



ANNUAL REPORT 2010

The Danish National Research Foundation's
Center for Research in Econometric Analysis of Time Series, CREATES



SCHOOL OF ECONOMICS AND MANAGEMENT
FACULTY OF SOCIAL SCIENCES
AARHUS UNIVERSITY



Center for Research in Econometric Analysis of Time Series, CREATES, is a research unit at Aarhus University, hosted by the School of Economics and Management. Research is conducted within the general fields of time series and financial econometrics. The center is funded as a Center of Excellence by Danmarks Grundforskningsfond (Danish National Research Foundation) via a DKK 40.2 mill. (Euro 5.4 mill.) grant plus own and further external financing. The funding period covers a 5-year period starting 1 April 2007. CREATES' core group of members are affiliated with Aarhus University and University of Copenhagen. A number of international fellows of Danish origin, mainly from North America, are associated with CREATES.

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1. HIGHLIGHTS

1.1. 2010 Highlights

As of 31 December 2010, CREATES counts 20 domestic research fellows and 12 international fellows. The junior CREATES faculty counts 5 post doctorates (most recruited internationally) and 17 PhD students. In 2010 2 new assistant professorships funded by the host institution have been filled. Also with respect to PhD recruitments CREATES has attracted promising candidates. 7 new PhD students have been affiliated with CREATES during 2010 and two of those are international students. 5 PhD students graduated after thesis defense.

In 2010 about 65 papers were published in peer reviewed journals and books and more than 65% of journal articles in absolute top econometrics and finance journals including *Journal of Econometrics*, *Econometric Theory*, *Journal of Business and Economic Statistics*, and *Journal of the American Statistical Association*. More than 50 papers are presently accepted for publication in peer reviewed journals. 76 working papers have been published in the CREATES Research Paper series in 2010 and most of these are currently under review at journals. Also, in 2010 CREATES authors had 2 books published at leading publishing houses, Oxford University Press and World Scientific.

In the March 2011 ranking published by *RePEc* that counts more than 5000 research institutions worldwide, CREATES remains on top 5-6 within the fields of *econometrics* and *time series econometrics*.

The research conducted at CREATES covers a broad range of sub-fields. One of the most active research areas is within the econometric analysis of high frequency time series data, especially volatility modeling of financial data. The production in this field is flourishing, and CREATES can document one of the strongest research groups worldwide. This area is further ex-

panding via recent recruitments. Other fields with a very dominant position in CREATES include theoretical time series econometrics: the analysis of non-stationary time series, long memory models, optimal inference, and non-linear time series modeling. Also the field of empirical finance including asset return predictability are very active research areas at CREATES. The research at CREATES is characterized by interdisciplinary collaboration amongst economists, econometricians, and mathematical statisticians.

About CREATES

Center for Research in Econometric Analysis of Time Series, CREATES, is a research unit at Aarhus University, hosted by the School of Economics and Management. Research is conducted within the general fields of time series and financial econometrics. The center is funded as a Center of Excellence by The Danish National Research Foundation via a DKK 40.2 mill. (Euro 5.4 mill.) grant on top of the funding from the host institution. From other external sources CREATES has now attracted additionally DKK 30 mill to support center activities. The funding period covers a 5-year period starting 1 April 2007 and the center is currently being evaluated regarding a possible 5-year prolongation of the funding period. CREATES' core group of members are affiliated with Aarhus University, University of Copenhagen and University of Southern Denmark. A number of international research fellows of Danish origin, mainly from North America, are associated with CREATES.

1.2. Midterm Evaluation

During 2010 CREATES prepared the midterm evaluation which initiated in September 2010. A Self-evaluation Report and a Research Plan for 2012-2017 were written as part of the application for prolongation of the grant from the Danish National Research Foundation. In the new research plan CREATES has been very specific regarding the focus on possible "high-risk" research areas and the center is becoming increasingly aware of the importance of including such projects in the research portfolio. Often such research will imply a significant interdisciplinary collaboration. The conclusion from the midterm evaluation will be due in April 2011.

1.3. Joint SoFiE-CREATES Conference

CREATES has active seminar series and regularly organizes international symposia and conferences. During 2010 more than 80 seminars and workshop presentations were given at CREATES, the majority being with international researchers. In addition, CREATES organized 4 international symposia and conferences. As the major conference event, CREATES hosted an international conference jointly with the *Society for Financial Econometrics, SoFiE*, 15-16 October, where the theme was "*Measuring and Predicting Risk from Financial High-Frequency Data*". CREATES has a strong collaboration with several international partners and institutions. In 2009 CREATES became an institutional member of SoFiE and we are happy that CREATES

can support the creation of a new and important scientific society within our profession.

CREATES has continued the "Distinguished Speaker Lectures" series with contributions in 2010 from Professor Joel Hasbrouck, New York University, Professor Hashem Pesaran, Cambridge University, and Professor Andrew Chesher, University College London. The lectures are video recorded and are available through the CREATES podcast archive, www.creates.au.dk.



Photo by Daniela Mayer

2. ORGANIZATION

2.1. Center Members

In 2010 CREATES has not experienced major changes in its organization apart from a continued increase in "man-years" (årsværk) of personnel affiliated with the center. The core group of domestic center members includes time series and financial econometricians as well as mathematical statisticians from Aarhus University (School of Economics and Management and the Aarhus School of Business) and University of Copenhagen (Department of Economics and Department of Mathematical Statistics). CREATES has also a fellow based at University of Southern Denmark in Odense.

Over the years, Aarhus University and University of Copenhagen have produced econometrics candidates who today are among the most cited researchers in the profession and with remarkable academic careers. Also, within the past few years promising PhD candidates in econometrics are now affiliated with some of the best universities internationally. These researchers are affiliated with CREATES as international research

fellows and typically spend 1-3 months per year at CREATES which serves as their Danish research base. In the future the group of international research fellows will be extended to include former CREATES affiliates (typically at the post doctoral level) who have made academic career moves internationally. The idea is to continue keeping close ties to these people in terms of research collaboration. Initially such affiliations will be for a two year period and subject to extension when the collaboration becomes especially productive.

As of 31 December 2010, CREATES counts a stock of 20 domestic research fellows, 12 international research fellows, and 5 post doctoral scholars. 17 PhD students are affiliated with CREATES. The stock of PhD students has increased by 4 students compared to 2009. During 2010 5 PhD students defended their theses.

Table 1 CREATES affiliates and funding sources, "man-years" (årsværk), 2010

	DG/CREATES	Host institution	Other external funding	Other sources	Total
Domestic Research Fellows	3.70	6.00	2.10	4.60	16.40
International Research Fellows	0.30	-	-	11.20	11.50
Visiting Professors	-	-	-	0.40	0.40
Post Docs	1.10	-	4.20	-	5.30
PhD students	2.70	8.90	2.00	1.30	14.90
Research Assistance	0.20	-	-	-	0.20
Support Staff	1.00	0.90	-	-	1.90
Total	9.00	15.80	8.30	17.50	50.60

Note: "Other external funding" includes research grants from FSE (Danish Social Sciences Research Council) and Faculty grants. "Other Sources" refer to salaries paid by other universities to individuals affiliated with CREATES.

2.2. Recruitments

Since its establishment, CREATES has experienced a great international interest in junior positions. By 31 December 2010 CREATES had 4 assistant professors and 4 post docs who were all recruited internationally. In the beginning of 2011 3 new international post docs started at CREATES. In 2010 2 new assistant professorships funded by the host institution were filled.

Visiting professors at CREATES include both visitors outside of CREATES and international research fellows.

All positions agreed with Danish National Research Foundation to be funded by the host institution and CREATES at the post doc, assistant professor and higher levels have been filled. It should be noted that the host institution has contributed additionally with 1 full professorship, 5 assistant professorships, 5 post doc years, and 5 post doc years via (competitive) grants offered by the Faculty of Social Sciences.

3 PhD positions funded via the DG grant have been filled and the first candidate defended his thesis in 2010. Yet another 15 positions funded by the host institution have been filled since 2007. One third of all new PhD scholarships have been offered to international students. According to the contract with the Danish National Research Foundation, the host institution committed to finance 7 PhD scholarships in the contract period, and hence this commitment has been more than fulfilled.

Section I provides a detailed staff list for 2010 (including funding) and in Table 1 a summary is given. In 2010 a total of 50.6 man-years (årsværk) were at CREATES. In 2008 and 2009 the figures were 44 and 47 man-years and hence a continued expansion has occurred. The expansion is due to increased co-funding from the host institution as well as a steady trend in external funding. The main increase in man-years since 2009 is due to a larger stock of PhD students. Since 2008 the co-funding by the host institution has increased by more than 60%.

3. RESEARCH PLAN AND PUBLICATIONS

In the 2007 Research Plan specified between Danish National Research Foundation and CREATES the main research areas of CREATES were categorized as follows: econometric theory, asset returns and volatility, non-linear time series modeling, forecasting, predictability, and bubbles. These areas are all very active and rapidly expanding research fields where CREATES members contribute with research results at the absolute research frontier. The categories have been chosen to provide an overview of the focused research areas, but in fact the different areas often overlap to a considerable degree, and in some cases a particular categorization can be somewhat artificial. The fact that the various research fields overlap is reflected by the participating researchers in the individual projects. The publication lists in Section H documents that the research areas of econometric theory, empirical finance, financial econometrics including volatility modeling and the analysis of high frequency data dominate much of the research undertaken at CREATES. Members contribute significantly to the research frontier in these areas, and in several fields CREATES has some of the strongest research groups worldwide. It goes without saying that the mentioned research areas are very active and will play a major role in future research at CREATES.

3.1. Research fields and future research directions

The research at CREATES will expand to include new related research areas such as the econometrics of energy markets and the analysis of high dimensional data. In September 2010 the mid-term evaluation of CREATES was initiated based on the *CREATES Self Evaluation Report 2010* and the *CREATES Research Proposal 2012-2017* as the main evaluation input. We refer to these documents for a detailed evaluation of progress

to date and the research plans for a possible prolongation of the grant beyond the current funding period.

The focused research areas described in the new Research Plan can be categorized as follows:

1. The econometrics of stationary processes and random fields with applications to energy markets
2. Volatility modeling and economic analysis with mixed frequency data
3. Macro-finance DSGE models, modeling and inference
4. High-dimensional data analysis and statistical algorithms for high dimensional variable selection
5. Conditional modeling and forecasting subject to non-linearity and persistence
6. Empirical finance: Asset pricing and volatility.

Like for the *2007 Research Plan* many of these general research fields overlap to some extent. For instance, the analysis of high frequency data and volatility are topics that are included in several of the focus areas mentioned and conditional modeling is also the benchmark for many projects across the different themes. Notwithstanding, the categorization is an attempt to structure the research into main areas to better overview the broad range of fields in which CREATES researchers operate. In the new research plan CREATES has been very specific regarding the focus on possible "high-risk" research areas. The center has become increasingly aware of the importance of including such projects in the research portfolio. It is our belief that focus area 1 is particularly "high risk" as a completely new methodological field is being developed and also includes to a considerable degree interdisciplinary collaboration with great potential. The first research papers initiating this focus area have been produced in 2010 and the prospects look excellent.

3.2. Research Output and Publications 2010

Research output and publications in 2010 have continued the steady trend observed since the establishment of CREATES in 2007. A detailed overview and discussion of the progress of the center in terms of research output to date can be found in the *CREATES Self Evaluation Report 2010*.

The *2007 Research Plan* is specified in the contract between Danish National Research Foundation and CREATES (January 2007). It is no exaggeration to say that CREATES has had great success in terms of both research activities and publications produced. In fact, productivity in terms of number of publications has been several times higher than the milestones set, and more importantly, the high qualitative standards put forth in the *2007 Research Plan* have been fulfilled. Moreover, the development has shown a steady positive trend.

Details about publications in 2010 are reported in Section H, including a total list of publications during the life time of the center. Publication summaries for 2010 and for the period 2007-2010 are displayed in Tables 2 and 3. Figure 1 displays the development in publications over the years for particular categories of publications.

The production of scientific peer reviewed journal articles in 2010 was slightly higher than in 2008 and 2009. A total of 50 refereed journal articles were published; 68% of these were published in journals from the CREATES short list of "Top Journals" which is reported in Section H. This continues a tendency of producing more papers in the better journals. The productivity of international research fellows in the better journals is slightly higher than for domestic CREATES members. This reflects 1) that CREATES has a remarkably strong group of established international researchers, 2) that CREATES has a relatively large proportion of junior researchers who are at the beginning of their careers, and 3) some former productive junior researchers have moved to the group of international researchers.

It is encouraging to see that so many of the junior fellows and post docs publish in good journals. In fact, an impressive number of publications by junior members are in the better journals (some of which of course are co-authored with senior researchers). However, several of the assistant professors and post docs at CREATES have also published single-authored papers in excellent journals like *Econometric Theory* and *Journal of Econometrics*.

Table 2. Review of publications 2010

	CREATES members, Denmark	International CREATES members	Total
Articles in refereed journals	34 (21)	27 (22)	50(34)
Notes in refereed journals	4 (3)	-	4(3)
Contributions to refereed books	9	2	11
Refereed and edited books	2	-	2
CREATES Research Papers	62	20	76
Forthcoming articles in refereed journals and books	35(14)	27(13)	53 (23)
PhD theses	5	-	5

Note: Number in parenthesis indicates the number of publications appearing on the suggested benchmark list. Note that due to co-authorship the "Total" column is not the sum of the other columns.

Table 3. Review of publications, total for 2007-2010

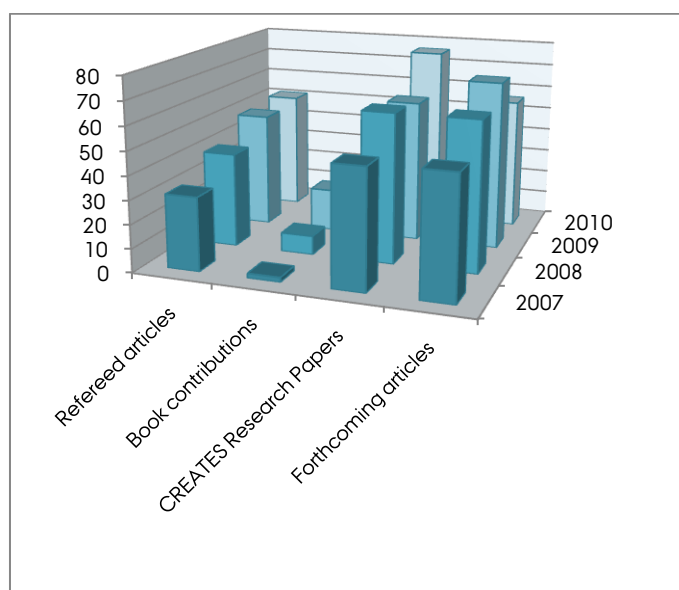
	CREATES members, Denmark	International CREATES members	Total
Articles in refereed journals	116 (61)	36 (63)	180 (109)
Notes in refereed journals	7 (4)	1 (0)	8 (4)
Contributions to refereed books	25	17	42
Refereed and edited books	5	-	5
CREATES Research Papers	182	76	245
PhD theses	13	-	13

Note: Number in parenthesis indicates the number of publications appearing on the suggested benchmark list. Note that due to co-authorship the "Total" column is not the sum of the other columns.

Publishing in the very top journals like *Econometrica*, *Journal of Finance*, *Annals of Statistics* and *JASA* is difficult. Within the past 3 years, CREATES members have published three *Econometrica* papers and one paper is forthcoming in *Econometrica* in 2011. Of these four papers, two papers are the result of joint research collaboration between domestic and international research fellows. Presently, a number of other papers are under review at *Econometrica* and it is our hope that some of these will become accepted. *Journal of Econometrics* is one of the absolutely leading field journals. It deserves mention that during 2010 no less than 20 papers have either been published or have been accepted for publication in this journal. Publications have also appeared in top journals like *Journal of Finance*, *Annals of Statistics*, *Econometric Theory*, *Journal of Business and Economic Statistics*, and *Journal of Applied Econometrics*.

From the perspective of research production since the establishment of CREATES, i.e. for the period 2007-2010, in total more than 275 articles have been published (or are accepted for publication) in peer reviewed journals or edited books. A book has been published at Princeton University Press (B.J Christensen and Nicholas Kiefer, *Economic Modeling and Inference*) and another book has just been published in 2010 at Oxford University Press, (C. Granger, T. Teräsvirta, and D. Tjøstheim, *Modeling Nonlinear Economic Time Series*). Also, a book has been published at World Scientific in 2010, (O. E. Barndorff-Nielsen and A. N. Shiryaev, *Change of Time and Change of Measure*). In the CREATES Research Paper series 245 papers have been published since April 1 2007 and of these 76 papers were published in 2010. It is estimated that presently 60-70 papers are at review at peer reviewed journals.

Figure 1. Publications. Summary statistics by type and year



As can be seen from the publication lists, CREATES members generally have extensive collaboration with international researchers and hence emphasizes the strong internationalization of the center.

3.3. Bibliometric Benchmarking

There are few research centers internationally which are similar to CREATES in terms of size and organization. Most research groups in econometrics consist of 2-4 senior econometricians plus a few PhD students who are affiliated with an economics department. However, at some economics departments the econometrics groups are somewhat larger, especially at leading economics departments in North America and Europe. In Europe it would be natural to benchmark with research institutions and centers like Oxford-Man (Oxford University), ECARES (Free University, Brussels), CASE (Humboldt-Universität, Berlin), CORE (Université catholique de Louvain), and the Tinbergen Institute in the Netherlands. However, all these research centers and institutions are characterized by covering a broader range of disciplines than at CREATES and hence making comparison difficult. Having talked to researchers worldwide who are external to CREATES, it is the impression though that CREATES is doing at least as well as these leading international research institutions.

The largest bibliographic database dedicated to the economics profession is run by IDEAS at the University of Connecticut and uses the so-called RePEc database as its source. More than 32 different ranking measures (number of publications, citations, impact factor weighted citations, working paper downloads etc.) are used, and the summary rank reports the average rank using the different measures. In the March 2011 ranking, CREATES was listed as number 127 out of 5189 institutions within *all* fields of economics.

When focusing on somewhat narrower fields associated with the research conducted at CREATES, a rank of 42 (out of 1471 institutions) was given within the field of "Finance", rank 6 (out of 1426 institutions) within the field of "Econometrics", and rank 5 (out of 1040 institutions) within the field of "Time Series Econometrics"; see Table 4 for details. Focusing on individuals, 6 CREATES members appear on the top 5% author ranking including *all* fields of economics: Torben G. Andersen, Tim Bollerslev, and Allan Timmerman amongst the international research fellows, and Ole Barndorff-Nielsen, Søren Johansen, and Timo Teräsvirta amongst the domestic research fellows. Niels Haldrup, Asger Lunde, and Peter Reinhard Hansen appear on the top 10% of the list. Clearly, the overall ranking of CREATES is much dominated by these individuals who are established senior researchers from both the domestic and the international group of researchers. However, this does not change the fact that overall CREATES consists of a very strong

research team that in total places the center in the top on an international scale.

Regarding citations for individuals it is hard to obtain precise figures. In the *CREATES Self Evaluation Report 2010* an extract from Google Scholar is reported by listing the number of citations for the five most cited papers amongst the CREATES domestic members who are full professors, plus CREATES' international research fellows. It is clear that Søren Johansen, Timo Terasvirta, Tim Bollerslev, Torben Andersen and Ole Barndorff-

Nielsen are in a league of their own and have contributed with fundamental work which have created many applications and hence citations. However, many others have impressive citation records documenting the impact and strength of CREATES. Several of the younger full professors at CREATES have a relatively large (and increasing) number of citations which is promising for the future given the generational changes that are likely to take place in a new granting period.

Table 4. RePEc top 10 institutions in the fields of "Econometrics" and "Time Series Econometrics", IDEAS March 2011. Source: www.repec.org

Rank	Econometrics	Time Series Econometrics
1	University of Chicago	New York University, Stern School
2	Yale University	University of California – San Diego
3	University of California – San Diego	Cambridge University
4	Cambridge University	Yale University
5	Harvard University	CREATES
6	CREATES	Harvard University
7	London School of Economics	Free University Amsterdam
8	New York University, Stern School	Columbia University
9	Columbia University	Duke University
10	Oxford University	Boston University

4. PHD ACTIVITIES

4.1. PhD Students

By 31 December 2010 CREATES had a stock of 17 PhD students enrolled at the host institution and 6 of these students are international. In addition to those already enrolled as PhD students at the establishment of CREATES, at least 17 new PhD students have been (or will be) enrolled as PhD students by 1 September 2011. 3 of these are financed via the CREATES grant, and the remaining students are financed by the host institution or from external sources. For the remaining funding period ending in April 2012, it is expected that additionally 2-3 PhD students will be offered scholarships funded by the host institution.

The first student funded by the DG grant, Thomas Quistgaard Pedersen, graduated in 2010. He is now employed as assistant professor at the host institution and is co-funded by the Danish Council for Independent Research via a post doctoral scholarship. During 2010 a total of 5 PhD students defended their theses. A full list is provided in Section H.7.

It is expected that 6-7 PhD students will graduate during 2011.

PhD students' external relations

It is an integral part of the PhD program that PhD students visit international research environments during their studies. The typical duration of a visit abroad is 4-6 months. During 2010 PhD students affiliated with CREATES had status as visiting PhD students at the following universities: Free University in Amsterdam, University of Illinois, and Cornell University. During 2010 CREATES has hosted visiting PhD students from Holland and Italy.

PhD students are active in presenting their works at international conferences, seminars, symposia and workshops. Also, CREATES has a weekly lunch seminar series where PhD students, post docs, and visiting PhD students have priority in presenting and discussing their works.

PhD courses organized by CREATES

In collaboration with the Danish Graduate Program in Economics, DGPE, CREATES organizes and finances specialized PhD courses typically lasting from 2-3 days up to a week. The courses are taught by leading international researchers. During 2010 CREATES organized 10 such courses and summer schools. See Section B.5 for details.

In addition to the "short" PhD courses, CREATES faculty members contribute significantly with full 10 ECTS PhD level courses at the School of Economics and Management.



Photo by Daniela Mayer

5. EXTERNAL RELATIONS AND COLLABORATIONS

5.1. International Collaboration

CREATES participates in numerous collaborations with institutions as well as individuals (see Section A for a full list). Members participate in individual research projects with more than 100 individuals from other institutions worldwide as documented in Section H.

Besides from the PhD students visiting abroad during 2010, some domestic fellows also went on longer sabbatical leaves abroad, Section A.2.

In 2010 CREATES had more than 50 visitors staying for longer or shorter periods. Most visitors presented papers in CREATES' weekly seminar series, gave PhD courses and/or participated in research collaboration, see Section A.3. In addition, CREATES had visitors participating in symposia, workshops and conferences organized at the center (see Section B.1-B.5).

CREATES also collaborates with a number of international research institutions and centers, including (see Section A.1):

1. Oxford-Man Institute of Quantitative Finance, Oxford University, England
2. Erasmus University, Rotterdam
3. The Society for Financial Econometrics, SoFiE
4. Stanford University.

The form of these collaborations mainly concern exchange of PhD students and post docs and collaboration on the organization of PhD courses, workshops, and conferences.

The collaboration with Oxford-Man Institute of Quantitative Finance has been very productive and there are concrete plans for extending the collaboration further in the future. In

addition to very fruitful research collaboration with Oxford-Man, (Director and Professor Neil Shephard in particular) CREATES members in the "high-frequency financial data"-group make regular research visits to Oxford and vice versa.

In the past CREATES has organized a workshop jointly with the Stanford Institute for Theoretical Economics (SITE) at Stanford University. A similar workshop on the modeling of high frequency financial data is planned for 20-21 June 2011.

In 2009 CREATES became one of 7 institutional members of SoFiE, The Society for Financial Econometrics. 6 CREATES members serve in the Council Board which has 27 members. We are happy that CREATES can support the creation of a new and important scientific society within our profession. 15-16 October 2010, SoFiE and CREATES organized a joint conference on "*Measuring and Predicting Risk with Financial High Frequency Data*", which was held in Aarhus.

CREATES and the Erasmus University in Rotterdam (and the Tinbergen Institute) have plans for extending their collaboration across a number of dimensions including conference organization and exchanges of junior researchers.

5.2. National Relations

CREATES also collaborates with two national research centers: D-CAF, Danish Center for Accounting and Finance, and the Thiele Center for Applied Mathematics in Natural Science. The collaboration includes organization of joint seminars and symposia. Also a data-base infrastructure is being established in collaboration with D-CAF to facilitate easy access to financial data for students and researchers.

6. CONFERENCES, SYMPOSIA, AND SEMINAR ACTIVITIES

6.1. Conference activities

Conference activities, internally and externally, are specified in Section B. CREATES members are active in presenting their work internationally at conferences, symposia, etc. In 2010 CREATES members participated in and gave invited paper presentations at more than 40 international conferences. Also, CREATES members appear in the program committees of many leading international conferences.

International Conferences

As mentioned, CREATES became an institutional member of SoFiE, The Society for Financial Econometrics, in 2009. One of the first direct outcomes of the collaboration was a focused joint conference 15-16 October 2010 held at the ARoS art museum in Aarhus. The conference theme was "*Measuring and Predicting Risk from Financial High-Frequency Data*". The conference aimed to shed new light on the uses of high frequency financial data in improved risk measurement, management, and asset pricing, including ways in which to distill large intraday data bases into manageable information structures. The conference had approximately 65 participants and 15 presentations. The scientific committee consisted of Torben Andersen, Northwestern University and CREATES, Nobel Laureate Robert F. Engle, Stern School of Business at New York University, Giampiero Gallo, University of Florence, Eric Ghysels, University of North Carolina, Niels Haldrup, CREATES, Nikolaus Hautsch, Humboldt-Universität zu Berlin, and Asger Lunde, CREATES.

Symposia and Workshops

An important activity at CREATES is to organize focused symposia and workshops. The purpose of the CREATES symposia is to gather CREATES members with interests within a specific area and to invite 6-8 prominent international specialists. These meetings have been extremely well received by both internal

and external participants. Often these activities last for several days and the external participants are offered office space and interact with the local people at CREATES. The following symposia and workshops have been arranged during 2010:

- Symposium "*Ambit Processes, Non-semimartingales and Applications*", (Joint with Thiele Center), 24-28 January, 2010. Organizers: Ole Barndorff-Nielsen and Almut Veraart.
- Symposium "*Empirical Market Microstructure*", 15-17 March 2010. Organizers: Asger Lunde, Carsten Tanggaard, Almut Veraart, and Valeri Voev.
- Workshop in Honour of Ole E. Barndorff-Nielsen's 75th Birthday (Joint with Thiele Center), 13-14 October, 2010. Organizers: Søren Asmussen, Bent Jesper Christensen, and Niels Haldrup.



Photo by Daniela Mayer

Distinguished Speakers

The distinguished speaker seminar series has 3-4 presenters each year and includes scientists of our profession who have had a major impact on the development of the econometrics discipline. These lectures are announced jointly with the School of Economics and Management. All distinguished speaker lectures are video recorded and made available to a broader audience via the CREATES podcast archive:

<http://www.creates.au.dk>.

The web-counter shows a great interest worldwide in viewing these lectures. Distinguished speakers in 2010 were:

- Professor Joel Hasbrouck, Stern School of Business at New York University, 17 March 2010: *Market Microstructure: Lessons and Questions in the Wake of the Crisis*.
- Professor Hashem Pesaran, University of Cambridge, 12 May 2010: *Cross Section Dependence in Panel Data Models*.
- Professor Andrew Chesher, University of London and CeMMAP, 30 September 2010: *Structural Econometrics and Discrete Responses*.

Seminars

CREATES schedules a series of weekly seminars. During 2010 the CREATES seminars were organized by Professor Asger Lunde. In 2010 a total of 24 paper presentations were given in the series (Section B.2). In the lunch seminar series, 20 paper presentations were given (Section B.3). The lunch seminars were organized by post docs Katarzyna Lasak, Almut Veraart, Kim Christensen and Robinson Kruse.

Members' Residential Meeting

1-2 June 2010 CREATES held the annual members' meeting at Molskroen, Femmøller Strand. The meeting was arranged to structure the input for the *CREATES Self Evaluation Report 2010* and the *CREATES Research Proposal 2012-2017*. The reports were submitted to the Danish National Research Foundation in September 2010 in connection with the midterm evaluation and the application for prolongation of the grant to CREATES. A decision will be made in April 2011.

7. EXTERNAL FUNDING

7.1. Successful Funding

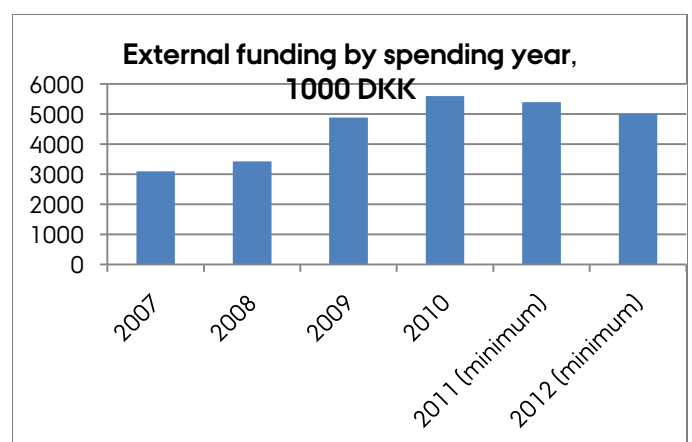
CREATES has been rather successful in attracting external funding in addition to the grant from the Danish National Research Foundation. A review of external funding is given in Section D. A number of grants were allocated prior to the establishment of CREATES in April 2007 but are directly relevant to CREATES' activities and the external funding of the center during the funding period. Until the end of 2009 approximately DKK 22,500,000 of external funding relevant to CREATES has been provided. During 2010 more than DKK 7,200,000 were raised such that CREATES has managed to attract almost DKK 30,000,000 since the center was established. Most of the external funding is provided by FSE (the Danish Council for Independent Research | Social Sciences), but the Faculty of Social Sciences has also been generous in providing additional grants to CREATES in the form of post doctoral fellowships.¹ A limited number of grants were provided via international funds including the Stevanovich Center for Mathematical Finance at University of Chicago, and the European Central Bank.

In 2009 CREATES participated in a data base application jointly with the Danish Center for Accounting and Finance, D-CAF, headed by Professor Peter Ove Christensen, Aarhus University, to the National Programme for Research Infrastructure under the Danish Ministry of Science, Technology and Innovation. The proposal was granted DKK 10 million to support access to financial data. The grant supplements yet another grant worth DKK 4 million from the Danish Council for Independent Research, Social Sciences. These amounts are not included in the figures reported above because it can be difficult to estimate

exactly how much accrues to the individual participants in the grant.

Figure 2 displays the external funding accruing to each year 2007-2012. These amounts do not include the support provided via the grants to D-CAF because these have a broader national focus even though CREATES benefits from the grants.

Figure 2. External funding of CREATES activities accruing to each year. Note, the grant from the Danish National Research Foundation, and the 14 million DKK grant to support national data infrastructure are excluded in the figures. For 2011-2012 the figures are projected (minimum) figures based on already granted funds.



¹ Grants from the Faculty of Social Sciences are considered "external" in the sense that they were given in competition with other schools at the faculty and are beyond the budget of the School of Economics and Management.


8. SIGNATURE

8.1. Director's Signature

(Ved underskriften bekræftes det, at beretning og regnskab med tilhørende noter og oversigter indeholder alle relevante oplysninger, som vedrører årets primære aktiviteter i Danmarks Grundforskningsfonds Center for Tidsrækkeøkonometri.)

To my knowledge, this report and accounts including notes and entry files comprise all the information concerning CREATES (The Danish National Research Foundation's Centre for Research in Econometric Analysis of Time Series).

31 March 2011



Niels Haldrup
Danish National Research Foundation's
Center for Research in Econometric Analysis of Time Series, CREATES

APPENDICES

Section A: External Relations

A.1 Research Institutions

			Collaboration with universities, research groups and institutions	
Collaborator	Collaboration subject and/or title	Danish	Foreign	
1	Danish Center for Accounting and Finance, D-CAF, Aarhus University & CREATES, DK	Seminar and research collaboration, Joint PhD courses, applied seminars, research collaboration. Also D-CAF and CREATES collaborate on data access via the D-CAF - CREATES Data Office Joint Grant, worth 10 mill. DKK, from the National Programme for Research Infrastructure under the Danish Ministry of Science, Technology and Innovation. Granted fall 2009. Also, CREATES participates in a joint grant with D-CAF regarding data infrastructure worth 4 mill. DKK. The grant is from the Danish Council for Independent Research, Social Sciences	x	
2	Oxford-Man Institute of Quantitative Finance, University of Oxford, UK	Exchange of seminar visitors, PhD students, joint postdoc positions. Director Neil Sheppard in CREATES' Advisory Board		x
3	Erasmus University Rotterdam, The Netherlands	Exchange of seminar visitors and junior researchers. Joint conferences to be organized		x
4	Thiele Centre for Applied Mathematics in Natural Science, DK	Seminar and research collaboration. Joint seminars and symposia	x	
5	ETSERN - Econometric Time Series European Research Network	European Network organizing Symposia in Time Series Econometrics across Europe	x	x
6	SoFiE - The Society for Financial Econometrics	CREATES institutional member of SoFiE. Several CREATES members on Council Board. Joint conference in Aarhus 2010		x
7	Stanford University	Co-organizing 2011 SITE conference in Stanford		x

A.2 CREATES members' long visits/sabbaticals abroad

	Venue/Place	CREATES member	Period
1	European University Institute	Timo Terasvirta	14 April - 19 June
2	University of Bonn	Robinson Kruse	3-24 November
3	University of Illinois, Urbana-Champaign (UIUC) (Visiting PhD)	Stefan Holst Bache	1 September - 15 December
4	VU University Amsterdam (Visiting PhD)	Johannes Tang Kristensen	1 September - 15 December
5	Cornell University (Visiting PhD)	Kenneth Dencker Petersen	1 September - 15 December
6	Duke University	Valeri Voev	1 September - 31 January '11
7	Duke University	Olaf Posch	1 September - 31 January '11

A.3 Visitors to CREATES 2010

	Name	Affiliation	Period
1	Helle Bunzel	Michigan State University & Queen Mary, University of London & CREATES	19 November '09 - 11-7 January
2	Mark Podolskij	ETH Zurich & CREATES	17-30 January
3	Morten Ørregaard Nielsen	Queen's University & CREATES	18 January-7 February 21 May 31 May-10 June 31 August-10 September
4	José Fajardo	Ibmec Business School, Rio de Janeiro	20 January-12 February
5	Magnus Dahlquist	Stockholm School of Economics	3-5 February
6	Paolo Santucci de Magistris	University of Pavia	5 February-31 March 23 August-6 September
7	Michel van der Wel	Erasmus University Rotterdam & CREATES	8 February-19 March 13-18 June 14-17 December
8	Changli He	Dalarna University and Southwestern University of Finance and Economics	10-12 February
9	Andrés González	Colombian Central Bank	13-19 February
10	Kirsten Hubrich	ECB	16-18 February
11	Lars Stentoft	HEC Montreal & CREATES	24 February-7 March 8-9 June 2 August-30 September 26 November-15 January '11
12	Bernd Schwaab	Free University Amsterdam	24-27 February
13	Paulius Stakenas	Amsterdam School of Economics	1 February-31 March
14	Søren Johansen	University of Copenhagen & CREATES	2, 16-19 March 1-3 June 12-14, 24-27 October
15	Anders Rahbek	University of Copenhagen & CREATES	2, 18-19 March 16-17 October
16	Lutz Kilian	University of Michigan	4-5 March
17	Russell Davidson	McGill University	7-12 March
18	Timo Trimborn	University of Hannover	9-12 March
19	Peter Reinhard Hansen	Stanford University & CREATES	13-19 March 12-17 October 15-17 December
20	Alessandro Palandri	University of Warwick & CREATES	14-19 March
21	Joel Hasbrouck	NYU Stern	14-18 March
22	Cristina Amado	University of Minho	15 March-15 April
23	Tomoaki Nakatani	Hokkaido University, Japan	17-24 March
24	Michael McAleer	Erasmus University Rotterdam	24-26 March
25	Karl H. Schlag	Universität Pompeu Fabra	11-16 April
26	Jeffrey Racine	McMaster University	13-23 April
27	Dennis Kristensen	Columbia University & CREATES	19-23 April 5-10 July
28	Roxana Chiriac	University of Konstanz	6-7 May
29	Hashem Pesaran	University of Cambridge	9-13 May
30	Nektarios Aslanidis	University Rovira Virgili	15-22 May

31	Wolfgang Härdle	Humboldt-Universität zu Berlin	19-21 May
32	Martin Møller Andreasen	Bank of England	27 May
33	Ingmar Nolte	Warwick Business School	2-8 June
34	Tue Gorgens	Australian National University	3-15, 20 and 23 June
35	Michael Jansson	UC Berkeley & CREATES	14 June-14 July
36	Roger Koenker	University of Illinois	20-25 June
37	Martin Klint Hansen	Aarhus School of Business & CREATES	17 June-4 September
38	Shin Kanya	University of Oxford	6-9 July
39	Jeroen Rombouts	HEC Montreal	15 August-15 September
40	Charles Bos	Free University Amsterdam	21-28 August
41	Peter Heppenger	Technische Universität München	30 August-3 September
42	Arthur Treadway	Madrid	10 September
43	Paolo Giordani	Sveriges Riksbank	15-17 September
44	Kevin Sheppard	Oxford-Man	19-24 September
45	Andrew Chesher	University College London and CeMMAP	29 September-1 October
46	Daniela Osterrieder	Maastricht University	6-17 October
47	HC Kongsted	University of Copenhagen	26-29 October
48	Harry Paarsch	University of Melbourne	2-3 December

Section B: Conferences

B.1 International conferences, symposia, seminars etc. organised by CREATES

Title and date of event	
1	24-28 January Workshop: Arbit processes, Non-semimartingales and Applications Location: Sandbjerg Estate Joint with Thiele Centre Organizers: Ole E. Barndorff-Nielsen, José-Manuel Corcuera, Jürgen Schmiegel, Almut Veraart
2	15-17 March Symposium "Market Microstructure" Organizers: Valeri Voev, Carsten Tanggaard, Asger Lunde and Almut Veraart
3	13-14 October Workshop in honour of Ole Barndorff-Nielsen Joint with Thiele Centre Organizers: Søren Asmussen, Bent Jesper Christensen, Niels Haldrup
4	15-16 October SoFIE-CREATES conference: "Measuring and Predicting Risk with Financial High Frequency Data" Organizers: Kim Christensen, Niels Haldrup, Asger Lunde

B.2 Weekly seminars

	Date	Speaker	Title
1	4 February	Magnus Dahlquist, Stockholm School of Economics	International Bond Risk Premia
2	11 February	Changli He, Dalarna University and Southwestern University of Finance and Economics	Smooth Transition Cointegration
3	25 February	Bernd Schwaab, Free University Amsterdam	Latent dynamic factor models for mixed measurements
4	4 March	Lutz Kilian, University of Michigan	Are the Responses of the U.S. Economy Asymmetric in Energy Price Increases and Decreases?
5	11 March	Russell Davidson, McGill University	Size Distortion of Bootstrap Tests: Application to a Unit Root Test
6	25 March	Michael McAleer, Erasmus University Rotterdam	Optimal Risk Management Before, During and After the 2008-09 Financial Crisis
7	15 April	Karl H. Schlag, Universitat Pompeu Fabra	Finite Sample Nonparametric Tests for Linear Regressions
8	15 April	Jeffrey Racine, McMaster University	Constrained Nonparametric Kernel regression: Estimation and Inference
9	22 April	Dennis Kristensen, Columbia University & CREATES	Bandwidth Selection and Bias Corrections for Kernel Estimators of Diffusion Processes
10	6 May	Roxana Chiriac, University of Konstanz	How Risky is the Value at risk?
11	20 May	Wolfgang Härdle, Humboldt-Universität zu Berlin	Partial Linear Quantile Regression and Bootstrap Confidence Bands
12	27 May	Martin Møller Andreasen, Bank of England	The SR Approach: a new Estimation Method for Non-Linear and Non-Gaussian Dynamic Term Structure Models
13	24 June	Roger Koenker, University of Illinois	Quasi-Concave Density Estimation
14	26 August	Charles Bos, Free University Amsterdam	Characterizing the Distribution of High Frequency Returns by Realized Quantile-based Measures
15	1 September	Peter Heppenger, Technische Universität München	Pricing and hedging under high-dimensional jump-diffusion models
16	9 September	Jeroen Rombouts, HEC Montreal	On the Forecasting Accuracy of Multivariate GARCH Models
17	23 September	Kevin Sheppard, Oxford-Man	Efficient Bipower Variation
18	7 October	Daniela Osterrieder, Maastricht University	Predicting Returns with a Co-fractional VAR Model
19	28 October	HC Kongsted, University of Copenhagen	A generalized pre-sample mean estimator for panel count data
20	4 November	Nikolaus Hautch, Humboldt-Universität zu Berlin	Estimating and Predicting Vast Dimensional Covariance Matrices
21	11 November	Philipp Sibbertsen, Leibniz University Hannover	Identification problems in ESTAR models and a new model
22	18 November	Anders Wilhelmsson, Lund University	The Pernicious Effects of Contaminated Data in Risk Management

	Date	Speaker	Title
23	25 November	Stefano Grassi, University of Perugia	Global, Regional and Country Factors for the World Economy: a dynamic factor approach
24	2 December	Harry Paarsch, University of Melbourne	The Effects of Competition on Post-Transplant Outcomes of Cadaveric Liver Transplantation under the MELD Scoring System

B.3 Lunch Seminars

	Date	Speaker	Title
1	2 February	Morten Ø. Nielsen, Queen's University & CREATES	Nearly Efficient Likelihood Ratio Tests of the Unit Root Hypothesis
2	9 February	Paolo Santucci de Magistris, University of Pavia	Fractional Cointegration and Level Shifts in the Realized and Implied Volatility Relation
3	23 February	Frank Nielsen, Aarhus University & CREATES	Discriminating between fractional Gaussian and spurious long memory processes
4	2 March	Andreas Schrimpf, Aarhus University & CREATES	Carry Trades and Global Foreign Exchange Volatility
5	16 March	Paulius Stakenas, Amsterdam School of Economics	Estimation and Inference of Fractionally Integrated Regressions by an Autoregressive Approximation
6	23 March	Isabel Casas, Aarhus University & CREATES	Comovements among different sectors of SP500 during 2004-2010
7	6 April	Anders B. Kock, Aarhus University & CREATES	Oracle Efficient Variable Selection in Random Effects Panel Data Models
8	27 April	Olaf Posch, Aarhus University & CREATES	Estimating Continuous-Time DSGE Models using Macro and Financial Data: A Regression Based Approach
9	4 May	Thomas Q. Pedersen, Aarhus University & CREATES	6 May Thomas Q. Pedersen, Aarhus University and CREATES: Predictable Return Distributions
10	18 May	Laurent Callot, Aarhus University & CREATES	Likelihood inference in Panels of Cointegrated VARs
11	31 August	Lars Stentoft, HEC Montreal & CREATES	33 August Lars Stentoft, HEC Montreal and CREATES: Multivariate Option Pricing with Time Varying Volatility and Correlations
12	7 September	Asger Lunde, Aarhus University & CREATES	Estimating and Forecasting Volatility using High Frequency Data
13	14 September	Athur Treadway	The Daily Closing VIX Data for 2008 Reveal Unrecognized Properties
14	21 September	Robin Kruse, Aarhus University & CREATES	Linearity Testing in Time-Varying STAR Models under Unknown Degree of Persistency
15	28 September	Bent Jesper Christensen, Aarhus University & CREATES	Latent Integrated Stochastic Volatility, Realized Volatility, and Implied Volatility: A State Space Approach
16	5 October	Christian Bach, Aarhus University & CREATES	Habit-based Asset Pricing with Limited Participation Consumption
17	26 October	Søren Johansen, University of Copenhagen & CREATES	An econometric analysis of the Blanchard-Watson bubble model
18	2 November	Andreas Schrimpf, Aarhus University & CREATES	Cash flow-predictability: still going strong
19	16 November	Kasia Lasak, Aarhus University & CREATES	18 November Kasia Lasak, Aarhus University and CREATES: Testing the rank under different memory
20	7 December	Niels Haldrup, Aarhus University & CREATES	Discriminating between true and spurious long memory processes

B.4 Distinguished Speaker Seminar Series

	Date	Speaker	Title
1	17 March	Professor Joel Hasbrouck NYU Stern	Market microstructure: lessons and questions in the wake of the crisis
2	12 May	Professor Hashem Pesaran University of Cambridge	Cross Section Dependence in Panel Data Models
3	30 September	Professor Andrew Chesher University College London and CeMMAP	Structural Econometrics and Discrete Responses

B.5 PhD Courses organized by CREATES

	Date	Lecturer	Subject
1	8-10 March	Russell Davidson, McGill University	The Bootstrap
2	11-12 March	Timo Trimborn, University of Hannover	Dynamic Macroeconomic Modeling with Matlab
3	12-13 April	Karl H. Schlag, Universitat Pompeu Fabra	Distribution Free Hypothesis Testing
4	10-11 May	Hashem Peseran, University of Cambridge	Dynamic Panel Data Models
5	21-23 June	Roger Koenker, University of Illinois	Topics in Quantile Regression
6	4-6 August	Jørgen Hoffmann-Jørgensen, Aarhus University	Empirical Process Theory
7	9-13 August (Summer school)	Bent Jesper Christensen, Aarhus University & CREATES	Intensive course on Dynamic Modelling and Inference
8	23-27 August	Charles Bos, VU University Amsterdam	Advanced Programming in Quantitative Economics
9	6 September	Jeroen Rombouts, HEC Montreal	Switching models for time series and their applications
10	13-17 December	Søren Johansen and Anders Rahbek, University of Copenhagen & CREATES	Econometric Analysis of the I(1) Cointegrated VAR Model and its Recent Extensions

B.6 CREATES members invited to talks at international conferences

	Title of event	Venue	Name(s) of participant(s)
1	28th European Meeting of Statisticians	Piraeus	Dennis Kristensen, Michael Sørensen, Mark Podolskij
2	6th Colloquium on modern tools for business cycle analysis: The lessons from the global economic crisis	EUROSTAT, Luxemburg	Timo Teräsvirta
3	Annual Conference of Finnish Statistical Society	University of Helsinki	Søren Johansen
4	Conference in honor of Takeshi Amemiya	Shanghai	Peter Reinhard Hansen
5	Conference on high frequency data modeling	Stevens Institute of Technology, Hoboken, USA	Almut Veraart
6	Conference on: Volatility and Systemic Risk	NYU, Stern	Peter Reinhard Hansen
7	CSDA International Conference on Computational and Financial Econometrics (CFE'10)	London	Asger Lunde, Kim Christensen
8	Eastern Finance Association	Miami	Andreas Schrimpf
9	Economic forecasting: alternative and complementary approaches	Oslo University	Tom Engsted
10	European Economic Association	Glasgow	Andreas Schrimpf
11	Financial Econometrics Conference	Toulouse	Mark Podolskij
12	HEC Montréal-CIRPÉE Applied Financial Time Series Workshop	HEC Montreal	Morten Ø. Nielsen, Dennis Kristensen
13	High-dimensional econometric modelling	Cass Business School, London	Søren Johansen
14	INET Conference, Toward an alternative macroeconomic analysis of microfoundations, finance - real economy dynamics and crises	University of Budapest	Søren Johansen
15	International Society of Forecasters conference	San Diego	Allan Timmermann
16	International Symposium on Business and Industrial Statistics	Portoroz, Slovenia	Michael Sørensen
17	International Symposium on Econometric Theory and Applications 2010	Singapore Management University	Peter Reinhard Hansen, Michael Jansson, Torben G. Andersen
18	International Symposium on Financial Engineering and Risk Management 2010 (FERM 2010)	Taiwan	Tim Bollerslev
19	Invited key note talk at Brazilian Finance Association meeting	Sao Paulo	Asger Lunde
20	Invited Seminar	University of Pennsylvania	Asger Lunde
21	Invited Seminar at Humboldt-Universität zu Berlin	Berlin	Asger Lunde
22	Minisymposium i anledning at Dag Tjøstheim fylder 65 år	Universitetet i Bergen, Norway	Timo Teräsvirta

	Title of event	Venue	Name(s) of participant(s)
23	Miniworkshop: Semiparametric modelling of multivariate economic time series with changing dynamics	Mathematisches Forschungsinstitut Oberwolfach, Germany	Timo Teräsvirta
24	NBER-NSF Times Series Conference (poster)	Duke University	Asger Lunde
25	Norges Bank Conference on nonlinear models in macroeconomics and finance	Venastul, Norway	Timo Teräsvirta
26	Revealed Preferences and Partial Identification	CIREQ	Dennis Kristensen
27	Semiparametric Methods in Economics and Finance	LSE	Dennis Kristensen
28	Shape Restrictions in Non- and Semiparametric Estimation of Econometric Models	Northwestern	Dennis Kristensen
29	Sixth Forecasting Conference	European Central Bank	Allan Timmermann
30	Society of Nonlinear Dynamics and Econometrics 18th Annual Symposium	University of Piemonte Orientale	Dennis Kristensen
31	Statistics Days 2010: Econometric time series models	University of Helsinki, Finland	Timo Teräsvirta
32	Symposium on high frequency data in empirical finance	University of Dortmund, Germany	Almut Veraart
33	The 8th world congress of the Econometric Society	Shanghai, China	Asger Lunde, Michael Jansson
34	Volatility and Systemic Risk	Stern School of Business, NYU	Tim Bollerslev
35	Workshop in Honor of Ole E. Barndorff-Nielsen's 75th Birthday	Aarhus University	Asger Lunde, Mark Podolskij
36	Workshop on Advanced Mathematical Methods for Finance (A.Ma.Me.F.)	Humboldt-Universität zu Berlin, Germany	Almut Veraart
37	Workshop on ambit processes, non-semimartingales and applications	Sandbjerg, Denmark	Almut Veraart, Mark Podolskij
38	Workshop on International Asset Pricing	Leicester	Andreas Schrimpf
39	Workshop on Mathematical Finance and Related Issues	Kyoto	Michael Sørensen
40	Workshop: "Econometric aspects of price transmission analysis"	Georg-August-Universität Göttingen, Germany	Timo Teräsvirta

Section C: Educational activities (only host institution)

	Title of activity	Level	ECTS
1	Microeconomics, Statistics, Mathematics	BA	20
2	Regression Analysis	BA	5
3	Finance and Investments	BA	10
4	Econometrics	BA	10
5	Microeconomics, Math-Econ	BA	10
6	Investment, Math-Econ	BA	10
7	Topics in Applied Economics and Finance	BA/MSc	5
8	Applied Time Series and Financial Econometrics	MSc	10
9	Time Series Econometrics	MSc	10
10	Investments	MSc	10
11	Financial Market Volatility	MSc	10
12	PhD Econometrics	PhD	10
13	The Bootstrap	PhD	2
14	Dynamic Macroeconomic Modeling with Matlab	PhD	2
15	Distribution Free Hypothesis Testing	PhD	2
16	Dynamic Panel Data Models	PhD	2
17	Topics in Quantile Regression	PhD	2
18	Empirical Process Theory	PhD	2
19	Intensive course on Dynamic Modelling and Inference	PhD	2
20	Advanced Programming in Quantitative Economics	PhD	2
21	Switching models for time series and their applications	PhD	2
22	Econometric Analysis of the I(1) Cointegrated VAR Model and its Recent Extensions	PhD	2
23	Advanced Financial Econometrics	PhD	10

Number of Master Graduates and Bachelor Graduates supervised at the CREATES		
	Number of Bachelor Graduates (estimated)	40
	Number of Master Graduates (estimated)	30

Section D: External funding

D.1 Public Danish Funds

	Funding body	Purpose	Grant holder	Activity period	Granted amount in DKK	Partial amount allocated to the reported year
1	The Danish Council for Independent Research Social Sciences (FSE)	Dynamic Modelling of Long Memory and Persistence in Economic Time Series	Niels Haldrup	2006-2009	3.225.000	-
2	The Danish Council for Independent Research Social Sciences	Analysis of Fractionally Integrated and Co-integrated Time Series with applications to Nordic Electricity Market Volatility	Morten Ø. Nielsen	2006-2008	560.000	-
3	The Danish Council for Independent Research Social Sciences	Guest Professorship, Timo Teräsvirta	Niels Haldrup	2006-2007	912.000	-
4	The Danish Council for Independent Research Social Sciences	Post doc Scholarship	Katarzyna Lasak	2008-2010	1.300.000	410.638
5	The Danish Council for Independent Research Social Sciences	Quantile Regression on panel data in the presence of unobserved heterogeneity	Christian M. Dahl	2007-2008	563.000	-
6	The Danish Council for Independent Research Social Sciences	Towards Integration of International Financial Markets	Charlotte Christiansen	2006-2008	611.000	-
7	Faculty of Social Sciences, Aarhus University	1-year post doc Faculty Grant	Mark Podolskij	2007-2008	430.000	-
8	Faculty of Social Sciences, Aarhus University	1-year post doc Faculty Grant	Olaf Posch	2007-2008	430.000	-
9	Faculty of Social Sciences, Aarhus University	1-year post doc Faculty Grant	Katarzyna Lasak	2007-2008	430.000	-
10	Faculty of Social Sciences, Aarhus University	2-year post doc Faculty Grant (Globalization)	Jie Zhu	2007-2008	860.000	-
11	Danish Center for Scientific Computing	Computing time at DCSC	Bent Jesper Christensen	2007-2008	400.000	-
12	The Danish Council for Independent Research Social Sciences	2008 NBER-NSF time series conference, CREATES	Niels Haldrup	2008	96.000	-
13	The Danish Council for Independent Research Social Sciences	Visiting Professorship, Gilles Teyssiere	Per B. Overgaard	2009	475.000	-

	Funding body	Purpose	Grant holder	Activity period	Granted amount in DKK	Partial amount allocated to the reported year
14	The Danish Council for Independent Research Social Sciences	Empirical Modeling of Financial Markets during Turbulent periods and Structural Change	Charlotte Christiansen	2009-2011	2.970.000	1.642.147
15	The Danish Council for Independent Research Social Sciences	Post doc Scholarship: Estimation, Testing, and Representation in Fractional Integration and Cointegration models subject to non-linearities	Frank S. Nielsen	2009-2011	1.381.000	122.597
16	The Danish Council for Independent Research Social Sciences	Post doc Scholarship: Volatility Modelling: Leverage and Long Memory	Isabel Casas	2009-2011	1.436.000	458.104
17	Ministry of Science, Technology and Innovation	3 PhD Scholarships, Co-financing	Niels Haldrup	2008-2011	1.856.000	650.000
18	The Danish Council for Independent Research Social Sciences	2-year Post doc Scholarship Fellowship	Robinson Kruse	2009-2011	1.445.520	750.104
19	The Danish Council for Independent Research Social Sciences	1-year Fellowship	Almut Veraart	2009-2010	723.600	523.594
20	The Danish Council for Independent Research Social Sciences	2009 (EC)2-conference, CREATES	Niels Haldrup	2009	122.400	-
21	The Danish Council for Independent Research Social Sciences	Conference, Periodicity, Non-stationarity and Forecasting	Niels Haldrup	2009	122.000	-
22	The Danish Council for Independent Research Social Sciences	2010 workshop "Ambit processes, non-semimartingales and applications"	Almut Veraart	2010	57.600	57.600
23	The Danish Council for Independent Research Social Sciences	Post doc Scholarship: Estimating multivariate financial volatility	Kim Christensen	2010-2012	1.861.200	731.860
24	The Danish Council for Independent Research Social Sciences	Eliteforskerpris 2009	Kim Christensen	2010-2012	288.000	14.465

Funding body	Purpose	Grant holder	Activity period	Granted amount in DKK	Partial amount allocated to the reported year
25 The Danish Council for Independent Research Social Sciences	Post doc Scholarship: Time-varying expected returns and regime shifts	Thomas Quistgaard Pedersen	2010-2012	1.584.576	55.000
26 The Danish Council for Independent Research Social Sciences	Post doc Scholarship: Inference in models with level shifts	Paolo Santucci de Magistris	2011-2013	1.598.400	-
27 AUFF	Anders B Kock - UC Berkeley USA	Per Baltzer Overgaard	2011	37.000	-
28* The Danish Council for Independent Research Social Sciences	FSE Research Unit	Bent Jesper Christensen	2010-2015	4.000.000	210.000
Total				29.775.296	5.626.109

* The total grant amounts to DKK 10.006.089 of which 4.000.000 are associated with CREATES activities

Funding to D-CAF (CREATES participates in grant)					
National Programme for Research Infrastructure under the Danish Ministry of Science, Technology and Innovation	Danish Data Center for Accounting and Finance	Peter Ove Christensen	2010-2015	10.000.000	1.383.067
The Danish Council for Independent Research Social Sciences	Danish Data Center for Accounting and Finance	Peter Ove Christensen	2010-2015	4.000.000	1.269.551

D.2 Private Danish funds

	Funding body	Purpose	Grant holder	Activity period	Granted amount in DKK	Partial amount allocated to the reported year
1	Danmarks Nationalbank	2008 NBER-NSF time series conference, CREATES	Niels Haldrup	2008	76.000	-
2	Velux Foundation	Visit from Columbia, NY	Anders Rahbek	2010	387.000	387.000
3	Markedskraft	Report	Per Baltzer Overgaard	2010	450.000	450.000

D.3 International funds

	Funding body	Purpose	Grant holder	Activity period	Granted amount in DKK	Partial amount allocated to the reported year
1	NBER-National Bureau of Economic Research and NSF-National Science Foundation	2008 NBER-NSF time series conference, CREATES, 12-13 September 2008, 12.000 USD	Niels Haldrup	2008	66.000	-
2	Stevanovich Center for Mathematical Finance, University of Chicago	Stevanovich Center - CREATES joint conference in 2009: Financial Econometrics and Statistics, Current Themes and New Directions	Niels Haldrup	2009	300.000	-
3	The European Central Bank	2009 (EC)2-conference, CREATES	Niels Haldrup	2009	37.225	-
Total					403.225	-

Note: The list only includes grants for CREATES members at the host Institution, Aarhus University

Section E: Awards

	Awards	Recipient	Granted amount in DKK
1	AUFF travel grant	Anders Bredahl Kock	37.000
2	National Science Foundation Grant, 2010-2013	Dennis Kristensen	1.669.822
3	VELUX Visiting Professor Programme Award	Dennis Kristensen/Anders Rahbek	302.613
4	Young Elite Researchers' Award	Kim Christensen	200.000
5	2010 WIEM (Warsaw International Economic Meeting) Best Paper Prize for young Economists	Katarzyna Łasak	1.875
6	QED Research Prize	Morten Ø. Nielsen	7.000
7	NSF grant 2010-2013	Tim Bollerslev/Viktor Todorov	
8	Gerald P. Dwyer prize for the top paper in finance presented by a graduate student - SNDE 18th Annual Symposium	Johannes Tang Kristensen	2.750
9	Nominee Leibniz Young Researcher Award	Andreas Schrimpf	

Section F: Public outreach

F.1 Electronic media

	Specific media	Type of communication	Subject	Contributor from the CREATES
1	Radio	Interview	Price manipulation, corporate governance in the banking sector	Carsten Tanggaard

F.2 Press

	Specific media	Type of communication	Subject	Contributor from the CREATES
1	www.pengeogpensionpanel.dk	Report	Anbefalinger om aktieinvesteringer	Tom Engsted

F.3 Other

	Specific type of communication	Subject	Contributor from the CREATES
1	Interview with Søren Johansen and Katarina Juselius. In: European Economics at a Crossroads. red. J. Barkley Rosser, Jr. ; Richard P.F. Holt ; David Colander. Cheltenham, UK : Edward Elgar Publishing, Incorporated, 2010, 115-131	European Economics at a Crossroads	Søren Johansen
2	Lectures at Open University/Folkeuniversitet	Investments	Carsten Tanggaard

Section G: Patents and applications

Section H: Publications

Total number of publications in the reported year	Peer reviewed	Not peer reviewed
Number of journal articles	54	
Forthcoming articles	53	
Number of conference proceedings	-	
Number of monographs	2	
Number of book chapters	11	
CREATES Research Papers		76
PhD theses	5	

Prioritized list of the most prestigious publication sources within CREATES' research area

General Econometrics:

- 1 Econometrica
Journal of American Statistical Association
- 2 Econometric Theory
Journal of Applied Econometrics
Journal of Business and Economic Statistics
Journal of Econometrics
Review of Economics and Statistics
- 3 Econometric Reviews
Econometrics Journal
Oxford Bulletin of Economics and Statistics

Financial Econometrics:

- 1 Journal of Finance
Journal of Financial Economics
Review of Financial Studies
- 2 Journal of Empirical Finance
Journal of Financial and Quantitative Analysis
Journal of Financial Econometrics
Journal of Monetary Economics
Journal of Money Credit and Banking
- 3 Journal of Banking and Finance
Journal of International Money and Finance

Statistics/Stochastics:

- 1 Annals of Statistics
- 2 Bernoulli
Finance and Stochastics
Journal of Royal Statistical Society Series B
Mathematical Finance
Scandinavian Journal of Statistics
Stochastic Processes and its Applications
- 3 Journal of Time Series Analysis

In the March 2011 RePEc ranking CREATES has been listed as number 6 (out of 1426 institutions) within the field of "Econometrics"; and as number 5 (out of 1040 Institutions) within the field of "Time Series Econometrics".

[Link "Econometrics"](#)

[Link "Time Series Econometrics"](#)

H.1 Articles published in refereed journals

- 1 2010, Marco Aiolfi, Marius Rodrigues and Allan Timmermann, Understanding Analysts' Earnings Expectations: Biases, Nonlinearities and Predictability, Journal of Financial Econometrics, 8(3), 305-334 (PR) (CO)
- 2 2010, Torben G. Andersen and Luca Benzoni, Do Bonds Span Volatility Risk in the U.S. Treasury Market? A Specification Test for Affine Term Structure Models, Journal of Finance, 65, 603-653 (PR) (CO)
- 3 2010, Martin M. Andreasen, How to Maximize the Likelihood Function for a DSGE Model, Computational Economics, 35 (2), 127-154 (PR)
- 4 2010, Martin M. Andreasen, Stochastic Volatility and DSGE models, Economics Letters, 108, 7-9 (PR)
- 5 2010, Martin M. Andreasen, Sufficient Conditions for Finite Objective Functions in DSGE Models with Deterministic and Stochastic Trends, The B.E. Journal of Macroeconomics (Topics), 10(16) (PR)
- 6 2010, Torben G. Andersen, Tim Bollerslev, Per H. Frederiksen and Morten Ø. Nielsen, Continuous-Time Models, Realized Volatilities, and Testable Distributional Implications for Daily Stock Returns, Journal of Applied Econometrics, 25(2), 233-261 (PR) (CO)
- 7 2010, Arizmendi, O., Barndorff-Nielsen, O.E. and Perez-Abreu, V., On free and classical type G laws, Brazilian Journal of Probability and Statistics, 24, 106-127 (PR) (CO)
- 8 2010, Barnett, Richard C., Joydeep Bhattacharya, and Helle Bunzel, Choosing to Keep Up with the Joneses and Income Inequality, Economic Theory, 45 (3), 469-496 (PR) (CO)
- 9 2010, Barnett, Richard C., Joydeep Bhattacharya, and Helle Bunzel, Resurrecting Equilibria Through Cycles in an Overlapping Generations Model of Money, Journal of Macroeconomics, 32 (2), 515-526 (PR) (CO)
- 10 2010, Tim Bollerslev and Viktor Todorov, Jumps and Betas: A New Framework for Disentangling and Estimating Systematic Risks, Journal of Econometrics, 157(2), 220-235 (PR) (CO)
- 11 2010, Bunzel, Helle and Walter Enders, The Taylor Rule and 'Opportunistic' Monetary Policy, Journal of Money, Credit and Banking, 42 (5), 931-949 (PR) (CO)
- 12 2010, Busch, T., B.J. Christensen and M.Ø. Nielsen, The role of implied volatility in forecasting future realized volatility and jumps in foreign exchange, stock, and bond markets, Journal of Econometrics, 160, 48-57 (PR)
- 13 2010, Matias Cattaneo, Richard Crump and Michael Jansson, Robust Data-Driven Inference for Density-Weighted Average Derivatives, Journal of the American Statistical Association, 105, 1070-1083 (PR) (CO)
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- 15 2010, Giuseppe Cavaliere, Anders Rahbek and A.M. Robert Taylor, Determination of the Number of Common Stochastic Trends under Conditional Heteroskedasticity, Estudios De Economía Aplicada, 28(3), 1-34 (PR) (CO)
- 16 2010, Giuseppe Cavaliere, Anders Rahbek and A.M. Robert Taylor, Testing for co-integration in vector autoregressions with non-stationary volatility, Journal of Econometrics, 158(1), 7-24 (PR) (CO)
- 17 2010, Christensen, B.J., M.Ø. Nielsen and J. Zhu, Long memory in stock market volatility and the volatility-in-mean effect: the FIEGARCH-M model, Journal of Empirical Finance, 17, 460-470 (PR) (CO)
- 18 2010, Kim Christensen, Silja Kinnebrock and Mark Podolskij, Pre-averaging estimators of the ex-post covariance matrix in noisy diffusion models with non-synchronous data, Journal of Econometrics 159, 116-133 (PR) (CO)
- 19 2010, Kim Christensen, Roel Oomen and Mark Podolskij, Realised quantile-based estimation of the integrated variance, Journal of Econometrics 159, 74-98 (PR) (CO)
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- 24 2010, Christoffersen, Peter F., Kris Jacobs and Karim Mimouni, Models for S&P 500 Dynamics: Evidence from Realized Volatility, Daily Returns, and Option Prices, Review of Financial Studies, 23, 3141-3189 (PR) (CO)
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- 81 2009, M. C. Jones, Jens Perch Nielsen and Carsten Tanggaard, Local linear density estimation for filtered survival data, with bias correction, Statistics, 167-186 (PR) (CO)
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- 3 2010, Jesper Rangvid, Maik Schmeling and Andreas Schrimpf, Cash Flow-Predictability: Still Going Strong (CREATES RP 2010-3)
- 4 2010, Helle Bunzel and Walter Enders, The Taylor Rule and “Opportunistic” Monetary Policy (CREATES RP 2010-4)
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- 6 2010, Søren Johansen and Bent Nielsen, Discussion of The Forward Search: Theory and Data Analysis by Anthony C. Atkinson, Marco Riani, and Andrea Ceroli (CREATES RP 2010-6)
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Stay abroad: University of California at San Diego.

Supervisor: Tom Engsted (Aarhus University and CREATES).

Present employment: Assistant Professor, Aarhus University and CREATES.

PhD (Industrial), Eske Stig Hansen, Essays in Electricity Market Modeling.

Committee: Catherine Waddams, professor, Centre for Competition Policy, University of East Anglia; Bjarne Brendstrup, PhD; Alexander Koch, Associate Professor, School of Economics and Management, Aarhus University.

Stay abroad: Toulouse School of Economics.

Supervisors: Niels Haldrup (Aarhus University and CREATES) and Claus Kastberg (Copenhagen Economics).

Present employment: Consultant, Copenhagen Economics.

PhD, Leonidas Tsiaras, Essays in Financial Econometrics.

Committee: Peter Christoffersen, Associate professor, McGill University and CREATES; Mark Shackleton, Professor, Lancaster University; Elisa Nicolato, Associate professor, Aarhus School of Business.

Stay abroad: Northwestern University.

Supervisors: Esben Høg, (Aalborg University).

Present employment: Greek National Bank.

PhD, Torben Beedholm Rasmussen, Essays on Dynamic Interest Rate Models and Tests for Jumps in Asset Prices.

Committee: Peter Reinhard Hansen, Assistant Professor, Stanford University and CREATES; Anders Rahbek, Professor, University of Copenhagen and CREATES; Tom Engsted, Professor, Aarhus University and CREATES.

Stay abroad: Princeton University.

Supervisors: Bent Jesper Christensen (Aarhus University and CREATES) and Niels Haldrup (Aarhus University and CREATES).

Present employment: Economist, Jyske Bank.

PhD (Industrial), Lasse Bork, Macro Factors, Monetary Policy Analysis and Affine Term Structure Models.

Committee: Esben Høg, Associate Professor, Aalborg University; Jesper Rangvid, Professor, Copenhagen Business School; Björn Hansson, Professor, Lund University.

Supervisors: Tom Engsted (Aarhus University and CREATES).

Present employment: Economist, Jyske Bank.

H.8 Forthcoming articles in refereed journals and books

- 1 M. Aiolfi, C. Capistran and A. timmermann, Forecast Combinations, [Forecast Handbook](#) (Oxford)
- 2 Marco Aiolfi, Luis Catão and Allan Timmermann, Common Factors in Latin America's Business Cycles, [Journal of Development Economics](#)
- 3 Torben G. Andersen, Tim Bollerslev and Xin Huang, A Reduced Form Framework for Modeling Volatility of Speculative Prices based on Realized Variation Measures, [Journal of Econometrics](#)
- 4 Torben G. Andersen, Tim Bollerslev and Nour Meddahi, Realized Volatility Forecasting and Market Microstructure Noise, [Journal of Econometrics](#)
- 5 Torben G. Andersen, Dobrislav Dobrev and Ernst Schaumburg, Robust Volatility Estimation using Nearest-Neighbor Truncation, [Journal of Econometrics](#)
- 6 Torben G. Andersen and Viktor Todorov, Realized Volatility and Multipower Variation, Encyclopedia of Quantitative Finance; Wiley and Sons
- 7 Barndorff-Nielsen, O.E., Stationary Infinitely Divisible Processes, [Brazilian Journal of Probability and Statistics](#)
- 8 Barndorff-Nielsen, O.E. and Basse-O'Connor, A., Quasi Ornstein-Uhlenbeck processes, [Bernoulli](#)
- 9 Barndorff-Nielsen, O. E., Benth, F. E. and Veraart, A.E.D., Ambit processes and stochastic partial differential equations, in G. Di Nunno and B. Øksendal, eds, Advanced Mathematical Methods for Finance, [Springer](#)
- 10 O. E. Barndorff-Nielsen, J. M. Corcuera and M. Podolskij, Multipower variation for Brownian semi-stationary processes, [Bernoulli](#)
- 11 Ole E. Barndorff-Nielsen, Peter Reinhard Hansen, Asger Lunde and Neil Shephard, Subsampling Realized Kernels, [Journal of Econometrics](#)
- 12 Ole E. Barndorff-Nielsen, Peter R. Hansen, Asger Lunde and Neil Shephard, Multivariate Realised Kernels: Consistent Positive Semi-Definite Estimators of the Covariation of Equity Prices with Noise and Non-Synchronous Trading, [Journal of Econometrics](#)
- 13 Barndorff-Nielsen, O.E. and Stelzer, R., Multivariate supOU processes, [Annals of Applied Probability](#)
- 14 Barnett, Richard C., Joydeep Bhattacharya, and Helle Bunzel, Minimum Consumption Requirements and Cycles in an Overlapping Generations Model of Money, [Journal of Macroeconomics](#)
- 15 Berkowitz, Jeremy, Peter F. Christoffersen and Denis Pelletier, Evaluating Value-at-Risk Models with Desk-Level Data, [Management Science](#)
- 16 Tim Bollerslev, Bent Jesper Christensen, Niels Haldrup and Asger Lunde, Editors, Introduction: Periodicity, Non-stationarity, and Forecasting of Economic and Financial Time Series. [Journal of Time Series Econometrics](#)
- 17 Tim Bollerslev, Michael Gibson and Hao Zhou, Dynamic Estimation of Volatility Risk Premia and Investor Risk Aversion from Option-Implied and Realized Volatilities, [Journal of Econometrics](#)
- 18 Tim Bollerslev and Viktor Todorov, Tails, Fears, and Risk Premia, [Journal of Finance](#)
- 19 Chang, B., P. Christoffersen, K. Jacobs, and G. Vainberg, Option-Implied Measures of Equity Risk, [Review of Finance](#)
- 20 Roxana Chiriac and Valeri Voev, Modelling and Forecasting Multivariate Realized Volatility, [Journal of Applied Econometrics](#)
- 21 Charlotte Christiansen, Angelo Ranaldo, and Paul Söderlind, The Time-Varying Systematic Risk of Carry Trade Strategies, [Journal of Financial and Quantitative Analysis](#)
- 22 Dahl, C and E. M. Iglesias, Modelling the Volatility-Return Tradeoff when Volatility may be Nonstationary, [Journal of Time Series Econometrics](#)
- 23 Dahl, C., H. C. Kongsted and A. Sørensen, ICT and Productivity Growth in the 1990's: Panel Data Evidence on Europe, [Empirical Economics](#)
- 24 Engsted, T., Pedersen, T.Q., and Tanggaard, C., The log-linear return approximation, bubbles, and predictability, [Journal of Financial and Quantitative Analysis](#)
- 25 P. Frederiksen and M.Ø. Nielsen, Fully modified narrow-band least squares estimation of weak fractional cointegration, [Econometrics Journal](#)

- 26 Frederiksen, P., F.S. Nielsen and M.Ø. Nielsen, Local polynomial Whittle estimation of perturbed fractional processes, [Journal of Econometrics](#)
- 27 Haldrup, Niels, Antonio Montanés, and Andreu Sansó, Detection of Additive Outliers in Seasonal Time Series, [Journal of Time Series Econometrics](#)
- 28 Peter Reinhard Hansen, Zhuo (Albert) Huang and Howard Howan Shek, Realized GARCH: A Joint Model of Returns and Realized Measures of Volatility, [Journal of Applied Econometrics](#)
- 29 Peter Reinhard Hansen and Asger Lunde, Forecasting volatility using high frequency data, [Oxford Handbook of Economic Forecasting](#), Oxford University
- 30 Peter Reinhard Hansen, Asger Lunde, and J. M. Nason, The model confidence set, [Econometrica](#)
- 31 Svend Hylleberg, Seasonal Integration and Cointegration in Economic Time Series, [International Encyclopedia of Statistical Science](#), Springer-Verlag
- 32 Michael Jansson and Morten Ø. Nielsen, Nearly Efficient Likelihood Ratio Tests for Seasonal Unit Roots, [Journal of Time Series Econometrics](#)
- 33 A.T. Jensen and Theis Lange, On IGARCH and Convergence of the QMLE for Misspecified GARCH Models, [Journal of Time Series Econometrics](#)
- 34 Søren T. Jensen, Theis Lange and Anders Rahbek, Estimation and Asymptotic Inference in the First Order AR-ARCH Model, [Econometric Reviews](#)
- 35 Søren Johansen and A.R. Swensen, On a numerical and graphical technique for evaluating some models involving rational expectations, [Journal of Time Series Econometrics](#)
- 36 Jungbacker, B., S.J. Koopman, and M. Van der Wel, Maximum Likelihood Estimation for Dynamic Factor Models with Missing Data, [Journal of Economic Dynamics and Control](#)
- 37 Nicholas M. Kiefer, Default Estimation, Correlated Defaults, and Expert Information, [Journal of Applied Econometrics](#)
- 38 Kock, A.B. and T. Teräsvirta, Forecasting with nonlinear time series models, in M.P. Clements and D.F. Hendry, eds: [Oxford Handbook on Economic Forecasting](#)
- 39 Dennis Kristensen and A. Mele, Adding and Subtracting Black-Scholes: A New Approach to Approximating Derivative Prices in Continuous Time Models, [Journal of Financial Economics](#)
- 40 Robinson Kruse, A new unit root test against ESTAR based on a class of modified statistics, [Statistical Papers](#)
- 41 Robinson Kruse, On European monetary integration and the persistence of real effective exchange rates, [Finance Research Letters](#)
- 42 T. Kurita, H. B. Nielsen and A. Rahbek, An I(2) Cointegration Models with Piecewise Linear Trends, [Econometrics Journal](#)
- 43 Menkveld, A.J., A. Sarkar, and M. Van der Wel, Customer Order Flow, Intermediaries, and Discovery of the Equilibrium Risk-free Rate, [Journal of Financial and Quantitative Analysis](#)
- 44 M.H. Pesaran, A. Pick and A. Timmermann, Variable Selection, Estimation, and Inference for Multi-period Forecasting Problems, [Journal of Econometrics](#)
- 45 D. Pettenuzzo and A. Timmermann, Predictability of Stock Returns and Asset Allocation under Structural Breaks, [Journal of Econometrics](#)
- 46 A.J. Patton and Allan Timmermann, Predictability of Output Growth and Inflation: A Multi-horizon Survey Approach, [Journal of Business and Economic Statistics](#)
- 47 Jeroen Rombouts and Lars Stentoft, Multivariate Option Pricing with Time Varying Volatility and Correlations, [Journal of Banking and Finance](#)
- 48 Maik Schmeling and Andreas Schrimpf, Expected Inflation, Expected Stock Returns, and Money Illusion: What can we learn from Survey Expectations?, [European Economic Review](#)
- 49 Andreas Schrimpf and Qingwei Wang, A Reappraisal of the Leading Indicator Properties of the Yield Curve under Structural Instability, [International Journal of Forecasting](#)
- 50 Michael Sørensen, Estimating functions for diffusion-type processes. To appear in Kessler, M., Lindner, A. and Sørensen, M. (eds.): [Statistical Methods for Stochastic Differential Equations, Chapman and Hall](#)

- 51 Michael Sørensen, Prediction-based estimating functions: review and new developments, [Brazilian Journal of Probability and Statistics](#)
- 52 Veraart, A.E.D. , Likelihood estimation of Lévy-driven stochastic volatility models through realised variance measures, [The Econometrics Journal](#)
- 53 Veraart, A.E.D. and Veraart, L.A.M., Stochastic volatility and stochastic leverage, [Annals of Finance](#)

Section I: Staff list

01.01.-31.12.2010

CREATES - Center for Research in Econometric Analysis of Time Series

Personale (Staff)		Ansættelses- periode i 2010 **)	Finansieret af (angives i årsværk *)			Udenlandsk medarbejder	Ph.d.-stud. / postdocs: tidl. uddannelse	Ph.d.- stud.: har opnået ph.d.-grad
Navn	Stillings- betegnelse		Grundforsk- ningsfond- en	Værtsinsti- tutionen	Anden finansiering ***)			
Centerleder (Center leader)								
Niels Haldrup	Professor	hele perioden	0,9	0,1				
Videnskabeligt personale (Scientific staff)								
Research Fellows, Aarhus								
Ole E. Barndorff-Nielsen	Professor	hele perioden	0,1		0,4 (egen tid)			
Henning Bunzel (20 %)	Lektor	hele perioden		0,2				
Bent Jesper Christensen	Professor	hele perioden		0,9	0,1 (FSE)			
Kim Christensen	Adjunkt	hele perioden			1 (FSE)			
Charlotte Christiansen	Lektor	hele perioden		0,6	0,4 (FSE)			
Tom Engsted	Professor	hele perioden		0,5	0,5 (FSE)			
Asgar Lunde	Professor	hele perioden		1				
Christos Ntantamis	Adjunkt	hele perioden	1			x		
Thomas Quistgaard Pedersen	Adjunkt	01.09-31.12		0,2	0,1 (FSE)			
Olaf Posch	Adjunkt	hele perioden		1		x		
Carsten Tanggaard	Professor	hele perioden			1 (ASB)			
Timo Teräsvirta	Professor	hele perioden	1			x		
Almut Veraart	Adjunkt	01.10-31.12			0,3 (NAT)	x		
Valeri Voev	Adjunkt	hele perioden		1		x		
Allan Würtz (50 %)	Lektor	hele perioden		0,5				
Research Fellows, KU								
Søren Johansen	Professor	hele perioden	0,3		0,3 (KU + egen tid)			
Anders Rahbek	Professor	hele perioden	0,4		0,6 (KU)			
Michael Sørensen	Professor	hele perioden			1 (KU)			
Research Fellows, SDU								
Christian M. Dahl	Professor	hele peroiden			1 (SDU)			

Personale (Staff)		Ansættelses- periode i 2010 **)	Finansieret af (angives i årsværk *)			Udenlandsk medarbejder	Ph.d.-stud. / postdocs: tidl. uddannelse	Ph.d.- stud.: har opnået ph.d.-grad
Navn	Stillings- betegnelse		Grundforsk- ningsfond- en	Værtsinsti- tutionen	Anden finansiering ***)			
Research Fellows, ikke DK								
Torben G. Andersen, Northwestern University, USA	Professor	hele perioden			1	(x)		
Tim Bollerslev, Duke University, USA	Professor	hele perioden			1	(x)		
Helle Bunzel, Iowa State University, USA	Professor	hele perioden			0,5	(x)		
Peter Christoffersen, Rotman School of Management, Canada	Professor	hele perioden			1	(x)		
Peter R. Hansen, Stanford University, USA	Professor	hele perioden			1	(x)		
Michael Jansson, U.C. Berkeley, USA	Professor	hele perioden	0,1		0,9	(x)		
Dennis Kristensen, Columbia University, USA	Professor	hele perioden			1	(x)		
Morten Ørregaard Nielsen, Queen's University, Canada	Professor	hele perioden			1	(x)		
Mark Podolskij, University of Heidelberg, Germany	Professor	01.08-31.12			1	x		
Lars Stentoft, HEC Montreal, Canada	Professor	hele perioden	0,2		0,8	(x)		
Allan Timmermann, UC San Diego, USA	Professor	hele perioden			1	(x)		
Michel van der Wel, Erasmus University Rotterdam, The Netherlands	Assistant Professor	hele perioden			1	x		
Post docs								
Isabel Casas	Postdoc	hele perioden	0,4		0,6 (FSE)	x	PhD	
Robinson Kruse	Postdoc	hele perioden			1 (FSE)	x	PhD	
Malene Kallestrup Lamb	Postdoc	15.09-31.12	0,3				PhD	
Katarzyna Lasak	Postdoc	hele perioden	0,4		0,6 (FSE)	x	PhD	
Frank Nielsen	Postdoc	01.01-15.03			0,3 (FSE)		PhD	
Andreas Schrimpf	Postdoc	hele perioden			1 (FSE)	x	PhD	
Almut Veraart	Postdoc	01.01-30.09			0,7 (FSE)	x	PhD	

Personale (Staff)		Ansættelses- periode i 2010 **)	Finansieret af (angives i årsværk *)			Udenlandsk medarbejder	Ph.d.-stud. / postdocs: tidl. uddannelse	Ph.d.- stud.: har opnået ph.d.-grad
Navn	Stillings- betegnelse		Grundforsk- ningsfond- en	Værtsinsti- tutionen	Anden finansiering ***)			
Gæsteforskere (Guest scientists)								
José Fajardo	Professor	20.01-12.02			0,1			
Paolo Santucci de Magistris	Ph.d.-stud.	05.02-31.03 23.08-06.09			0,1			
Paulius Stakenas	Ph.d.-stud.	01.02-31.03			0,2			
<i>Se Research fellows, ikke DK</i>								
Teknisk personale (Technical staff)								
Flere		hele perioden	0,2					
Administrativt personale (Administrative staff)								
Martha Vogdrup Berdiin	Center- admini- strator	01.01-28.02	0,2					
Solveig Nygaard Sørensen	Center- admini- strator	01.04-31.12	0,8					
Birgitte Højklint/Johanne Sejersen		hele perioden		0,3				
Marie Louise Ates		hele perioden		0,1				
Budget og økonomi		hele perioden		0,2				
Thomas Stephansen		hele perioden		0,1				
IT-support		hele perioden		0,2				
Andre (Others)								
Advisory Board								
Svend Hylleberg	Professor	hele perioden						
Robert F. Engle, NY Stern, USA	Professor	hele perioden						
Nicholas M. Kiefer, Cornell University, USA	Professor	hele perioden						
Neil Shephard, Oxford University, UK	Professor	hele perioden						

Personale (Staff)		Ansættelses- periode i 2010 **)	Finansieret af (angives i årsværk *)			Udenlandsk medarbejder	Ph.d.-stud. / postdocs: tidl. uddannelse	Ph.d.- stud.: har opnået ph.d.-grad
Navn	Stillings- betegnelse		Grundforsk- ningsfond- en	Værtsinsti- tutionen	Anden finansiering ***)			
Ph.d.-studerende (Ph.d.-students)								
Juan Carlos Parra Alvarez	Ph.d.-stud.	01.09-31.12			0,3 (MVTU)	x	BSc (econ)	
Stefan Holst Bache	Ph.d.-stud.	hele perioden		1			MSc (econ)	
Laurent Callot	Ph.d.-stud.	hele perioden		1		x	MSc (econ)	
Niels Husted Dall-Hansen	Ph.d.-stud.	hele perioden		1			IMSQE	
Mateusz Piotr Dziubinski	Ph.d.-stud.	hele perioden	1			x	BSc (econ)	
Eske Stig Hansen	Ph.d.-stud.	01.01-30.11		0,9			MSc (econ)	
Martin Klint Hansen	Ph.d.-stud.	hele perioden			1 (ASB)		BSc(B)	
Anders Bredahl Kock	Ph.d.-stud.	hele perioden	1				BSc (econ)	
Christian Bach Kristensen	Ph.d.-stud.	hele perioden		1			MSc (econ)	
Johannes Tang Kristensen	Ph.d.-stud.	hele perioden		1			MSc (econ)	
Manuel Sebastian Lukas	Ph.d.-stud.	01.09-31.12			0,3 (MVTU)	x	BSc (econ)	
Kasper Vinther Olesen	Ph.d.-stud.	01.09-31.12		0,3			BSc (econ)	
Thomas Quistgaard Pedersen	Ph.d.-stud.	01.01-31.08	0,7				MSc (merc)	
Kenneth Dencker Petersen	Ph.d.-stud.	hele perioden		1			MSc (econ)	
Zhenjiang Qin	Ph.d.-stud.	hele perioden			1 (MVTU)	x	MSc (stat)	
Anne Floor Sørensen	Ph.d.-stud.	01.10-31.12		0,3			MSc (math.econ)	
Leonidas Tsiaras	Ph.d.-stud.	01.01-01.04			0,3 (ASB)	x	MSc (fin)	
Nima Nonejad	Ph.d.-stud.	01.09-31.12			0,4 (MVTU)		BSc (econ)	
Rasmus Tangsgaard Varneskov	Ph.d.-stud.	01.09-31.12		0,4			BSc (econ)	
Yukai Yang	Ph.d.-stud.	hele perioden		1		x	MSc (econ)	
Total			9	15,8	25,8			

Årsværk i alt

50,6

*) Opgøres med max. 1 decimal, og fonden er opmærksom på, at der kan være tale om et skøn

**) Kun perioder over 3 uger medregnes

***) Inkl. evt. medarbejdere uden finansiering

(x) Danske statsborgere bosiddende i udlandet

Forkortelser:

FSE: Forskningsrådet for Samfund og Erhverv

KU: Københavns Universitet

SDU: Syddansk Universitet

ASB: Aarhus School of Business, Aarhus Universitet

MVTU: Ministeriet for Videnskab, Teknologi og Udvikling

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