Final Data Management Plan

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Project Information Summary

Table 1: Project Information Summary

Project Acronym	FRAME
Project Full Title	Framework for the Analysis of Research and Adoption Activities and their Macroeconomic Effects
Grant Agreement	727073
Call Identifier	H2020 - SC6 – CO-CREATION – 2016 -1
Topic	CO-CREATION-08-2016/2017: Better integration of evidence on the impact of research and innovation in policy making
Funding Scheme	Medium-scaled focused research project
Project Duration	1st April 2017 – 31st March 2019 (24 months)
Project Officer(s)	Hinano SPREAFICO (Research Executive Agency)
	Roberto MARTINO (DG Research and Innovation)
Co-ordinator	Dr. Georg Licht, Zentrum für Europäische Wirtschaftsforschung GmbH
Consortium Partners	Centre for Economic Policy Research
	Lunds Universitet
	Università Luigi Bocconi
	Universitat Pompeu Fabra
	London Business School
Website	http://www.h2020frame.eu/frame/home.html

Deliverable Documentation Sheet

Table 2: Deliverable Documentation Sheet

Number	**D7.4**
Title	
Related WP	WP7
Lead Beneficiary	Centre for European Economic Research (ZEW)
Author(s)	Florence Blandinieres
Contributor(s)	
Reviewer(s)	All partners
Nature	R (Report)
Dissemination level	PU (Public)
Due Date	31.10.2018
Submission Date	31.10.2018
Status	Revised, 27.04.2019

Quality Control Assessment Sheet

Table 3: Quality Control Assessment Sheet

Issue	Date	Comment	Author
V0.1	26.07.2018	First draft	Florence Blandinieres
V0.2	15.09.2018	Second draft	Florence Blandinieres
V1.0	24.10.2018	Final draft	Florence Blandinieres
V2.0	27.05.2019	Public version	Florence Blandinieres

Disclaimer

Acknowledgment

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Executive Summary

The purpose of the FRAME Final Data Management Plan is to provide an overview of the main elements constituting the data management policy in the light of the data sources involved. Since no data collection is involved, giving access to the scripts that led to the computation of the parameters based on existing public datasets allows to replicate the main findings. The full set of scripts covering the modelling and the parameters will be uploaded on the FRAME GitHub depository, cross-linked with the project website[1]. The upload will be done step by step when authors will receive the confirmation of publication from scientific journals. Doing so will ensure the publication and the replication of the FRAME scientific findings. The scripts linked to the extraction of patent data have been already uploaded since the latter does not put in doubt the capacity to publish the related study. The contents of the script linked to Work Package 3 has been uploaded as well considering the limited scientific contributions related to it. Work Packages 1, 2, 4, and 5 will be therefore uploaded in the next upcoming months depending on the journal reviewing process.

[1] `https://www.h2020frame.eu/frame/scientific-materials/scripts.html`

Contents

1 Introduction

The main contribution of D7.4 is to introduce the changes undergone in Work Package 5 which now relies on various data sources to achieve the new objectives described in the Grant amendment: on the one hand, providing new Total Productivity Estimates for European countries, and on the other hand, determining the respective roles of drivers of unemployment in explaining why some European countries recovered faster than others after the Great Recession. To do so, Work Package 5 now involves different empirical estimations. Consequently, two Work Packages are currently using data. The report is organized in two main sections related to Work Packages 5 and 6 respectively. The conclusion summarizes the key implications regarding the replicability of the project findings.

2 Work Package 6: estimations of the R&D and Technologies adoption parameters

The first set of estimations relates to R&D parameters. P1-P3 are estimated based on patent data and OECD data related to Research and Development (R&D) expenditures. P4 and P5 are based on previous work developed by Comin and Mestieri (2014), known as the CHAT dataset. Finally, P6 is estimated by aggregating and merging two sources of data: micro-data coming from ZEW and the confidential dataset summarizing all agreements between firms and the Fraunhofer institutes.

2.1 Data description: micro datasets

2.1.1 Mannheim Innovation Panel (MIP)

The MIP represents an annual survey conducted by ZEW on the behalf of the German Ministry of Research and Education. The MIP provides information about the introduction of new products, services and processes, the expenditures for innovations and how the economic success achieved with new products, new services and improved processes. In addition, the survey gives information about the factors which promote and also hinder innovation activities of enterprises. The innovation survey from ZEW lays an important basis for evaluating Germany's technological performance. It is also the basis for the German Community Innovation Survey (CIS), which constitutes the EU science and technology statistics surveys carried out each two years by EU member states and number of ESS member countries.

2.1.2 PATSTAT

PATSTAT contains bibliographical and legal status patent data from leading industrialised and developing countries. This is extracted from the EPO's databases and is provided as raw data or online. The PATSTAT product line forms a unique basis for conducting sophisticated analyses of bibliographic and legal status data. It has become a standard in the field of patent intelligence and statistics. The PATSTAT product line consists of three individual databases. They are available in raw data format or via PATSTAT Online, a web-based interface to the databases. For the conditions related to different access modalities, see `https://www.epo.org/searching-for-patents/business/patstat.html#tab-2`.

2.2 Data description: macro datasets

2.2.1 GERD dataset - OECD

The OECD data is available online and covers a wide range of OECD and non-OECD countries. Data is available from 1981 onwards. RD data reported in this dataset have been collected according to 2002 guidelines of the Frascati Manual, which have been now superseded by the Manual's 2015 edition. Revised definitions are not expected to revise significantly the major indicators. Data are provided in million national currency (for the euro zone, pre-EMU euro or EUR), million current PPP USD and million constant USD (2010 prices and PPPs). This table contains research and development (R&D) expenditure statistics. Data includes gross domestic R&D expenditures by sector of performance (business enterprise, government, higher education, private non-profit, and total intramural) and by source of funds (business enterprise, government - including public general university funds -, higher education, private non-profit and funds from abroad - including funds from enterprises and other funds from abroad).

2.2.2 CHAT dataset

The Cross-country Historical Adoption of Technology (CHAT) dataset is an unbalanced panel with information on the adoption of over 100 technologies in more than 150 countries since 1800.It contains information on the diffusion of about 104 technologies in 161 countries during the last 200 years. It extends the data used in Comin and Hobijn (2004) and Comin, Hobijn, and Rovito (2006). Almost all of our source data is only available at an annual frequency. For some of the older technologies, like steamships, data go back until the early Nineteenth Century. The last year in the sample is 2003. Some data, especially in the earlier part of the sample, is not available at an annual frequency. The technology measures in CHAT capture a similar intuition. They are either: (i) the number of capital goods specifically related to accomplishing particular tasks, (ii) the amounts of particular tasks that have been accomplished, (iii) the number of users of a particular manner to accomplish a task. For more details about CHAT, see `http://www.nber.org/papers/w15319.pdf`.

2.3 Access to the datasets

2.3.1 Micro-data: replication of results vs confidentiality

The MIP data is composed of micro-data (German firms) and their use for scientific purposes is free of charge. The ZEW places value on the fact that the whole scientific community benefits from the MIP. The data is placed at the disposal of external users in an anonymous form (Scientific Use File / Education Use File) for scientific, non-commercial purposes. At the moment more than 100 scientists use the Scientific Use files, and over a dozen of researchers visit ZEW's Research Data Centre every year. For more information about the Data Centre, please see `https://kooperationen.zew.de/en/zew-fdz/home.html`.
PatStat is widely used in the academic community to extract patent data. Even if the latter is private, most of universities with faculties in Economics and Economics of Innovation acquires licenses for its use. The scripts linked to the patent extraction can be found on the GitHub depository in order to replicate the results for each sector and country over time. The only exception to an opened access to the data concerns the micro-data about the confidential agreements between the Fraunhofer institutes and German firms to license, or to perform R&D. The FRAME project could benefit from a specific allowance to use the data within the FRAME

project only (see Appendix A for more details).

2.3.2 Aggregated data: replication and public sources

Besides the limitations previously mentioned, the other data sources are already publicly available: the GERD dataset is available online [2], CHAT dataset [3]. To ease the replication of the research results across Work Packages, the detailled calibrated estimates will be summarized on the project website. Moreover, the scripts used in extracting patent data are already available on the GitHub depository[4]. Doing so allows people with licences to PatStat to replicate the queries and estimations of P1-P3.

3 Work Package 5

The reference method developed by Basu, Fernald, and Kimball (2006) cannot be easily applied in the European context. The lack of available quaterly data does not allow a direct application of their methodology to the European case. However, the EU-KLEMS database provides an alternative by providing series of annual TFP measures. The main drawback is linked to the assumption behind the estimation: constant returns to scale and do not adjust for changes in factor utilization. Work Package 5 proposes to extend these estimations by relying this assumption and uses EU-KLEMS as a starting point.

3.1 TFP estimation: EU countries vs the USA

3.1.1 Main datasets: description and access

Work Package 5 uses outputs and inputs measures at the industry level (for further details, see O'Mahony and Timmer (2009) and Jäger (2017)). Two main sources of data are used to evaluate the added-value of the developed methodology. First, the EU KLEMS is used for EU countries to provide annual industry-level growth accounting data. Second, the World KLEMS data has been used to assess the relevancy of the methodology to estimate the TFP for the USA. EU-KLEMS is maintained and updated on the official website of the initiative: `http://www.euklems.net/`. Therefore, data is freely available and recently updated. The EU KLEMS updates in the new ISIC Rev. 4 industry classification are provided on a country by country basis. Similarly, the use of capacity utilization is also available on the European Commission website and freely available `https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys/download-business-and-consumer-survey-data_en`. Regarding the USA, the industry measures used to estimate the TFP are coming from another publicly dataset, available online `http://www.worldklems.net/data.htm`. The US capacity utilization data comes from the Federal Reserve Board's monthly reports on Industrial Production and Capacity Utilization (G.17)[5] The data is constructed by the Federal Reserve on the basis of an underlying Census Bureau survey of manufacturing firms, the Census Bureau's Quarterly Survey of Plant Capacity (QSPC).
In order to tackle endogeneity, Work Package 5 relies on different variables to instrument the

[2] `https://stats.oecd.org/Index.aspx?DataSetCode=GERD_FUNDS`
[3] `http://www.nber.org/data/chat`
[4] `https://github.com/H2020FRAME`
[5] The data can be accessed and downloaded at `https://www.federalreserve.gov/releases/G17/Current/default.htm`.

relationship between the capacity utilization and TFP. Therefore, secondary datasets are also involved.

3.1.2 Secondary datasets: description and access

Work Package 5 relies on different sources of shocks to tackle endogeneity: shock in oil prices, monetary policy shocks, and fiscal policy shocks. Oil prices are computed by deflating the Brent Europe price of oil with each country's GDP deflator for European country. The latter relies on two public available data sources: the Brent Europe price (COILBRENTEU) from the World Bank[6] and the OECD GDP data see `https://data.oecd.org/gdp/gross-domestic-product-gdp.htm`. For the USA, oil prices are retrieved from FRED (Federal Reserve Bank of St. Louis) available online at `https://fred.stlouisfed.org/series/WPU114112153`.

The variable linked to uncertainty has been computed based on the number of journal articles per year and country, and known as the Economic Policy Uncertainty (EPU). This data source is already widely used in the economic and finances academic communities[7]. The EPU database is maintained and available by various US universities, its use is also free of charge and available online: `www.policyuncertainty.com`.
The variable based on monetary shocks comes from the ECB policy announcements which are used in Jarocinski and Karadi (2018) but is not yet publicly available. For the moment, the study is under review and the summary of the monetary shocks has been directly communicated to the Work Package 5 team by Jarocinski and Karadi. When the study will be published, it will be possible to replicate the estimations with the specified monetary shocks. For the United States, the WP5 team uses the series of narratively identified monetary policy shocks from the seminal work of Romer and Romer (2004), as updated in Wieland and Yang (2016) and provided at an annual frequency in the latter paper[8].
For fiscal shocks, WP5 mainly relies on a database on fiscal consolidation shocks compiled by Alesina et al.(2015), which identifies changes in taxes and government spending motivated by debt and deficit reduction concerns, and therefore arguably unrelated to productivity shocks. Their database, which builds on earlier efforts by Pescatori et al. (2011), is available at the annual level for all countries in our sample between 1978 and 2014[9]. For the United States, a measure of exogeneous tax changes developed by Romer and Romer (2010)[10] is used and available at the quarterly level for the period 1945-2007.

3.2 Drivers of unemployment

The aim is to evaluate how much discount factors can explain of the actual dynamics of unemployment by comparing the unemployment rate predicted by the model to the actual data for each of the four countries we consider. To evaluate the extent to which variation in discounts can explain unemployment variability across EU countries, WP5 relies on realized country specific returns on stock market data. Data is provided by WRDS.The estimations are also compared

[6] available online at `http://www.worldbank.org/en/research/commodity-markets`

[7] `http://www.policyuncertainty.com/research.html`

[8] The shock has been described in their publication, see `https://www.nber.org/papers/w22141`

[9] The data is also available in a non-published version of the paper, see `https://scholar.harvard.edu/files/alesina/files/output_effect_fiscal_consolidations_oct_2014.pdf`

[10] Also available on the Berkeley's paper depository, see `https://eml.berkeley.edu/~dromer/papers/RomerandRomerAERJune2010.pdf`

with the Leading Economic Indicators from OECD, as these measures have been shown to predict stock maret returns (see Zhu and Zhu, 2014 on Financial Research Letters)[11]. Before doing that, WP5 explores the qualitative predictions of the model by discussing the Impulse-Response Functions (IRFs) which involves different datasets due to the calibration exercises.

3.2.1 Data description

SDF are estimated with data collected onstock market returns as a measure of risky return in each country. WRDS offers measures of national stock market returns and are computed (by WRDS) as weighted averages of price variations of each stock in each stock exchange. The discussion of the IRF involves different data sources to calibrate the model. First, to benchmark the model, the project team of WP5 tries to mimic the results of Hall (2017) by using US data. The latter is about the stock market prices and dividends. The data has been collected by Professor Robert Shiller. Secondly, the authors discuss the results in the light of previous contributions for EU countries, namely Elsby et al.(2013). The WP5 project team does not follow the same methodology as Elsby et al. (2013) but computes the productivity shocks by dividing the GDP of various countries by the total number of workers in these countries.
D5.1 and D5.2 use the calibration existing in the literature but is rather US-biased. In order to provide relevant estimates for the EU countries, the authors have calibrated the model with OECD data to characterize the labour market dynamics with the: NRR (net replacement rates, for the new calibration), DUR_D (unemployed persons by duration, to calibrate job-finding and separation rates) and MEI (for quarterly measures of unemployment).

3.2.2 Access to the datasets

The market returns are estimated based on the computation of a private database provider, Wharton Research Data Services (WRDS). WRDS offers a dataset called "World Indices by WRDS". WRDS computes of stock market returns at the country level, so what WRDS does her is to aggregate the stock market returns of listed companies from the security issue level for a given country. The access to the data requires a license and can be accessed online: `https://wrds-www.wharton.upenn.edu/pages/support/manuals-and-overviews/wrds-world-index/`. The Euro OverNight Index Average (EONIA) as a measure of the net risk-free return. The data is provided by the Statistical Data Warehouse of the European Central Bank. All series are expressed in percent per annum and available at monthly frequency. The data collected by Robert Shiller is available publicly at `http://www.econ.yale.edu/shiller/data/ie_data.xls`. Such dataset has monthly observations about prices Pt and dividends dt, which have been provided by Standard and Poor's. Finally, the productivity shocks are also based on another public source of data, see `http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en` and `http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=namq_10_pe&lang=en`. Finally, the calibration of the labour market parameters is also by definition available for replication and for different countries to fit the researchers' needs for replicability purposes as well. For more information about the data, please see `https://stats.oecd.org/Index.aspx?DataSetCode=NRR`.

[11] The data involved is available at `https://stats.oecd.org/Index.aspx?DataSetCode=MEI_CLI`

4 Conclusion

Broadly speaking, the FRAME project will ease the access to the data and scripts for replication within the scientific community. Most of the sources of data is publicly available, either by being in opened access already, or by belonging to national statistical offices. Consequently, the use, archiving and, preservation of these datasets follow the rules of the respective institutions. However, due to confidential agreement and copyrights, two micro sources of information will not be available (i.e. PatStat and Fraunhofer Institutes licensing agreements). The confidentiality linked to the data does not impact the replication of the macro-findings across Work Packages because the aggregated estimations to define the calibration of the model will be provided. Only the micro-estimations from Work Package 6 will not be possible to replicate.

The archiving policy of the data and scripts involved in the FRAME project will follow the ZEW Data Protection Policy. Consequently, the latter will be available for replication and scientific purposes for the next 10 years at the ZEW data center[12]. The upload of the different scripts linked to each type of modelling will be achieved after receiving the acceptance of scientific journals of the related studies. Doing so will ensure the publication of the FRAME results and their replication. The access to the different datasets involved within the project is centralized on the website[13] to cover the largest spectrum of users. The project website links to the official sources of the data but the datasets are not associated to official PID. It is therefore likely that the url used to cross-link the datasources might be affected.

The Data Management Plan has been designed to be the most user friendly as possible by providing access to most of the data involved in the modelling approaches but also in calibrating the models. The depository will be updated over the submission process of the different deliverables. The deliverables will be available on the project website after receiving the acceptance of the deliverables by the European Commission. The scripts linked to the different models will be made available for download when the project members will receive the acceptance of their related articles into scientific journals. The scripts linked to the modelling approaches are based on the Dynare software, which is available for free.

[12] https://www.zew.de/en/forschung/zew-forschungsdatenzentrum-zew-fdz/
[13] http://www.h2020frame.eu/frame/scientific-materials/data.html

A Agreement for the exploitation of the Fraunhofer dataset

Project Agreement

between the companies and institutions shown below

ZEW, Zentrum für Europäische Wirtschaftsforschung GmbH
L7, 68161 Mannheim, Federal Republic of Germany.....

-hereinafter referred to as "ZEW" -

Prof. Diego Comin
Professor of Economics, Dathmouth College, 6106 Rockefeller Hall, Hanover, NH 03755-3514, U.S.A.

-hereinafter referred to as "Prof. Comin" -

CIRCLE, Lund University
P.O.Box 117, 22100 Lund, Sweden

-hereinafter referred to as "CIRCLE" -

and

Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e. V.,
Hansastraße 27c, 80686 München, Germany

as legal entity for its

departments for customer and market information systems (A4) and Fraunhofer Academy (A9),

-hereinafter referred to as "FhG" -

ZEW, Prof. Comin, CIRCLE and FhG together hereinafter referred to as "Partners" -

for the joint implementation of the project

"Fraunhofer Impact Study"

080-P-315466/801161-080 B6-Fis

WHEREAS, all Parties, for their mutual benefit and with the purpose of identifying areas of common interest for joint collaborative activities, e.g. in the form of a joint research project to estimate the impact that collaborating with Fraunhofer has on the performance of German companies (hereafter referred to as the "Fraunhofer Impact Study"), intended to disclose to each other certain business and technical information and data in the following scientific fields:

1 data evaluation, data matching and data analysing
2 setting up a longitudinal database that combines information on the firms with information on the extent and timing of their collaboration with Fraunhofer

WHEREAS, all Parties have, in order to define the nature and content of the collaboration regarding the Fraunhofer Impact Study the Parties hereto wished to exchange technical and/or business information and data of a confidential nature presently in their possession and wished to ensure that the same remain confidential.

WHEREAS, all Parties have already signed a Non Disclosure Agreement (version January 20, 2015) at January 21, 30, 2015.

Now, therefore, in order to define the details of the project "Fraunhofer Impact Study", the Parties agree to the following regulations as set forth below:

1 Subject

Subject matter of this Agreement shall be the Partners' co-operation in carrying out the joint project

"Fraunhofer Impact Study"

The type and scope of the work to be performed by each Partner is defined in detail in the work plan attached as Annex A. Every Partner shall be responsible for the implementation of its assigned tasks at its own costs.

2 Designated Representatives

The designated representatives of each Partner fort he performance of the joint project "Fraunhofer Impact Study" are listed in Annex B.

3 Duration

The joint project started on January 01, 2015, has an expected period of performance of 18 months and ends when FhG has approved a final version of the Fraunhofer Impact Study. Details are specified in the work plan attached as Annex A.

4 Rights and Obligations

4.1 The Partners shall inform each other about the attained research results or the work progress, and shall exchange informations, data and interim and final reports as given in the work plan attached as Annex A.

4.2 For the duration and implementation of the project only, the Partners shall grant each other a non-exclusive, non-transferable, non-sublicensable, royalty free right of use to their information, data and any other industrial property rights of the Partners already existing prior to the signature of this Project Agreement (hereinafter referred to as "BACKGROUND"), whereas this right of use is limited insofar as this right of use is necessary for the Partners to perform their work packages according to Annex A. No further rights of use are granted to the other Partners to the BACKGROUND.

Notwithstanding the foregoing the Partners shall keep the BACKGROUND of the other PARTNERS strictly confidential according to section 5 of this Cooperation Agreement. , Regarding any information and/or data of FhG section 6 shall apply in addition.

4.3 The Partners agree the result of the joint project "Fraunhofer Impact Study", including but not limited to the final study, (hereinafter referred to as the "RESULTS") shall vest in FhG. ZEW, Prof. Comin, CIRCLE shall transfer right and title to the RESULTS, insofar as legally possible, to FHG and shall keep the RESULTS strictly confidential unless FhG agrees in writing prior to any intended disclosure of any of the other Partners.

The other Partners shall grant to FhG an exclusive, unrestricted in time, place and content, right to use the RESULTS in any form or matter; this right includes the right to copy, distribute, adapt, or modify the RESULTS. If the RESULTS are protected by copyright, FhG is especially entitled to develop and modify the RESULTS in any way and to offer, publish, copy, exhibit, or distribute – also via networks or satellite transmission – the results in their initial or modified form. FhG is entitled to transfer its rights of use and to grant exclusive or non-exclusive licenses – including sublicenses – to third parties to the RESULTS.

5 Confidentiality

The Partners shall keep in confidence for the confidential information of the other Partners according to the Non Disclosure Agreement (version January 20, 2015) at January 21, 30, 2015 which term shall be extended until the end of this project according to section 3 and which is attached as Annex C.

6 Data of FhG

6.1 The data of FhG may be used by the other Partners only for the purpose of the joint project "Fraunhofer Impact Study". These data may not be processed or used for any other purpose; in particular commercial or any other business purposes for private or public clients is not permitted.

6.2 The Recipient of data of FhG is obliged to delete the data and any backup copies, selected files and auxiliary files at the latest at the end of the project agreement and a representative of the Recipient of data of FhG shall confirm promptly in writing that the data have been deleted.

6.3 In the event that the provided data of FhG not used in accordance with this Project Agreement the data Recipient shall be liable for any damage incurred to FhG.

7 Liability

7.1 The Partners shall not be liable for the correctness of the research results exchanged or the information communicated during the project. Likewise, the Partners do not warrant that the rights of use granted by them can be executed without infringement of any third party's rights. Such limitation of liability shall not apply in cases of intent.

7.2 Unless otherwise stipulated in this Agreement, the Partners shall, including liability for their senior executives, legal representatives and vicarious agents, not be liable for breach of duty or tort except in case of intent. The foregoing limitation of liability shall not apply in cases of violation of any of the obligations stated in section 6.

8 Publications, Advertising

8.1 Solely FhG shall be entitled to publish the RESULTS according to the sole discretion of FhG, whereas FhG shall name the author or the other Partners in cases of publications of the final version of the Fraunhofer Impact Study.

8.2 ZEW, Prof. Comin or CIRCLE shall ensure that any results of the research that they intend to publish or disseminate otherwise (further publication) do not contain information which may permit the identification of Fraunhofer individual records (such as customer etc.) of the data. To avoid any disclosure of confidential data (customers etc.), Fraunhofer reserves the right to check all preliminary, mid-term and final results (such as estimations, publication iterations etc.) that might be components in planned publications. If ZEW, Prof. Comin or CIRCLE are interested to publish the RESULTS or any parts thereof they are therefore only allowed to do so after the prior written consent of FhG, which shall not be unreasonably withheld.

8.3 The Partners may only mention the name of any other Partner for purposes of advertising with the prior express consent of such Partner.

9 Subcontracts

The Partners may conclude subcontracts only with the prior written consent of the other Partners. If - in case of such consent - a Partner assigns some of his tasks under this Project Agreement to a subcontractor this does not affect its own obligations resulting from this Project Agreement. The respective Partner shall secure that the subcontractor will comply with all obligations – especially with regard to confidentiality – resulting from this Agreement and that the RESULTS attained by the subcontractor will be made available to FHG according to Section 4.

10 Termination

Each Partner may terminate its participation in the project for good cause only. There is no right of termination for convenience.

11 Miscellaneous

11.1 Ancillary agreements, amendments, additions hereto shall be made in writing. This applies also if the requirement of the written form shall be waived.

11.2 This Agreement shall be governed by the laws of the Federal Republic of Germany. Any dispute or claims arising out of or in connection with this Agreement shall be subject to the jurisdiction of the District Court of Munich.

11.3 If any provision of this Agreement is determined to be illegal or in conflict with the applicable law, the validity of the remaining provisions shall not be affected. The ineffective provision shall be replaced by an effective provision which is economically equivalent. The same shall apply in case of a gap.

11.4 This Agreement will come into force upon the signature of all Partners with retroactive effect on January 01, 2015.

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Mannheim, June, 1st, 2015

ZEW, Zentrum für Europäische Wirtschaftsforschung GmbH

Thomas Kohl
(Director)

Dr. Christian Rammer
(Deputy)

26-P-315466-15/B6-Fis

Hanover,

Prof. Diego Comin

signature

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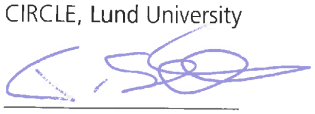
Lund,

CIRCLE, Lund University



signature

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Munich, 08.06.2015

Fraunhofer-Gesellschaft zur Förderung
der angewandten Forschung e. V.

Dr. Birgit Gebler

Thomas Fischer

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