Applicant:

Paul Hünermund

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Mannheim / Germany

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Position: Post-Doc in Innovation Policy at NBER

Dear Members of the Search Committee,

I would like to be considered for the vacant post-doc position for the academic year 2017-2018. I am a PhD student in Business Economics under the supervision of Prof. Dirk Czarnitzki at KU Leuven in Belgium. Currently, I am spending a semester abroad at NYU Stern School of Business by invitation of Prof. Luís Cabral. In addition, I am affiliated with the Centre for European Economic Research (ZEW) in Mannheim, Germany. I will finish my PhD in spring 2017.

My research interests lie in the economics of innovation and technological change. Moreover, I have a background in the fields of industrial organization and applied econometrics, where I already gained considerable teaching experience.

Please find the following documents enclosed:

1. My current CV
2. A research proposal

Please do not hesitate to contact me in case you need further information. My referees will send their letters of recommendation directly to Denis Healy.

I would be pleased to have a personal conversation with you. I will be available for interviews at the 2017 Annual Meeting of the American Economic Association in Chicago, January 6-8, 2017.

Kind regards,

Paul Hünermund

Paul Hünermund

Personal Data

Place and Date of Birth:	Quedlinburg — 11 December 1987
Citizenship:	German
Gender:	Male
Languages:	English (fluent), French (good), German (native), Lithuanian (basic), Russian (basic)
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Education

Research Fields: Innovation Economics, Applied Econometrics, and Industrial Organization

Doctoral Studies:
KU Leuven, Belgium
Department of Managerial Economics, Strategy and Innovation (MSI)
PhD, Business Economics (expected 2017)

References:

Professor Dirk Czarnitzki
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Education:
M.Sc. in Economics, University of Mannheim, 2012
Thesis: "Innovation and Industry Shakeouts: A Model of Dynamic Oligopoly" — Advisor: Professor Yuya Takahashi

B.Sc. in Economics, University of Mannheim, 2010
Thesis: "Estimation of Quantile Treatment Effects in the Regression Discontinuity Design" — Advisor: Professor Markus Frölich

Experience

Teaching Experience	Microeconomic Theory (graduate level), Teaching Assistant to Professor Yossi Spiegel	Spring 2016
	Advanced Applied Econometrics (graduate level), Guest lecture on treatment effects and IV estimation	Spring 2015 & 2016
	Introduction to Econometrics for Practitioners, ZEW Expert Seminar	Spring 2015 & 2016
	Macroeconomics A (undergraduate level), Teaching Assistant to Professor Tom Krebs	Spring 2011 & 2012
	Introductory Econometrics (undergraduate level), Two-day Exam Preparation Course	Spring 2010, 2011 & 2012
	Mathematics for Economists (undergraduate level), Two-day Exam Preparation Course	Fall 2010 & 2011
Relevant Positions	Working Student, BASF SE, Strategic Planning and Economic Intelligence Division	2011-2012
	Research Assistant, Prof. Enno Mammen, Chair of Statistics and Econometrics	2010
	Research Assistant, Prof. Ernst-Ludwig von Thadden, Chair of Microeconomic Theory	2008-2009

Professional Activities

Conference Presentations (Selection)	76th Annual Meeting of the Academy of Management Anaheim, United States, California	2016
	72nd Annual Congress of the International Institute of Public Finance, Lake Tahoe, United States, Nevada	2016
	Innovation Growth Lab Global Conference, London, UK	2016
	6th Asia-Pacific Innovation Conference, School of Management, Zheijang University, Hangzhou, China	2015
	European Association for Research in Industrial Economics, 42nd Annual Conference, Munich, Germany	2015
	13th Annual International Industrial Organization Conference, Boston, United States	2015
	European Association for Research in Industrial Economics, 41st Annual Conference, Milan, Italy	2014
	5th Lindau Meeting on Economic Sciences Master class by Professor Roger Myerson "Game theory and mathematical economics"	2014
Invited Talks	Maastricht University (SBE), Department of Organization and Strategy, Internal Seminar	2016
	Maastricht University (SBE), Technology, Innovation and Industrial Dynamics Seminar Series	2015
	Ghent University, Department Seminar, Innovation, Entrepreneurship and Service Management	2015
Conference Organizations	6th ZEW/MaCCI Conference on the Economics of Innovation and Patenting	2015

	ZEW Doctoral Workshop, Innovation, Entrepreneurship, and Economics of Science	2014 & 2016
Contract Research	"Investigating the Impact of the Innovation Union", European Commission, DG Research, Brussels	Mar 2015 - Jun 2017
	"Evaluation of the German Contribution to Eurostars 1" (Project Lead), Bundesministerium für Bildung und Forschung, Bonn	Nov 2015 - Jun 2016
	"Evaluation of the BMWi Funding Program 'INVEST – Grant for Venture Capital'", Bundesministerium für Wirtschaft und Energie, Berlin	Nov 2015 - Apr 2016
	"Welfare, Wealth and Work for Europe" European Commission, DG Research, Brussels	Nov 2012 - Mar 2016
	"Mannheim Innovation Panel", Bundesministerium für Bildung und Forschung, Berlin	Since 2012
Visitis, Summer Schools, etc	Leonard N. Stern School of Business, NYU Visiting Stay, by invitation of Prof. Luís Cabral	Fall 2016
	Sino-German Workshop on Innovation and High-tech Entrepreneurship, Zheijang University, Hangzhou, China	2015
	17th ZEW Summer Workshop for Young Economists, Mannheim, Germany	2015
	Competition and Innovation Summer School, Turunç, Turkey	2013 & 2014
	University of Lausanne, Switzerland Visiting Studies	2009
Fellowships, And Honors	5thLindau Meeting on Economic Sciences, Fellow of Leibniz-Gemeinschaft	2014
Reviewing	Academy of Management	

Research

Job market paper:

[1] "Estimating the Local Average Treatment Effect of R&D Subsidies in a Pan-European Program" (with Dirk Czarnitzki, *under review*)

We investigate the effect of Europe's largest multilateral subsidy program for R&D-performing, small and medium-sized enterprise. The program was organized under a specific budget allocation rule, referred to as Virtual Common Pot (VCP), which is designed to avoid cross-subsidization between participating countries. This rule creates exogenous variation in treatment status and allows us to identify the local average treatment effect of public R&D grants on firm growth. In addition, we compare the program's effect under the VCP rule with the standard situation of a Real Common Pot (RCP), where program authorities allocate a single budget according to uniform project evaluation criteria. Our estimates suggest no average effect of grants on firm growth but treatment effects are heterogeneous and increase with project quality. A Real Common Pot would have reduced the cost of policy-induced job creation by 27%. We discuss the implications of our findings for the coordination of national policy programs within the European Research Area.

Featured in:

Hünermund and Licht, 2016: "Joint programming in European science and technology policy". Voxeu.org. 8 July.

Hünermund and Licht, 2016: "Mehr Integration in der europischen Forschungspolitik notwendig". ZEW-Aktuell. 19 July.

Hünermund and Licht, 2016: "Die gemeinsame Programmierung in der europäischen Innovations- und Technologiepolitik". Oekonomenstimme.org. 9 August.

OTHER PAPERS:

[2] "Entry and Shakeout in Dynamic Oligopoly" (with Philipp Schmidt-Dengler and Yuya Takahashi)

[3]"Staging real option investments in innovation: A behavioral perspective on portfolio composition" (with Petra Andries)

Featured in:

Hünermund, 2014: "Managing Innovation: Step-by-step approach rarely yields better performance". Lindau Nobel Laureates Meeting Blog. September 12. (based on an earlier version of the paper)

Version: October 26, 2016

Research Proposal

I will begin this research proposal with a short description of my dissertation as it provides the basis for the research projects I plan to work on during the next years. My job market paper studies the effect of R&D grants on the performance and growth of small and medium sized firm. The topic of R&D policy excites me for various reasons. First, it is clearly of high relevance to society. Second, I saw the practical impact of my research when I had the chance to consult the European Commission and the German Federal Ministry of Education and Research on the topic. And third, I think that decades of academic research in this area have failed to produce conclusive results.

These three aspects are crucial for understanding the contribution of my job market paper. Although it revisits an old question, the paper proposes a new methodology to identify causal effects in a setting where positive selection effects are almost inevitable. In that sense, our research fully embraces the "causality movement" of recent years and tries to provide answers to questions of enormous societal importance. Furthermore, our data comes from the newly emerging *Joint Programming Initiatives* which aim to combine individual national R&D policies of European countries and thereby create synergy effects at the supranational level. Since this makes our paper highly topical it was also featured on the policy portal of the CEPR, voxeu.org[1], and its German derivative, oekonomenstimme.org[2]. Currently, the paper is under review at the *European Economic Review*.

The second study of my dissertation, which originated from my Master thesis at the University of Mannheim, develops a dynamic oligopoly model of industry shakeouts with an application to the U.S. postwar penicillin industry. Firms in our model have an incentive to preempt their rivals' entry because of anticipated productivity gains over the course of the industry lifecycle. Over time, however, strategic incentives change and the game develops into a war of attrition after which the losers exit in large numbers. The paper uses recent advances in dynamic game theory (Ericson and Pakes, 1995; Doraszelski and Satterthwaite, 2010) and offers a fresh perspective on shakeouts emphasizing the effects of strategic interaction in contrast to coordination failures or information cascades, which prior literature have put forward.

A third paper studies the staging of R&D projects, i.e., investing sequentially in projects in order to manage their inherent uncertainty. The theoretical foundation of investment staging can be found in the real options framework—a very influential theoretical concept from financial economics (Dixit and Pindyck, 1994). However, we know from prior literature that firms, although they generally embrace the usefulness of the concept, have difficulties implementing it in a way a completely rational investor would (Cooper, 2008). The paper explores the potential for biased decision making in real options by incorporating ideas from the behavioral theory of the firm, and tests the developed hypotheses empirically.

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[1] Link: http://voxeu.org/article/joint-programming-european-science-and-technology-policy

[2] Link: http://www.oekonomenstimme.org/artikel/2016/08/die-gemeinsame-programmierung-in-der-europaeischen-innovations--und-technologiepolitik/

We submitted the paper to *Strategic Management Journal* where our research agenda was perceived favorably. However, the editor felt that combining real options theory and the behavioral theory of the firm, which have very different conceptual roots, requires a stronger focus on theory building than the paper offered at the time. This led to an initial rejection, but with the possibility to resubmit a revised version to SMJ. We are very eager to seize this opportunity and are currently working on a new iteration of the paper.

My dissertation investigates a broad variety of topics. The overarching theme of my research is my strong interest in innovation and productivity growth. This field is highly multidisciplinary in its nature, with important works from economics, finance, management, and sociology. As an economist, I am particularly interested in the role for public policy to foster innovation and to confront possible market failures. At the same time, as firms are one of the main drivers of technological change in the economy, I believe it is crucial to understand their R&D strategies and investment decisions in order to design effective policies. My research agenda reflects this dual approach.

In line with my interest in innovation and productivity growth, I am currently working on a number of new projects. A first project builds contextually on my job market paper. R&D projects that were funded in the *Eurostars* subsidy program often entailed collaborations between SMEs and universities or research institutes. The academic literature emphasizes the benefits of industry-science collaborations for firms (Veugelers and Cassiman, 2005). However, to date very little is known how they affect the research output of scientists. On the one hand, industry collaborations could simply substitute other research efforts or shift a scientist's career towards more applied research. On the other hand, there could be substantial complementarities between basic and applied research which drive research output. Because of these conflicting forces the question asks for an empirical investigation. The data used in my job market paper contains contact information of participating scientists. It is therefore possible to link collaborative grants to publication data. In addition, the identification strategy we developed previously will allow estimating causal effects of a grant receipt.

A second project looks at the innovation activities of family-owned firms. The socio-emotional wealth model (Gómez-Mejía et al., 2007) posits that they invest less in R&D than a profit-maximizing firm because owners' have an objective to preserve tight control over their business and shy away from involving external investors. As a consequence, this tightens resource-constraints and increases risk aversion. By contrast, the possibility to pass a family firm on to the next generation should facilitate the long-term orientation of managers and thereby be favorable for innovation activities (Chrisman and Patel, 2012). With the help of data stemming from the Community Innovation Survey—which I am familiar with from my work on real options—my coauthors and me show that these *transgenerational intentions* indeed moderate the relationship between family control and innovation spending. However, with the help of arguments stemming from the behavioral theory of the firm we derive hypotheses that such a moderating effect will depend crucially on a firm's financial position and performance aspirations. Again, we find empirical support for these conjectures. Our results have important implications for academics and policy makers who want to understand the large heterogeneity within family firms with respect to R&D investments.

In a third project, which is still in an early stage, I study the design of direct R&D support schemes for firms with regard to the goal of maximizing policy impact. In my job market paper I found out that treatment effects are heterogeneous even within the same subsidy program—a result which confirms a conjecture put forward by Einiö (2014)—and vary depending on project quality. This poses a particular challenge for policy makers who a concerned with the additionality of their initiatives. I plan to extend the empirical results of my job market paper by showing that treatment effects are not monotonically increasing with project quality. Instead, they level off for firms with very good projects as financial constraints are alleviated for these types of projects. Consequently, crowding-out (Wallsten, 2000) is most prevalent for low and high quality projects and policies should therefore target projects of medium quality. However, under asymmetric information such a targeted policy scheme appears to be challenging. One possibility might be the use of conditional R&D grants that need to be repaid in case of project success (Atallah, 2014). My goal is to develop a theoretical model of potentially innovating firms that face financial constraints in the fashion of Holmstrom and Tirole (1997) in order to guide policy makers in this question.

Furthermore, I am involved in a project that studies empirically the effectiveness of public procurement as an innovation policy tool. It builds on recent policy debates to make use of public procurement not only to improve government services but also to spur R&D in the private economy by increasing the demand for early-stage technologies (Edquist and Zabala-Iturriagagoitia, 2012). We find a significant impact on the innovativeness of German firms of a European-wide policy reform to allow for innovation being part of procurement's contractual terms. Moreover, the effect shows to be robust in a number of different empirical specifications.

Again, this project is a good example for my combined interest in innovation and empirical research. I feel that many important contributions to the optimal design of R&D policies still lie ahead of us. The topic has recently gained renewed attention by economists who apply modern tools of causal inference and microeconomic theory to provide fresh insights. They recognize that design details matter a lot for the effectiveness of our existing policies such as intellectual property laws, R&D subsidies, tax incentives, demand-side approaches, and science funding. Moreover, there is an emerging consensus that we need more rigorous empirical work to assess the validity of our theoretical arguments. I am confident that my training and background will allow me to be a part of this community and to advance the literature, both theoretically and empirically.

From a Post-Doctoral Fellowship at the NBER I expect to get further insights into various innovation policy initiatives in the United States and access to unique data sources for pursuing my empirical research agenda. Shifting my focus on the U.S. will likely increase my chances to publish in top-ranked economics journals which, in turn, will help me on the job market after my time at the NBER.

References

Atallah, G. (2014). *Conditional R&D subsidies*. Economics of Innovation and New Technology, 23(2), 179-214.

Chrisman, J. J., and P. C. Patel (2012). *Variations in R&D Investments of Family and Nonfamily Firms: Behavioral Agency and Myopic Loss Aversion Perspectives.* Academy of Management Journal 55(4), 976–997.

Cooper, R. G. (2008). Perspective: *The Stage-Gate Idea-to-Launch Process – Update, What's New, and NexGen Systems.* The Journal of Product Innovation Management 25, 213–232.

Dixit, A. K, and R. S. Pindyck (1994). *Investment under Uncertainty*. Princeton University Press, Princeton, NJ.

Doraszelski, U., and M. Satterthwaite (2010). *Computable Markov-perfect industry dynamics*. The RAND Journal of Economics, 41(2), 215–243.

Edquist, C., and J. M. Zabala-Iturriagagoitia (2012). *Public Procurement for Innovation as mission-oriented innovation policy.* Research Policy 41, 1757–1769.

Ericson, R., and A. Pakes (1995). *Markov-Perfect Industry Dynamics: A Frame-work for Empirical Work.* The Review of Economic Studies, 62(1), 53–82.

Einiö, E. (2014). *R&D subsidies and company performance: evidence from geographic variation in government funding based on the ERDF population-density rule*. Review of Economics and Statistics, 96(4), 710–728.

Gómez-Mejía, L. R., Takács-Haynes, K., Núñez-Nickel, M., Jacobson, K. J. L., and J. Moyano-Fuentes (2007). *Socioemotional Wealth and Business Risks in Family-controlled Firms: Evidence from Spanish Olive Oil Mills*. Administrative Science Quarterly 52(1), 106–137.

Homstrom, B., and J. Tirole (1997). *Financial Intermediation, Loanable Funds, and the Real Sector*. The Quarterly Journal of Economics, 112(3), 663–691.

Veugelers, R., and B. Cassiman (2005). *R&D cooperation between firms and universities. Some empirical evidence from Belgian manufacturing*. International Journal of Industrial Organization 23, 355–379.

Wallsten, S. J. (2000). *The Effects of Government-Industry R&D Programs on Private R&D: The Case of the Small Business Innovation Research Program.* The RAND Journal of Economics, 31(1), 82–100.

Aalto University

28.9.2016

TO WHOM IT MAY CONCERN

It is a pleasure to write a letter to Paul Hünermund whom I know since he started his PhD at our department at KU Leuven. Paul immediately stood out as a particularly highly motivated, highly talented, intellectually curious and deeply analytical PhD student. Paul came to Leuven from Mannheim where he had obtained a master's degree in economics, and had started working together with Yuya Takahashi and Philipp Schmidt-Dengler on a structural model of industry shakeouts.

At Leuven, Paul showed a large appetite for questions related to economics of innovation, and made the best use of our department's multidisciplinary environment. Paul is an independent thinker, and took quickly the view that innovation as a topic requires a multidisciplinary approach where the question dictates the methods, rather than the other way around. It also quickly became obvious that he could acquire whatever research tools he needs.

His PhD thesis demonstrates his breadth and depth as a researcher. The first paper uses a structural dynamic oligopoly model which is calibrated to data and is a solid piece of craftmanship. The third is a more management-oriented paper.

His job market paper is something in-between these two. Paul and his coauthor Dirk Czarnitzki study an EU-wide R&D subsidy program called Eurostars. They pay homage to the original definition of econometrics which emphasized the combination of economic theory, statistical methods, and numeric and "institutional" data. They very cleverly exploit the institutional structure to obtain credible identifying variation that allows them to obtain estimates of the causal effect of R&D subsidies. The institutional structure has to do with the way this international scheme works: applications were ranked, and had to have members (firms) from several countries. Each country allocates a budget to Eurostars, and a project would only get funding if there

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was sufficient funding left in the home countries of all the member firms in the application. This institutional feature creates exogenous variation whereby a project may fail to get funding despite being relatively highly ranked because one of the countries in question has run out of budget. In my view, Paul and Dirk showed creativity in spotting this source of variation, and in making good use of it. They find that the treatment effect (on employment) is highly heterogenous.

I have had the chance to watch from close by the development of this paper, and have discussed it at several points with both Paul and Dirk. My conversations with Dirk have convinced me that Paul has played a major role in all aspects of writing the paper, and it therefore offers good information on his qualities as a researcher.

I have no doubt that Paul has a promising future as an academic who studies the economics of innovation using a variety of approaches and methods, paying great attention to institutional detail, and using data in the most appropriate way. As if that was not enough, Paul is a joy to have around, and I am sure he would be a first rate colleague in any department, generating those positive spillovers that also characterize his research object, innovation.

Were you to have any further questions, I would be very happy to assist.

Otto Toivanen

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professor

economics department, Aalto University School of Business

department of managerial economics, strategy and innovation, KU Leuven.

Prof. Dr. Dirk Czarnitzki
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KATHOLIEKE
UNIVERSITEIT
LEUVEN

Letter of recommendation
Application of Paul Hünermund

Leuven, September 29th 2016

Dear Selection Committee,

I am writing to support the application of Paul Hünermund. I got acquainted to Paul about four years ago when he started his first job as researcher at the Centre for European Economic Research (ZEW) in Mannheim, Germany. I am affiliated with the ZEW and visit Mannheim regularly for research purposes. In addition, I also supervise Ph.D. dissertations of ZEW researchers which requires them to complete the doctoral program of the Faculty of Economics and Business here at KU Leuven. After a very few contacts it became very clear to me that Paul has an absolutely outstanding research potential and that he managed to acquire exceptional research skills by completing his bachelor and master degrees at the University of Mannheim, one of the top three schools for economic studies in Germany with a strong profile in microeconomics and econometrics. I was thus very happy when Paul agreed to enter the KU Leuven Ph.D. program under my supervision.

His doctoral dissertation will doubtlessly represent very original and extremely well-executed work on interesting and underexplored topics in the fields of economics and management. His job market paper deals with a new and unique econometric identification strategy of treatment effects of R&D subsidies to firms in Europe. Even though I am a co-author on this paper, Paul is clearly the lead author. I had completed the "Eurostars final evaluation" as independent expert on behalf of the European Commission and Paul assisted me not only conceptually but also on practical terms, such as data preparation and collection (among many other tasks, he designed, implemented and monitored a large online survey among program participants). In the policy report, we applied standard econometric evaluation techniques such as difference-in-difference estimation, propensity score matching and regression discontinuity design to the data. The additional intellectual investment required for preparing an academic paper introducing a novel econometric idea for identifying treatment effect has been exclusively made by Paul. His 2nd paper in the doctoral dissertation, co-authored with Yuya Takahashi and Phillip Schmidt-Dengler, is a highly sophisticated application of industrial economic theories on market shakeouts and is based on a complex dynamic oligopoly model. His third paper co-authored with Petra Andries from the University of Ghent demonstrates Paul's intellectual flexibility as it is situated in the area of innovation strategy. The paper revolves around internal firm decision making with respect to financing innovation projects and builds on real options theory. He has recently obtained a "reject and resubmit" of the Strategic Management Journal for this paper.

In his work, Paul is able to show that he has developed an excellent understanding of the analyzed phenomena of interest, the relevant literature, and the various empirical aspects. He accomplished challenging and work-intensive tasks in combining different data sources to original datasets, and he has addressed the research questions with extremely high methodological rigor. Furthermore, Paul is also aware and transparent with regard to the limitations of his work, which gives additional credibility to his research and to him as a researcher. Besides his ability to generate interesting ideas and his strong

ASSOCIATIE K.U.LEUVEN

empirical research skills, I would like to especially highlight his aptitude to combine various perspectives from Economics *and* Management.

Furthermore, it is also noteworthy that Paul has been involved in several contract research projects at the ZEW Mannheim, i.e. he is used to contract research and writing proposals for research projects and grants. In addition he is eager to diffuse his excellent knowledge of economic theory and methods by teaching undergraduate and graduate students. Among others, he has volunteered to teach a class on local average treatment effects within my Advanced Applied Econometrics course here at KU Leuven and he will teach a course on microeconomic theory applied to online markets.

In addition to his impressive academic skills he is also mobile and willing to further hone his intellectual capabilities which is demonstrated by a current research stay at the New York Stern School of Business where he is hosted by Prof. Luís Cabral.

With regard to his personality, I have experienced Paul as a very friendly, cooperative and curiosity-driven person. I would especially like to emphasize that he is a very creative researcher rich of novel ideas which also makes him an excellent team player and co-author. I am fully convinced that this skill will even further develop in the future and thus, in combination with successful grantsmanship, will allow Paul to build and lead a group of researchers in the future and make important contributions to the field.

In summary, I conclude enthusiastically that I am lucky to have met Paul. In my opinion, he is one of the absolute top students our department had in the Ph.D. program in the last decade. His academic potential even outperforms that of other good students who obtained assistant professorships at other European renowned universities. The combination of Paul's academic skills with his kind personality, make him a particularly interesting candidate for the open position at your school. I am fully convinced that he will bring a high additional value to any department that hires him. Please do not hesitate to contact me if you have further questions.

Yours sincerely,



Prof. Dr. Dirk Czarnitzki
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Mannheim, October 24, 2016

TO WHOM IT MAY CONCERN

Reference Letter for Paul Hünermund

Paul joined the Centre of European Economic Research (ZEW) in November 2012 and works in the department of Industrial Economics and International Management which was recently renamed into "Economics of Innovation and Industrial Dynamics. He is also a fourth your PhD student at the KU Leuven. This recommendation focuses on Paul's contributions to research project and consulting work on behalf of the German Ministry of Research and Education as well as European Commission's DG Research and Innovation.

His first task comprise the development of a flexible simulation model for the fiscal cost of a R&D tax credits which was widely debated during the election campaign 2013. The model was able to quickly provide robust estimates of the costs of this support instrument of the private R&D investments. Then, Paul assisted an expert group which evaluated the joint programming initiative EUROSTARS which support R&D investments of R&D-intensive SMEs in Europe. His tasks comprised conducting an internet-based survey of programme participants and no-participants across Europe and contributing to the econometric analysis of the resulting data. His contribution to project "WWW for Europe" – funded by the European commission as part of the research framework progamme 7 – look at R&D support for SMEs. Based on his excellent performance in the project and his communication skills we decided that Paul should take the lead in project about the impact of the German part of the EUROSTARS programme. Paul developed a proposal which was successful in winning the contract. He quickly gained the trust of the Ministry of Research and Education and should a excellent skills in organising this project. He also demonstrated his excellent skills in communicating complex economic research results. Based on his initiative Paul developed two policy briefs which were uptake by "Ökonomenstimme" as well as vox, CEPR'S policy portal. More recently, Paul contributed to Horizon2020-funded research project "Investigation the Impact of the Innovation Union". Here, Paul's task comprise an economic assessment of various commitments which were made by the European Commission and form the major part of the Commission's Innovation Union initiative. His tasks comprise an the analysis of the economic background on several commitments, providing a short survey of

the recent economic literature related to the topic at hand and to develop a strategy for the assessment of several commitments.

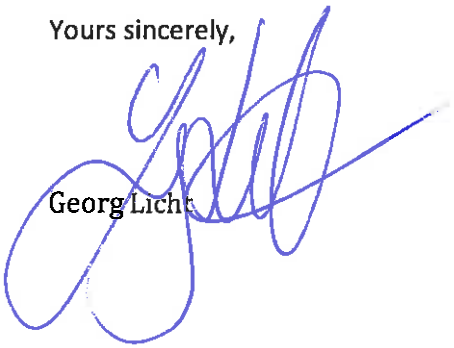
During the last four years I have experienced Paul as an exceptionally gifted and passionate young researcher. He proofed to be an efficient researcher and he has shown that he has the ability to present complex economic research findings to a wide audience comprising policy makers, the scientific community and managers of large international companies. He adjusted very quickly to the new work environment and displayed great abilities in terms of social interaction. This is also shown by the fact that shortly after his arrival he initiated a successful collaborative research project with other young but also with experienced members of my team. Due to his high level of dedication and his efficient way of working, he quickly gained the esteem of partners and clients of research and consulting projects.

I have perceived Paul as an extremely positive, helpful and friendly colleague who functions very well both independently and as a team member. He displayed first-rate abilities to approach and solve scientific questions in innovation policy. My colleagues and I will be keen collaborating with him on topics like design of R&D support programmes, the analysis of innovation strategies as well as evaluation of innovation and entrepreneurship policy. Paul is a man of excellent character, who can be relied upon to perform any task with which he may be entrusted, not only efficiently, but also with unfailing willingness and cheerfulness. He is a team player and developed high skills as project manager.

All in all, I heartily recommend Paul for an Assistant Professor position.

Please feel free to contact me, if you have any further questions.

Yours sincerely,



Georg Licht

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OUR REF. Letter of recommendation Paul Hünermund
YOUR REF.
LEUVEN

4 November 2016

Dear Sir/Madam,

I am writing to recommend Mr. Paul Hündermund, who is applying for a position at your institution. I have known Paul for about three years. Paul is a student in the doctoral program of the Department of Strategy and Innovation (MSI), supervised by Prof. Dirk Czarnitzki and Otto Toivanen. I am affiliated to the Department of Economics, but I attended several of his doctoral seminars at MSI.

In his dissertation, Paul is co-author of three papers. His first paper grew out of his master paper at University of Mannheim and is called “Entry and Shakeout in Dynamic Oligopoly” (with Schmidt-Dengler and Takahashi). This paper calibrates a timing game of entry and exit for the German penicillin industry. It aims to characterize entry by pre-emption motives and shakeout as in a war of attrition. When attending his doctoral seminar on this paper about two years ago, I found the research questions quite interesting. At the same time, we raised several methodological questions on how the paper needed improvement. As I understand it, Paul is still working on the paper, but for the time being seems to have given priority to two other papers. In sum, I believe there is good potential for this paper, but I have too limited information to comment on his recent progress in more detail.

Paul’s second paper is “staged investments in innovation: a behavior perspective on real options and portfolio composition” (co-authored with Petra Andries). This paper is inspired by real option theory and the behavioral theory of the firm to consider a staged investment approach to innovation. The paper argues that both low- and high-performing firms will make use of the option to delay project decisions. But low-performing firms lack the resources to investigate a broad range of research opportunities, and therefore more quickly abandon the least promising projects. The paper considers a short theoretical framework to derive hypothesis, and the estimates regressions to explain the status of several projects: completion, ongoing, abandoned, new projects. Explanatory variables are firm size, age, share of graduates, etc. The paper considers novel research questions, but also requires improvements mainly in the econometric part. The paper is a reject and resubmit at the Strategic Management Journal, but I think he and he co-author have a good chance if they can address the methodological questions.

Paul’s job market paper is with Dirk Czarnitzki and is called “Estimating the Local Average Treatment Effect of R&D Subsidies in a Pan-European Program”. This paper considers a European program to subsidize small and medium-sized enterprises. The program contained a budget allocation rule to avoid cross-subsidization between participating countries, which creates exogenous variation in the treatment

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status. They use this to estimate the causal effects of the subsidy program and find that there is no average effect of the grants on firm growth. However, they also find heterogeneity and higher quality projects tend to have higher effects. They also consider counterfactuals and find that a Common Pot would have been more cost effective. I think this paper obtained an original identification strategy to address interesting questions that are at the center in the innovation literature. There are still some open issues such as the performance measure (levels versus growth), but overall I consider this a very promising paper that can make it to a top management or IO journal.

I only know Paul Hünermund from his doctoral seminar presentations and reading his papers, so I cannot comment on his personality. However, during his seminars he showed strong pedagogic skills, enthusiasm for his research, and openness towards the various questions that were raised.

In sum, Paul Hünermund is a good researcher who addresses interesting questions in the field of innovation economics. He has a very promising job market paper which considers a novel identification strategy to identify the subsidy effects on firm performs and shows his experience in estimating treatment effects models. His two other papers also cover interesting topics and have good potential, but need some more revisions. I would recommend to consider him at good departments of strategy and/or innovation outside the top 20, or for an industrial organization position if you are looking for a profile in innovation economics.

Yours sincerely,

Frank Verboven