to model the probability of the occurrence of very rare events. To what extent do you think EVT can play an important role in modeling economic phenomena, and in contrast, what are its limitations? EVT is a very useful tool. However, it is completely silent about the causes of extreme events. To say more about those, one needs a more refined economic analysis, understanding the causal chains and agents’ motivations.

**What topics do you plan to discuss during the TI Lectures?**

The aforementioned power laws and their promise of delivering “universal laws” that may help make economics more like a real science, with hard laws around which to organize economic theory. And I’ll also discuss their consequences – a better understanding, for example, of aggregate fluctuations in the stock market or the macro-economy.
What do you want students to get out of the lectures?
First and foremost, enthusiasm for this type of research, which every generation revisits with improved data and modeling techniques. Second, some knowledge of the hard techniques. Third, a good sense of the open questions in the area, so that students can identify dissertation topics in it.

Are you looking forward to your visit to Holland?
Of course! As a Frenchman and neighbor, I love Holland and its museums. I also know quite a few Dutch economists; this country has an amazingly high level of interesting economists per capita.

“These awards affirm my efforts to do ‘out of the box’ research, which is sometimes hard to pursue.”

Notes


2) See http://www.bernacerprize.org/2010_Gabaix


These papers can be downloaded from http://pages.stern.nyu.edu/~xgabaix/
The **best ideas** emerge in conversations
An interview with Bauke Visser, newly appointed general director of Tinbergen Institute

First off, please accept our congratulations on your appointment as general director of Tinbergen Institute. Before we discuss your plans for TI, could you first say something about ‘the economist behind the director’?

Although I do think of myself as an economist now, I originally trained as an econometrician. It was only during my PhD that I became an economist, when I grew interested in the economic analysis of organizations. What really fascinated me was the structure of decision-making processes inside organizations. Indeed, if you think about it, many people in society – both in the public and in the private sector – never actually “produce” anything. Instead, they spend their days making decisions as part of an organization.

Consider a monetary policy committee of a central bank like the ECB. What incentives do the committee members have to make good decisions? Direct and personal financial incentives may play some role. But one would suspect that reputation and career concerns exert considerable power on the decisions they take. Do such concerns improve decision-making? Research shows that this not obvious!

Can you provide an example of an area in which these insights might be particularly relevant?

An area of research that interests me greatly is the organization of learning processes. Consider, for example, the medical world – in which a great many physicians in many different hospitals address essentially very similar problems. Given a particular diagnosis, each physician will make some choice about how to intervene. Initially, there may be some variation in the treatment choice – since different physicians may have different ideas about what the optimal treatment should be. Yet, after several years, one would think that enough evidence has accumulated to shed light on the optimal treatment type for a given diagnosis. Even after many years, however, an incredible amount of variation can still be seen between hospitals with regard to the way people are being treated. Although medical authorities have been aware of this problem for quite some time and have been trying to address it – the variation remains enormous.

One of the reasons why variation in treatment choice does not seem to disappear over time through the exchange of information and learning from each other is that a choice made by a physician is typically not a random choice. After putting a great deal of effort into studying the problem, the doctor has made a conscious choice for a certain treatment method. If she then finds out that the technique she consciously chose is not working very well, changing treatments could almost be interpreted as a sign of weakness or lack of ability. As a result, the information that the physician presents to her peers in learning processes may be overly positive. She may also refuse to take the information of other physicians fully into account. Organizational economics could play an important role in such a situation by pointing towards mechanisms that could improve the efficiency of the information-sharing process.

Many of your papers have been co-authored with Otto Swank. How did this collaboration develop?

When I joined Erasmus University in 2000, I had been working at Shell for two years, and my research had always been related to problems within business organizations. Otto was already in Rotterdam, and he had always been interested in decision-making
problems in political organizations.
As I recall, he came into my office one day and said “Bauke, you’re new here, why don’t you give me one of your papers to read?” And then we found that we were looking at very similar problems but in different contexts.

From the start, when we began writing our first paper together, we discovered that we form a good partnership. Not only do we match up very well topic-wise, but we are also quite complimentary in terms of what we contribute to the whole process of writing a paper. One of Otto’s talents is developing simple models very quickly. I am quite good at saying, “hold on for a moment, what’s actually driving this result?” What Otto and I also both really enjoy is that when one of us reads something interesting or strange in a newspaper, we can always go to the other person to talk about it. And such conversations often lead to topics for research.

So far, most of your papers have been theoretical. Recently, however, you received an NWO grant for a PhD student to do experimental research in the lab. Does that reflect a more general plan for the future – to put your theories to the data both in experiments and in the field? Yes, I definitely think it is important for theoretical models to be put to the data. In fact, there is one paper where Otto, Job Swank and I do have some data from the Federal Open Market Committee (FOMC). We wanted to test the theory that we developed in the QJE. The idea of that paper is that committees of experts want to show a united front to the outside world; in order to do so, they bias their results in a certain direction. We got data on the FOMC from Ellen Meade; she had a theory and so did we. In the end, we were very happy to find that our theory explains just a few things more. In general, I think it is very important that our models are put to the data, even though I have grown up in a more theoretical tradition.

With regard to lab experiments, the trouble with doing research on decision-making processes in organizations is that there is a lack of quality field data. What we show in our theories is that one has to know a fair bit about the details. Small changes in the details can substantially affect the implications of our models. Unfortunately, these details tend to be missing from field data. Getting field data of sufficient detail would almost require getting an anthropologist or an ethnographer to listen in and write down what he or she sees.

Do you think that lab experiments can be representative of the decisions that are made, for example, by business executives? There has been, of course, a long debate on the external validity of laboratory experiments. Rather than trying to contribute to that debate, I propose asking, “Do we have better ways at the moment?” Some economists now say that field experiments are better. At the same time, psychologists in some areas are now moving back to lab experiments because they realize that when they want to test fairly difficult theories, field experiments present too many uncontrolled elements.

One way to test your theories is to take up a decision-making position inside an organization yourself. Is this part of what motivated you to become general director of the Tinbergen Institute? Not quite. Actually, during my years at Shell I had the opportunity to become part of a decision-making process. I remember observing carefully what my managers were doing – and it did not look very appealing to me. They seemed to be...
jugglers keeping a great many balls in the air at the same time—with demands on their time coming in from all sides. They were never in control of their own agenda. It looked terrible to me, which is why I went back to academia.

Now, in hindsight, I realize that what I really found terrible about a managerial role at Shell was that I was not interested in the main processes there. At the Tinbergen Institute, I am dealing with processes that I do find interesting. For example, I really enjoy teaching MPhil students, and I also look forward to trying to help to fulfill TI’s mission: to improve the international visibility and productivity of the researchers of the participating institutions.

**Do you have any ideas about how you can achieve that?** I can say a few things. In my view, TI consists of three relatively distinct parts: the MPhil program, the PhD phase and the research institute. I think that TI’s staff, led by Adriaan Soetevent and Ton Vorst, does a great job at managing the MPhil program. It has a very strong reputation internationally, so I would say that this part of TI is doing very well. However, I think that TI could do more when it comes to the PhD phase. Recently, TI started a program intended to help PhD students with placement. Other than this, TI still plays a modest role in the PhD phase: it essentially hands the students over to the three Schools, and then loses sight of them. As a consequence, we risk being excluded from external funding aimed at graduate schools. So, improving the PhD phase is definitely an objective of mine in the coming years.

The Tinbergen Institute could play a more active role in making it a common practice for PhD students to go to bilateral meetings with seminar speakers. When I am invited to give a talk, I really enjoy these meetings. For PhD students, bilateral meetings are very important— for at least three reasons. First, such meetings force them to learn to explain their research idea in two seconds. In academia, we are in the business of selling ideas, which underlines how important it is that PhD students learn to sell the ideas they have. Second, such meetings stimulate serendipity: you may get references you were unaware of, names of people working on related topics that escaped your attention, a different
way of looking at a problem etc. Bilateral meetings may also help PhD students establish contacts with researchers from prestigious institutions – with the potential for both paving the way for visits in the future and increasing the size of their own network.

**Could setting standards also improve the PhD program in other areas?**

In general, I think that setting standards is very important. For example, I think that it should become standard practice for all PhD students in their final year to take part in TI’s job market program. I also think that it may be a good idea to further formalize the position of PhD students following the four-year track. These students do not pursue the MPhil track, but their thesis will eventually be published in the TI series. Currently, some of these students take 15 ECTS’ worth of courses, whereas others take 40 or more. It may not be such a bad idea to set a standard for these students as well. For example, only students that complete at least 40 ECTS of TI courses will have their theses published in the Tinbergen series, and will have full access to TI facilities and services.

**Presumably, you will also be addressing the recommendations of the Blundell report. Could you say something about these recommendations and how you plan to implement them?**

In general, the Blundell report was very positive about TI. Nevertheless, it also made some recommendations for change. The argument was made, for example, that since TI has grown up sufficiently, it might consider taking on a somewhat different role vis-à-vis the three participating schools – becoming more like a partner.”
consider taking on a somewhat different role vis-à-vis the three participating schools – becoming more like a partner. At the moment, TI is regarded by the faculties to some extent as an instrument of faculty policy. TI might, then, be thought of as a hammer with which one can build a very nice shed for its owner. But a hammer is a dead thing – with no will or life of its own. If TI could be regarded more as a partner, then we could start a life together.

The previous Peer Review Committee advised TI to attract more outside funding. As a consequence, TI started a joint venture with the Duisenberg School of Finance, which has, amongst other things, led to a move away from the UvA towards the 'Zuidas' area of Amsterdam.

How do you feel about the move and its effects so far?
This move offers a number of advantages. It allows TI to fully exploit the joint venture with DSF, it is closer to the VU and easier to reach by those coming from Rotterdam, the location is much bigger than the previous one, and so forth. However, there is a disadvantage for the people at the UvA, and I understand that the distance could affect their seminar attendance. This problem will have to be addressed by TI and the research groups. One of the aspects that I have been studying over the past two months is the degree of commonality of research interests between groups at the VU and groups at the UvA. If there is a sufficient overlap, then my point of departure is that seminar financing by TI requires the groups to organize a joint seminar at TI.

Do you think that TI’s partnership with DSF has indeed allowed it to attract more outside funding?
I think that our strategic partnership with DSF is valuable because TI has been able to develop the finance side to a much bigger degree. Also, we get substantial funding through DSF for a number of MPhil students and PhD students. The joint venture has allowed us to organize field courses that are also being attended by economics students. TI also benefits from the DSF finance seminar series, which has been able to attract some big-name speakers; we are now trying to alternate the DSF series with the TI finance seminar series. All in all, I am therefore very positive about the collaboration so far.

Are there any other aspects of TI you wish to address in the coming years?
The mission of TI is to further improve the quality of the research conducted at the three participating institutions and to increase its international visibility. I would argue that anything that TI can do to help fulfill these goals should be on my agenda, certainly if we can exploit economies of scale. Consider, for example, the website of TI. I think that it should give a much better overview of what TI is about. In particular, research groups should get their own space on the TI website. Imagine that you are considering applying for a PhD program, and you’re interested in international trade. Then, a look at the TI website should show you very clearly that there is indeed a group of researchers working in that area at one of its participating institutions. Such information would also be useful for potential job market applicants. Given its mission, TI should be in constant dialogue with its three founding institutions. The best ideas emerge in conversations.

Notes
Combating climate change:

By Cees Withagen
Cees Withagen is professor of environmental economics at VU University Amsterdam. His main research interests include non-renewable resources, growth, and climate change.

Introduction

In December 2010 Rick van der Ploeg and I received word that we were awarded an ERC Advanced Investigators Grant amounting to 3 million euros for our research proposal “Combating climate change: Political economy of green paradoxes”. I will spare you the details of the Herculean efforts needed to obtain the grant, descriptions of the stiff competition we faced, and the pleased reactions from my department of Spatial Economics at VU University, my dean and even the rector magnificus. Having said that, I would like to share with you the excitement we feel at the prospect of having five years of research ahead of us with a team of 4 PhDs and 3 PostDocs that we can select ourselves, divided over VU University and Oxford University.

However, in writing this brief essay on our research, I came across a bit of a ‘hitch’. According to the ERC, proposals “should rise to pioneering and far-reaching challenges at the frontiers of the field(s) addressed, and involve new, ground-breaking or unconventional methodologies, whose risky outlook is justified by the possibility of a major breakthrough with an impact beyond a specific research domain/discipline.” The problem is that, at present, we are just preparing for these endeavors – so there are no milestones on which to report, thus far. Our earlier work has, however, already produced some counterintuitive results on climate policy. This grant gives us the opportunity to extend this research to take into account growth and development, public finance, political economy and international issues. A lot of the work will involve the nitty-gritty of solving dynamic (stochastic) general equilibrium models containing the dynamics of resource depletion and CO2 accumulation and the arduous task of calibrating them to the real world. This essay briefly reviews some of the results we have obtained and discusses what we aim to do in the future.

The Green Paradox

Green Paradoxes arise in the context of the economics of climate change when well-intended policies have adverse effects. Mitigation policies are typically designed to reduce the emissions of greenhouse gases, the accumulation of which cause climate change. This is best achieved by reducing the use of fossil fuels (oil, coal, gas), which are the main causes of CO2 emissions. This is all common knowledge. What is also well known is that the negative (climate) externality is ideally dealt with by a carbon tax reflecting the marginal damage of increased temperatures. However, such an optimal tax is difficult to implement, due to all kinds of considerations including (perceived) loss of competitiveness, political economy issues such as lobbying and free riding (possibly leading to emissions elsewhere, a process known as carbon leakage). In reality, we therefore observe an increase in alternative policy measures, such as subsidizing energy from renewables or backstops (solar, wind), in an attempt to reduce the use of fossil fuel.

The problem with this type of policy is that it focuses on reducing demand for fossil fuels, but neglects the supply side of fossil fuel. Let us consider, for example, the supply of oil from a given well. To keep things as simple as possible, assume that extraction is costless and the oil market is perfectly competitive. When an oil sheik maximizes his total profits over time, discounted at the constant rate of interest,
Hotelling’s rule says that along intervals of time where oil is actually supplied the equilibrium price of oil will increase at a rate equal to the interest rate, independent of demand conditions. Indeed, oil in situ is merely a capital good that earns a rate of return. If along some interval the price rises faster, then no oil would be supplied at the beginning of the interval; if the price rises at a lower rate, then no oil would be supplied at the end. The upper bound on the price of oil is the price of the inelastically supplied backstop (wind, solar). A subsidy decreases this price, leading the sheik to extract oil faster, because all oil needs to be exhausted before the backstop price is reached. Hence, the policy – though well intended – has adverse consequences. Although this has been acknowledged in the literature for some time already, Hans-Werner Sinn (2008a,b) was the first to make a big issue of it and to bring it to the policy fore. Since then, an abundant literature has emerged discussing this “Green Paradox”.

Is there really a Green Paradox?
In a recent paper, Rick van der Ploeg and I (Van der Ploeg and Withagen, 2010a) explored this question using a three-pronged approach. First, we introduced stock-dependent extraction costs. Secondly, we looked at the welfare effects of subsidies, and not just at the effect on extraction rates. Thirdly, we allowed for non-constant marginal costs of the backstop. The paper began by characterizing the socially optimal program, with convex damage costs, depending on the accumulated stock of emissions. The model entails an initial interval of time of oil use only, followed by the use of the backstop only. With stock-dependent extraction costs, not all oil is necessarily depleted at the transition date. In particular, if the cost of the backstop is low, or damages are high, it is optimal to leave some oil unextracted. A decrease in the marginal cost of solar energy will lead to lower first-best extraction and a higher stock of oil left unexploited. In the absence of an optimal carbon tax, the competitive market economy will extract oil too fast, which is detrimental to green welfare (that is, the part of social welfare related to climate change). But even without government interference some oil might be left in situ, and this amount is decreasing in the cost of the backstop that producers have to bear. Hence, a subsidy on the backstop may in this case lead to improved green welfare, and the Green Paradox doesn’t occur. With a high cost of the backstop, all oil is extracted and the Green Paradox prevails. In that situation it might even be desirable to tax the backstop. With strictly convex backstop costs, the situation becomes more complicated – and interesting. Periods of time with simultaneous oil and backstop supply will prevail. In this case, the likelihood of the Green Paradox appearing is smaller than in the case of constant marginal cost of the backstop.

Extensions underway
Capital accumulation and economic development
Most of the work done so far focuses on partial equilibria. We recently extended the Ramsey model of capital accumulation with the elements introduced above: damage from climate change, a backstop and a non-renewable resource (Van der Ploeg and Withagen, 2010b). The aim was to see how the state of economic development would affect the transition from the use of fossil fuel to the backstop. As expected, it matters a lot. An economy with a low initial stock of capital, a relatively large initial stock of fossil fuel and a small initial stock of accumulated CO2 will find it important to consume, and it attaches a relatively low weight to the accumulation of CO2 and the associated damage. We show that in this economy an overshooting of the steady-state capital stock may even take place. An economy with a high initial capital stock might feature an initial interval of time where only the backstop is used, followed by the simultaneous use of both energy sources. As in the case discussed above (without capital), fossil fuel might get depleted or not. We conclude that the stage of development matters a lot.

Dirty backstops
Another extension that we have already worked on is a dirty backstop technology, such as tar sands or coal, which can be considered available in unlimited amounts (Van der Ploeg and Withagen, 2011). Depending on the initial conditions, many optimal patterns (including switches from oil to coal and vice versa) are possible. For example, if coal is cheap and it is expensive to extract the last drop of oil, then the optimal sequence is coal only (since it is cheap), then oil together with coal and eventually coal only (after exhaustion of oil). The challenge is then to design

“This grant gives us the opportunity to extend this research to take into account growth and development, public finance, political economy and international issues.”
“The climate problem is a **global problem**, posing different externalities for different regions. The challenge is thus to move away from modeling a homogeneous economy and then to discuss the fiscal federalism implications of this.”

An array of important and fascinating further challenges is on the horizon. In the next five years, Rick van der Ploeg and I intend to dig deeper into the Ramsey-type approach with less restrictive assumptions on the backstop technology. We also aim to introduce learning by doing. When it comes to the oil market, perfect competition is not an appropriate characterization – so we will need to couple our insights about the Green Paradox with insights from the literature on dynamic games with the Nash-Cournot or Stackelberg-types of equilibrium concepts. Incorporating the possibility of carbon capturing and sequestration may also yield interesting insights. True to the title of our proposal, we will also investigate political economy explanations as to why optimal carbon taxes cannot be implemented. The climate problem is a global problem, posing different externalities for different regions. The challenge is thus to move away from modeling a homogeneous economy and then to discuss the fiscal federalism implications of this. This is just one of many other problems calling for a solution, so I will end this essay by emphasizing that the empirics will play a crucial role. In order for the project to be successful we need to gain insight into the real-world extraction costs, backstop technologies, stocks of nonrenewables, preferences and so forth. It will not be easy to meet the high expectations inherent to obtaining the ERC advanced grant. We need to integrate and cope with many fields in economics: environmental and resource economics, macroeconomics, political economy, applied economics, public economics, dynamic games, simulations and more. At the same time, this is what makes the research plan attractive. Right now, our first priority is to find PhDs and PostDocs eager to tackle the stated problems. All in all, I look forward to getting started. 😊

**References**


Sandra Maximiano
Purdue University, West Lafayette, Indiana, United States

Sandra graduated in 2007 with a thesis entitled “Essays in Organizational Economics”

Some decisions in life can be called “life-changing”, and despite the fact that they are easily recognizable when we look back in time, they are hardly known on the spot when our bounded capacity to foresee the future can render only an incomplete set of benefits and costs upon which we make decisions.

Today, I can trace the beginning of such life-changing decisions to June 2006, a few months before the deadline for submitting my thesis. During a meeting with my advisors to evaluate what still needed to be done for my dissertation I had an apparent moment of insanity when I presented my travelling/conference plans for the summer: from June until September I was going to travel for conferences and workshops in Lisbon, Nottingham, Prague, Atlanta, Santa Monica and Melbourne. That would leave me with only three months for working on my dissertation. I will never forget the suspicious looks and the ironic smiles that accompanied the entirely correct but tough question: “do you think that that is a good decision? Will you have time to comply with the submission deadline?” I remember that I mulled it over briefly, reckoning that if I were to work between 18 to 20 hours a day I would be able to multiply the three months left; since half a year seemed to be a sufficiently large amount of time, I just said “yes” to their question–and few days later I was landing in Australia.

The University of Melbourne had recently opened an experimental laboratory and was organizing a workshop/summer school on organizational incentives and experimental economics. Summer schools are among the best events I remember from my PhD life. They are a mixture of networking, work and fun in a kind of ‘big brother’ context, where in a few days students and professors can discuss ideas and establish productive co-authorships and friendships that may eventually last forever. Melbourne had all of that plus something extra.

After presenting my work and research agenda, John List offered me a two-year postdoc position at the University of Chicago to work on field experiments. And, one year later, I moved to the windy city to join a very exciting academic environment in a dynamic Economics department. One of the many academic highlights of my time in Chicago was working on field experiments with John List, Uri Gneezy and Steve Levitt. In 2008, with a team of co-authors, I travelled to Northeast India to investigate the interplay of nature and nurture on female and male behavior that could help us better understand gender discrimination.

During my postdoc, the financial crisis also hit the universities. The academic job market was tight, with many institutions closing positions. Nevertheless, I decided to go on the job market, fortunately got some job offers, and ended up accepting a tenure-track position at Purdue University.

Being an Assistant Professor at Purdue has been extremely rewarding. The opportunities for collaborative research are great. Here, I “returned” to the lab and my dissertation work on social preferences. I have been working on mechanisms underlying cooperation, reciprocity, fairness and morality on economic decisions, and on the effect of both formal and informal incentives on effort and motivation in organizations. The experimental lunch seminars I organize with Tim Cason remind me of those at CREED. And every time I conduct an experiment here with some of the PhD students I work with, I recall the full trust that Randolph Sloof and Joep Sonnemans had in me.

While I am not sure where I will be in some years from now, I am almost sure that another apparently minor event at a certain point in time will prove to be life changing.
The effects of lottery prizes on winners and their neighbors: Evidence from the Dutch postcode lottery

This paper studies the effects of exogenous income shocks on household consumption behavior using data from the Dutch Postcode Lottery (PCL). Each week, this lottery allocates a prize to participants in a randomly chosen postcode area. A participant wins €12,500 per ticket. In addition, one household receives a BMW. A survey was made of all addresses in PCL-winning postcode areas and one or more neighboring postcode areas, six months after the prize draw. The study contains four main results.

First, no effect could be detected of winning the postcode lottery on most components of households' own expenditures, including food at home, transportation and total monthly outlays. Positive effects were, however, detected for automobile consumption and other durable expenditures. Participants in winning postal code areas were 4.5 times more likely than their non-winning neighbors to initiate major exterior home renovations and cars. Having an immediate neighbor win the PCL raises the probability that a household will buy a car within six months by close to 7 percentage points (from a baseline percentage of 17.3).

Third, 84 percent of BMW winners convert their BMW into cash. This behavior is consistent with simple models of in-kind transfers.

Finally, winning the PCL has no effect on a household’s reported happiness. Further, non-winning households that witness their neighbors in the same postcode area winning the PCL do not seem to be any less happy.

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Peter Kuhn (UC Santa Barbara), Peter Kooreman (Tilburg University), Adriaan R. Soetevent (UvA) and Arie Kapteyn (RAND), The effects of lottery prizes on winners and their neighbors: Evidence from the Dutch postcode lottery, American Economic Review.

Does algorithmic trading improve liquidity?

Technological change has revolutionized the way in which financial assets are traded. Every step of the trading process, from order entry to trading venue to back office, is now highly automated, dramatically reducing the costs incurred by intermediaries. By reducing the frictions and the costs of trading, technology has the potential to enable more efficient risk sharing, facilitate hedging, improve liquidity and make prices more efficient. This could ultimately reduce firms’ cost of capital.

Algorithmic trading (AT) is a dramatic example of this far-reaching technological change. Many market participants now employ AT (commonly defined as the use of computer algorithms) to automatically confirm trading decisions, submit orders, and manage those orders once they have been submitted. From a starting point near zero in the mid-1990s, AT is thought to be responsible for as much as 73% of trading volume in the US in 2009.

There are many different algorithms, used by many different types of market participants. Some hedge funds and broker-dealers supply liquidity using algorithms, competing with designated market-makers and other liquidity suppliers (see Jovanovic and Menkveld, 2010). For assets that trade on multiple venues, liquidity demanders often use smart order routers to determine where to send an order (see Foucault and Menkveld, 2008). Statistical arbitrage funds use computers to quickly process large amounts of information contained in the order flow and price moves in various securities, trading at high frequency based on patterns in the data. Last but not least, algorithms are used by institutional investors to trade large quantities of stock gradually over time.
Does AT improve market quality, and should it be encouraged? This paper provides the first analysis of this question. The NYSE automated quote dissemination in 2003; the paper uses this change in market structure, which increases algorithmic trading, as an exogenous instrument to measure the causal effect of AT on liquidity. For large stocks in particular, AT narrows spreads, reduces adverse selection, and reduces trade-related price discovery. The findings indicate that algorithmic trading improves liquidity and enhances the ‘informativeness’ of quotes.

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The rich domain of uncertainty
In many decisions, probabilities are not available because the risks faced are new. Thus, every financial crisis occurred because of new and unforeseen events, about which we had no statistics or probabilities. Such unprobabilized uncertainty is called ambiguity.

Keynes (1921) pointed out that decision makers consider not only probabilities and utility values in their decisions, but also how confident they are about their probabilities. Ellsberg (1961) showed that this third component, ambiguity attitude, cannot be modeled by the classical expected utility, and that fundamentally new theories are needed.

This paper proposes a method, the source method, to measure ambiguity attitudes. Besides the classical components, subjective probability and utility, the paper introduces source functions, which convert the subjective probabilities into willingness to bet for a particular type of uncertainty (a “source of uncertainty”). Source functions are less restrictive than most alternative ways to model ambiguity attitude, but are still tractable (they can, for instance, be easily visualized in a graph).

The paper implements the source method in two experiments and studies ambiguity attitudes using source functions estimated through subjects’ choices. First, the less knowledgeable the subjects were about events, the more ambiguity-averse they tended to be (betting less than what could have been expected from their subjective probabilities). This agrees with the common wisdom in the field. But, second, they often acted (too) much as if all probabilities were close to 50-50, suggesting a lack of discriminatory power – all the more so, the less knowledge they had. The second sensitivity component is new, and shows that many models for ambiguity in the literature need updating.

Uncertainty is a rich domain: investors do not behave uniformly when dealing with foreign or domestic stocks (the home bias). But some behavioral regularities are still present. The source method makes use of them in such a way that the richness of uncertainty becomes tractable.

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Stick to the plan? A revealed-preference study of behavioural impacts of traffic information
Understanding how information technologies affect people’s daily activities and how people respond to the introduction of new technologies is at the core of research in many areas. In the field of transport research, it is generally believed that travellers can benefit from the provision of advanced traveller...
Information systems. Real-time traffic information enables road users to make more informed decisions, and thus helps to improve the efficiency of transportation systems. Research assessing the effects of these new information technologies has usually focused on (1) their technical feasibility; (2) their impact on the efficiency of road usage; and (3) their impact on driver behaviour. This study investigates the third issue by analyzing revealed-preference (RP) data collected specifically for this purpose. Because of the scarcity of RP data in this field, this paper contributes to the existing knowledge by providing more evidence from a real-world experiment. The data were based on repeated observations of individual vehicles during the morning peak, with and without the provision of real-time traffic information. Because the experiment involved electronic registration of vehicle passages, and observations could be made of behaviour both with and without the provision of this information, a proper assessment could be made about whether the information provided to the commuters had a distinguishable impact on their behaviour. The RP data were subsequently used to estimate a number of discrete-choice models that describe the commuters’ behaviour with respect to departure time and mode choice. The study distinguishes between the marginal impact of expected travel times and the marginal impact of deviations from this expectation upon user behaviour. The findings suggest that participants with traffic information in the experiment responded to the deviation of actual travel times from the expectation, which they did not do when no information was available. This can be interpreted as evidence that traffic information indeed affects behaviour. Another finding is that participants who did not have the smart-phone also responded to the deviation of actual travel times from the expectation to some extent. This suggests that these drivers use other sources of information (such as radio or TV) to help their trip planning.

By Yin-Yen Tseng, (VU); Jasper Knockaert, (VU); Erik T. Verhoef, (VU). Stick to the Plan? A Revealed-Preference Study of Behavioural Impacts of Traffic Information, TI 2010-068/3

Risk attitudes and profits among small enterprises in Nigeria

Among small business firms in Nigeria that make a profit, business owners who have a higher perception of risk make more profit. With risk perception measured on a seven-point scale, an increase of one point on this scale increases profits by 13%. As risk taking is commonly rewarded in market systems, one would indeed predict that, on average, persons who are more inclined to take risks will collect a risk premium. Rather than using a single measure of risk attitude, this paper distinguishes between risk propensity and risk perception. Risk propensity, which measures a person’s inclination to take risky actions, does not increase profits. Risk perception measures how risky particular actions are perceived to be. Persons who perceive more risk may be assumed to be more careful in assessing risk and taking the proper actions to deal with the risk. The results suggest that it is not the act of seeking out the risky actions that leads to an earnings premium, but the care and caution that are applied in dealing with risky situations. The results of the paper are based on a survey among more than 500 enterprises in Lagos, Nigeria, selling foodstuffs, cloth and a variety of other products. Most of these firms have no employees (the average number of hired employees is 0.31). Schooling of entrepreneurs pays off handsomely. Relative to persons who did not complete primary education, those who did complete it had almost 70% higher profits, those who completed secondary education made more than double profits and those who completed tertiary education saw their profits more than trebled (actually, they increased to 3.75 times the profits of those without primary education).

The paper has been revised substantially and will be published in Journal of Economic Psychology.

By Judith Lammers (UvA); Daan Willebrands (SEO Economic Research); Joop Hartog (UvA). Risk Attitudes and Profits among Small Enterprises in Nigeria, TI 2010-053/3

Is power production flexibility a substitute for storability? Evidence from electricity futures prices.

Electricity is not directly storable. As a consequence, electricity demand and supply need to be in balance at any moment in time, as a shortage in production volume cannot be compensated with supply from inventories. Nevertheless, electricity is indirectly storable. If the installed power supply capacity is very flexible, then variation in demand can be counterbalanced with flexible adjustment of production volumes. Therefore, supply flexibility can replace the role of inventories to some extent. This paper questions whether power production flexibility is a substitute for storability, through examining power futures prices from countries that differ in their primary method of power supply. The NordPool markets (Norway, Denmark, Sweden and Finland) produce most of their electricity with flexible hydropower, whereas the predominant power source of the other countries is comprised of fossil fuels such as coal (Germany 49% in 2007), natural gas (the Netherlands 57% in 2007) and nuclear power (Belgium 54% in 2007). These power futures prices are tested on whether they contain information about the expected future spot prices and risk premiums, and are examined to discern whether futures prices from a market in which power supply is more flexible would lead to futures prices that are more in line with the theory of storage. The results indicate the opposite: futures prices from markets with flexible power supply behave according to the expectations theory. Hydropower is flexible enough to absorb short-term changes in demand and supply, but supply capacity and, therefore, storage costs (as it were) are too uncertain in the long run. If at any moment in time the potential energy of water stored behind a dam could be

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converted quickly and cheaply into electricity, then production flexibility should be economically equivalent to inventory storage. However, due to seasonality there is uncertainty in supply, which makes it impossible to bring electricity into the market at all times. For the other markets, supply capacity is less subject to seasonality. The implicit view from futures prices is that flexibility is not a substitute for storability.

By Ronald Huisman (EUR) and Mehtap Kilic (EUR), Is power production flexibility a substitute for storability? Evidence from electricity futures prices, TI 2010-070/2

How to select instruments supporting R&D and innovation by industry

This paper presents a theoretical framework that allows comparison of the effectiveness of tax measures, loans and funding in supporting industry-oriented research. For each of the instruments an estimate is made of the exact government contribution required by a firm to decide on investing in R&D, given the costs and probability of success of the project, and the foreseen change in profit following the successful implementation of the research results. The study applies Prospect Theory to analyze the risk attitude of the firm. Comparing the contribution that is required makes it possible to identify the instrument that is most effective, and, therefore, preferred by a government. The analysis indicates that there exists a critical value for the probability of success of the project for which the modality of the most effective instruments changes. For a probability of success smaller than the critical value, tax measures offering support only in case of successful completion of the project are preferable. For a probability higher than the critical value, a loan is most effective. The value of the critical probability depends on the perception of risk and the loss aversion of the firm involved in the research. Applying the framework in this paper also provides an indication of the limitations of the current practice concerning government support for firms conducting R&D. Regulations for the funding of collaborative research, such as the EU State Aid rules, foresee a contribution of 50-80% of the project costs. The model in this paper can be used to argue that under this legal framework, projects requiring a higher level of support will not be conducted. Under these conditions, the measures do not seem to be effective, as they are not able to initiate research. Another finding is that projects that have been conducted with the help of government support would most likely have required, in practice, a lower contribution than the one provided. Under these conditions, the instruments thus seem to be neither effective nor efficient.

By Marcel J.L. de Heide (EUR) and Amit Kothiyal (EUR), How to select instruments supporting R&D and innovation by industry, TI11-021/2

theses

Essays on parameter heterogeneity and model uncertainty

Does investment foster economic growth in all countries? Do relatively poor countries catch up with the rich over time? Does education increase the monetary earnings of individuals? Quantitative analysis of several economic research questions brings similar complexities. One such complexity is the possible existence of parameter heterogeneities – which means that the analyzed relationship between economic variables is different in subsets of the data being analyzed. A second source of complexity in the analysis is model uncertainty, where the economic question at hand can be formulated modeled in several ways which typically lead to different results – and the researcher has to assess the performance of these alternative models.

This thesis consists of four essays on methods to incorporate possible parameter heterogeneities and model uncertainty in the quantitative analysis of economic data. The first two essays develop new econometric models with a sufficient degree of flexibility to accommodate various forms and degrees of heterogeneity in (the relations among) economic variables. The last two essays focus on issues related to assessing model fit and model comparison, with applications to several datasets. In particular, new tools to accurately assess model fit from a Bayesian perspective are developed. These essays provide an overview of the available methods to estimate the marginal likelihood, which
is the main tool of Bayesian model comparison, and provide an alternative method for model assessment, focusing on the effects of education on income, which is typically analyzed by Instrumental Variable (IV) models.

The empirical results demonstrate that accounting for parameter heterogeneity and model uncertainty is important in several economic questions addressed. In terms of economic growth, we find that countries’ economic development is subject to significant heterogeneity over time, with some countries performing poorly during the whole period, while others improve in their level of economic development. Further, the relationship between economic growth and the factors fostering growth is found to be different across groups of countries. These country groupings are different from the conventional ex-ante groupings in the literature. With respect to the analysis of monetary returns on education, we show that the existing analyses can be improved by combining alternative models and by accounting for changing effects of education on income over time.

Thesis: ‘Essays on parameter heterogeneity and model uncertainty’, by Nalan Basturk. Published in the Tinbergen Institute Research Series #489

Essays on auctions

The past few decades have witnessed a remarkable expansion of auctions activities. From the sales of mobile-phone licenses and industrial goods to the privatization of formerly state-owned enterprises, auction mechanisms have been employed to enhance revenue and efficiency in otherwise imperfectly competitive markets. This thesis incorporates the risk attitudes of the auction participants, as well as the possibility of collusion among the bidders, into the existing auction models and offers an in-depth analysis of several important topics.

The thesis first analyzes the effects of buyer and seller risk aversion on the seller’s optimal reserve price in standard Dutch or first-price auctions (FPA) and English or second-price auctions (SPA). It is shown that it is optimal for the seller to reduce the reserve price if he and/or the buyers become more risk averse – and this effect is more pronounced in the FPA than in the SPA. Hence, risk aversion can be a disguised blessing in terms of ex post efficiency, because it induces the seller to lower the reserve price and leads to a higher probability that the object is allocated to the one who values it most.

The thesis then examines how premium auctions may deter bidder collusion. In a premium auction, the seller pays the highest losing bidder a cash reward according to some pre-specified rule. Despite significant advances in auction theory in the past half-century, the reason why sellers employ such premium tactics remains largely unclear. The research in this thesis is motivated by the idea that a premium auction may discourage “strong” bidders (e.g., those who have a serious interest in acquiring the object) to form a cartel, because “weak” bidders (e.g., “fortune hunters”) can be attracted to the auction in pursuit of the premium and bid aggressively to spoil the potential profits of the cartel. The collusive properties of the first-price, English, and English premium auctions (EPA) are derived and then investigated using a laboratory experiment. The experiment confirms the theoretical prediction that the EPA is less conducive to collusion than the other auction formats. The EPA is, therefore, likely to outperform the English and first-price auctions in generating higher expected revenue.

Lastly, the thesis develops a theory of the EPA in which risk-averse or risk-loving bidders with symmetric private values compete. The aim is to sharpen and enrich the current understanding about the premium auctions, as these have been studied thus far only under the assumption of risk neutrality. The thesis establishes the existence and uniqueness of the EPA equilibrium and shows that, in general, the premium reduces the riskiness of revenue and induces all bidders to bid higher than their values. However, the net expected revenue in the premium auction strictly decreases in the bidders’ risk aversion. These results suggest that revenue maximization is not likely to be the seller’s motive for the use of premium auctions when the bidders are risk averse. Instead, reducing revenue risk and encouraging more entry are plausible reasons for the use of premium tactics in practice, as the EPA is always more attractive to risk-averse buyers than the English auction is.
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