



Putting **OPEN SCIENCE** into practice in economics

*The best strategies and investments for more transparency
and visibility in economic research*

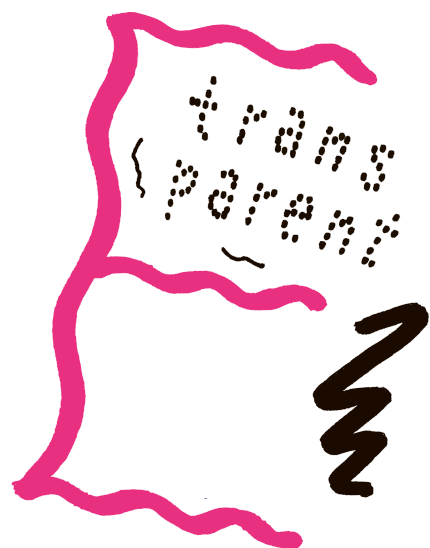
PART 1: Tips for everyday research life



PRACTICAL TIPS

You're familiar with the concept of Open Science and often hear that openness and transparency can have considerable visibility and citation effects for your research?

Learn here in brief practical guides how you can apply Open Science in your daily scholarly work.



Using freely accessible *resources*

You have started working on your master or PhD thesis. You need access to publications, articles and data in your field that already exist. This is where your orientation run starts...



Access and reuse

The Open Science movement aims to facilitate access to scholarly content and to promote its reuse. We often speak of:

- **Open Access resources:** Thanks to their authors and/or their editors these resources can be accessed freely. You don't need an institution, such as a university or a research institute, that enables access.
- **Free resources:** These are not only freely accessible; they also often allow reuse depending on the licence. Creative Commons licences allow the reuse (e.g. of graphics, slides etc.) as long as you comply with the conditions stipulated by the authors.

Read more about it at → creativecommons.org

Worth knowing: The fact that a resource is freely accessible does not guarantee its quality or lack of it. Like all document resources, it must be assessed critically before it is utilised.

Where can you search for resources?

Open Access journal platforms:

Open Access journals can have different business and editing models. Among the few Open Access journals in economics listed in rankings are:

- **Theoretical Economics:** Established in 2006 by the Econometric Society, a US scholarly association, and one of the first Open Access journals to be included in the SSCI.
→ econtheory.org
- **Quantitative Economics:** The other Open Access journal of the Econometric Society has been published since 2010. In contrast to its sister journal "Theoretical Economics" it has an application-oriented focus. → qeconomics.org
- **SERIEs:** SERIEs is the journal of the Spanish Economic Association. It was created in 2010 by merging two renowned Spanish journals, "Spanish Economic Review" and "Investigaciones Económicas". SERIEs is published as an Open Access journal by Springer in the SpringerOpen context.
→ springer.com/journal/13209
- **Monthly Labor Review:** The Monthly Labor Review was published first in 1915 and is edited by the U.S. Bureau of Labor Statistics. The range of topics covers all aspects of the labour market. → bls.gov/opub/mlr/

In Germany, the IZA Institute of Labor Economics – which has been publishing an internationally renowned working paper series for many years – offers three Open Access journals which are peer reviewed. These are:

- IZA Journal of Labor Economics
- IZA Journal of Labor Policy
- IZA Journal of Development and Migration

Open Access repositories

Open archives hold many scientifically relevant resources. These open archives can be organised by disciplines, institutions or nation states. If you have not been given specific guidelines, you can ask your institution's library or the **ZBW – Leibniz Information Centre for Economics (zbw.eu)** for advice on choosing the most suitable repository. → zbw.eu

- **EconStor:** The publication server of the ZBW – Leibniz Information Centre for Economics holds more than 200,000 full-texts in Open Access, mostly from German economic researchers. These are mainly working papers, but also include conference contributions and journal articles. A part of the EconStor publications is available through RePEc and can also be found in Google Scholar and EconBiz. → econstor.eu
- **RePEc:** Although RePEc (Research Papers in Economics) is not a repository in the original sense (it does not store full-texts, but merely offers a decentralised union catalogue with links to full-texts), it must be listed here because for many researchers it is the most widely known source for full-texts in economics. Nearly half of all publications linked there (mostly journal articles and working papers) are freely available. RePEc is operated decentrally by a team of economists on a non-commercial basis. → repec.org
- **SSRN:** The Social Science Research Network is the largest repository in economics. As the name indicates, it is an interdisciplinary offer which covers all social sciences (including some humanities). Here you can access around 500,000 full-texts in Open Access, a large part of which are from economics. SSRN is owned by the academic publisher Elsevier. → ssrn.com
- **AgEconSearch:** It is a disciplinary repository operated by the University of Minnesota and funded mainly by the “Agricultural and Applied Economics Association”. It holds around 150,000 freely accessible full-texts, mostly from agricultural and applied economics. All publications on AgEconSearch are also indexed in RePEc. → ageconsearch.umn.edu
- **MPRA:** The Munich Personal RePEc Archive (MPRA) is hosted by LMU Munich University and contains 50,000 economics publications from all over the world. Most of them are not provided by institutions or publishers, but by individual researchers through self-upload. An editing team releases them, and they are indexed in RePEc. → mpra.ub.uni-muenchen.de

Databases for theses or scholarly papers:

Such databases aggregate the digital theses collections of universities and research centres. Visit → dart-europe.org or → [Open Access Thesis and Dissertation \(OATD.org\)](http://OpenAccessThesisandDissertation.org).

Specialised search engines:

Search engines customised for Open Access aggregate Open Access contents to make them more findable.

→ core.ac.uk is a specialised search engine for openly accessible scholarly publications (books, articles, theses etc.).

→ Unpaywall.org can be installed as a browser add-on and offers freely accessible versions of all articles listed in its database.

→ BASE-search.net (Bielefeld Academic Search Engine) is one of the world's largest search engines for scientific online documents. The index contains more than 240 million documents from nearly 8,000 data providers. Around 60 per cent of the documents indexed in BASE have freely accessible full-texts. BASE is operated by Bielefeld University library.

Planning *data management*



What are research data?

The OECD defines research data as factual records (numerical scores, textual records, images and sounds) used as primary sources for scientific research, that are commonly accepted in the scientific community as necessary to validate research findings.

Why manage research data?

From the start of your research you will collect, produce, and use data. Research data management (RDM) is part of the research process. It covers all activities that deal with collecting, describing, storing, processing, analysing, archiving and accessing data.

How do you manage research data?

Data management must often be anticipated at the start of a project by presenting a data management plan (DMP). This document helps you consider how to organise your data, files, and supporting documents during and after the project. Many research funders, e.g. the German Research Foundation (DFG), the European Commission and the 9th research framework programme “Horizon Europe” require proof of a DMP. The DMP is a continuous document that must be updated during your research project.

Recommendations for managing research data in economics

- Research data management in the social, behavioural and economic sciences – guidelines of the German Data Forum (in German) (PDF) → [zbw.to/FDM_01](https://www.zbw.to/FDM_01)
- Managing Research Data: “Economic Sciences” (PDF) → [zbw.to/FDM_03](https://www.zbw.to/FDM_03)

Research data management helps you react to challenges relating to data, during and after the project. This can also apply to data administration which is often designed more consistently and sensibly after prior conception. Responsibilities, access rights and clear planning make it easier for you and the research team to administer the data and make them accessible and reusable for others, if necessary. At the end of the project it facilitates the archiving and transfer of datasets.

What should a data management plan include?

Collection and documentation: Here you need to describe the type, format and scope of data that you will collect. The format of the created data usually depends on the software you use. It will affect the options for joint usage and long-term archiving. The initial descriptions in a data management plan will not only help you create a documentation, but also the metadata. This documentation is useful for understanding your data, and you will enrich it during the productive phase.

Storing and archiving: How will you save and archive the data while you carry out your research? Where will they be archived when the project will have ended? Who will be responsible for data recovery if something happens? The earlier you consider this, the better.

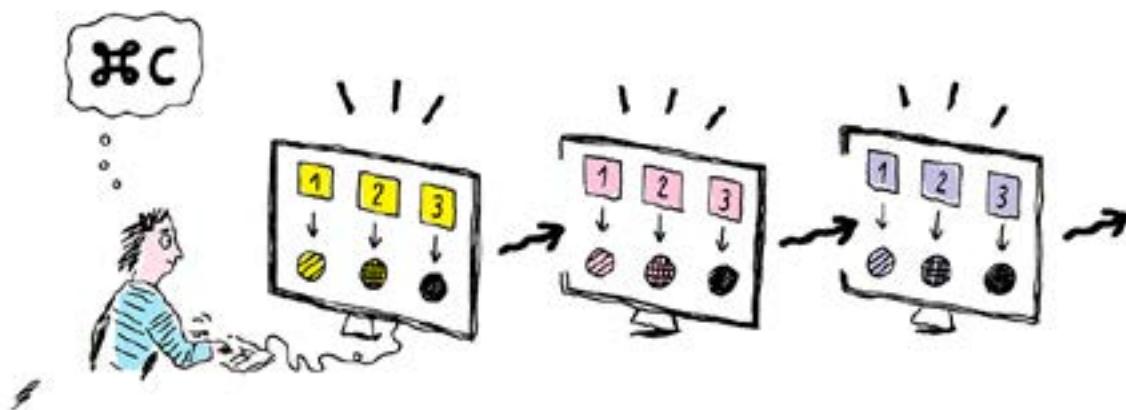
Legal and security-related questions: What are the protective regulations applicable to your data? Which methods must you apply to guarantee the safety of personal or other sensitive data? Which regulations must you comply with if you want to obtain personal data beyond the immediate intended use? You should take care to familiarise yourself with the European General Data Protection Regulation (GDPR).

For the joint usage of data and long-term archiving, please consider the following:

- who may possibly want to use your data;
- what criteria may apply to the selection of data to be transferred;
- how long the data should be archived;
- in which data repository you could deposit the data;
- how you can identify your data (persistent identifier/DOI).

Responsibilities and resources: Specify the roles and responsibilities of people who work on the project, especially in the case of alliance projects where many researchers, institutions, and groups with different working methods collaborate.

Working reproducibly: *for yourself, for others*



What are we talking about?

Research is considered reproducible if using the same data, the same methodology, and possibly the same environment leads to findings that are identical to the original findings. Providing data, software code, algorithms or experimental setups is an important prerequisite for this.

How reproducibility is established varies, depending on discipline and methodology. Basically, it means that an experiment is conducted identically; that the results of a statistical analysis of quantitative data are reproduced; that the analysis and the results from evaluating image and text corpora are reconstructed etc.

The benefits of a reproducible approach

Good documentation enables you to **understand, even after some time has passed, exactly what you did in your computations and why you did it**. This is helpful (e.g. after an article has been reviewed) or if you cannot work continuously on a project. You monitor and log how your data and/or code evolve from the beginning of the project and with every change. It is much more difficult and unreliable if you have to reconstruct these evolutions a posteriori.

It is easier to explain and justify the results you obtain to fellow scientists. If you submit an article for publication you will find it easier to respond to questions from your reviewers.

Future papers are made more reliable. You're giving yourself a chance to reuse data, code, documents etc. in the future.

How to apply this approach in practice

Document the work and analysis stages of your research.

If you use statistical software to analyse your data, comment in detail what you are doing in the individual analytical stages and why you are doing it. This may be absolutely clear while you are doing it, but two months later it can be less so, even if you are the author.

Manage your bibliographic references with a tool such as → [Zotero.org](https://www.zotero.org). Working with a reliable bibliographic standard is a common requirement for all disciplines.

Organise your data, files, and folders: Apply file-naming conventions, build folder trees with a consistent, scalable structure, separate raw data from analysed data, etc.

Learn the basics of version control, even if your research does not require coding skills. The possibility to restore a specific version of a document written over a period of several years can be invaluable.

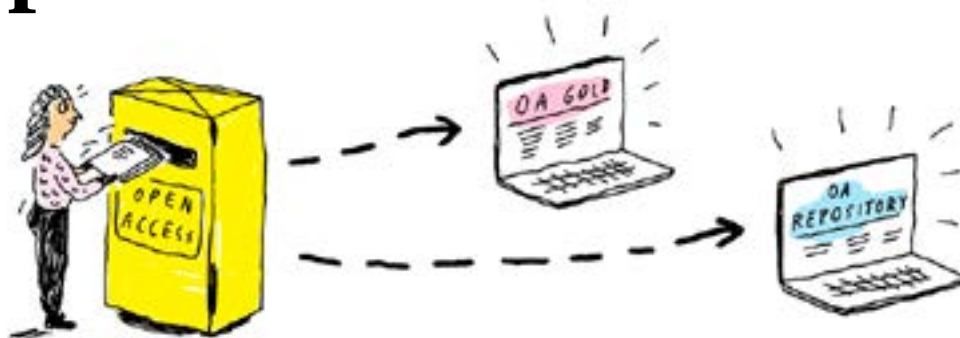
Automate specific recurrent tasks. This can increase the reliability of your findings and facilitate the writing of scholarly papers because you can vary parameters much more easily.

Your resources are limited? **Consider using collaborative approaches!** Train yourself in collaborative working methods; participate in research projects with other colleagues; use public datasets if they exist.

Automate your workflows: Write scripts to process your data and to manage your work stages. Avoid using spreadsheets for the processing of large datasets.

Opt for **Open Source solutions** to ensure more transparency and guaranteed access.

Dissemination of your publications in Open Access



Open Access dissemination means the **instant, free and persistent availability of scholarly publications on the internet**. You have several options to disseminate your paper in Open Access – you can publish in an Open Access journal or deposit your paper in an Open Access repository.

These practices are not mutually exclusive. You can combine them to ensure maximum dissemination for your work and still comply with the regulations of intellectual property.

Publishing in an Open Access journal (so-called Gold OA)

In the traditional business model of scholarly journals, access to articles is restricted to individuals and institutions with a paying subscription. Publishing in a scholarly Open Access journal means that anyone can instantly access your article without cost. There are different funding models to cover the costs of publishing, with two main categories of such models which are in continuous evolution:

- **With costs:** Publishing costs are covered in the form of Article Processing Charges (APCs). These charges will be paid by your university or research institute.
- **Without costs:** Authors do not have to pay fees. The journal costs are financed in advance by the organisation publishing or distributing the publication based on various funding mechanisms (institutional funding, subscription, etc.).

Storing in an open (text) repository

An Open Access repository enables you to disseminate your scholarly work independent of previous publication [*remember to check content from publishing houses first]. Storage in an open repository does not replace the publishing process in a journal, however. But it guarantees persistent storage and wide accessibility which is not necessarily the case with academic social networks such as ResearchGate or Academia.

This is not limited to articles: you can also deposit a PhD thesis, a report or a conference contribution.

Open Access repositories can be organised by disciplines, institutions or nation states. If you have not been given specific guidelines, you can ask your institution's library for advice on

///Warning! /// Hybrid journals

Some publishers try to increase their revenues by maintaining the traditional model of access by subscription and at the same time offering a payable option to publish articles in Open Access. This effectively means that institutions are made to pay twice over – for access to the journal and for publication of an article.

This controversial business model is often used by big commercial publishers. **It is not advisable to pay these additional costs**, especially since you can make your article available through an Open Access repository.

The DEAL contracts and other transformation agreements enable authors to publish Open Access in hybrid journals without additional costs. Ask your institution's Open Access officer about this.

TIP: If you do not know anybody in your institution who is familiar with Open Access, you are welcome to ask for support at the → **ZBW – Leibniz Information Centre for economics ([zbw.eu](https://www.zbw.eu))**.

Fraudulent practices: Beware appearances

The development of digital technologies has given rise to publishers with questionable practices. They will contact you and promise to publish your paper quickly. Such rapid publication is bought with a lack of editing quality and peer review. Such publishers also demand fees for publication. Publishing in such journals can damage your academic reputation and also generates costs. It is sometimes difficult to identify so-called predatory journals, but there are tools available to help you. Similar to fraudulent journals are fraudulent conferences where the organisers only want to make money. Academic reputation plays little or no role here.

→ **ThinkCheckSubmit.org:** This website offers a number of checklists to help you assess the trustworthiness of the journal in which you want to publish your paper.

choosing the most suitable repository. Turn to page 4 for a commented list of Open Access repositories in economics.

You can deposit different versions of an article:

- the preprint or the author version (the version submitted for publication);
- the version submitted by the authors to the journal before the peer review;
- the author accepted manuscript (AAM), i.e. the version which includes the revisions resulting from the peer review process, but not the final publisher's layout;
- the *version of record* (final published version, publisher's PDF), i.e. the article with the publisher's layout as published in the journal. The publisher may have the exclusive rights to dissemination of this version, depending on the conditions set out in the publishing agreement you signed.

Worth knowing: Have you written a paper jointly with other authors and want to deposit this in a repository? Have you collected data jointly with others and now want to assign a licence that allows reuse by others? Always discuss this with your co-authors.

What rights do authors have?

Independently of the dissemination method you choose, publishing in Open Access requires that you comply with the regulations regarding intellectual property.

- As the author you own all rights to your scholarly text until you sign a publishing agreement in which you cede a part of these rights to the publisher.
- In the case of scholarly articles you can disseminate specified versions of your article in Open Access, especially by depositing it in an open repository. This applies to the preprint and the author accepted manuscript. In certain cases a legal right to secondary publication with a twelve month embargo applies.
- For other forms of publications the publishing agreement and/or the publisher's guidelines apply. You can use **SHERPA/RoMEO** to check on the Open Access policies of publishers. → v2.sherpa.ac.uk/romeo/

Evaluating research *differently*

Open Science represents a profound change in science and research. At the core it always includes the public transparency of decisions. This also applies to evaluation practices that until now took place between individual and mostly anonymous reviewers and authors.



Rethinking peer review

Peer review is a central reviewing process in research. The result of such a review is good, well-founded scientific research. Usually, the publishers or the journals organise the process. They submit the manuscript to other researchers in the same field. However, the system has a few weaknesses, in particular because reviewers can be competitors of the author. Sometimes reviewers work on research topics which are not a close match to their own expertise.

And the peer review mechanism cannot protect against scientifically doubtful publications. Since 2000, diverse fraudulent or questionable articles have come to light which were based on data manipulation or plagiarism, but nonetheless passed the peer review process (Grieneisen & Zhang, 2012; Fang, Steen & Casadevall, 2013).

Open Science has **given rise to Open Peer Review practices** with two main modalities: the names of the reviewers are disclosed and/or the review takes place on a platform that allows all users to comment the article. This practice has been facilitated by preprint platforms such as arXiv and bioRxiv, which journals can use to collect comments.

Example

The → [PeerCommunityin.org](https://www.peercommunityin.org/) platform organises the reviewing of scholarly manuscripts deposited in an open archive. After a determinate number of positive reviews the authors receive the results of the peer review process, so-called recommendations that are openly accessible and citable and that have a Digital Object Identifier. This enables journals to publish articles freely without requesting reviewers.

In some disciplines, for instance in economics, the pre-registration of hypotheses and registered reports in registers or journals has changed the peer review practice. Peer review takes place in two stages which reduces the effect of publication bias (the tendency to publish only positive findings) and emphasises the research process.

Publishing replications in **International Journal for Re-Views in Empirical Economics (IREE)**

What is IREE?

IREE is the abbreviation of “International Journal for Re-Views in Empirical Economics”. IREE is the first journal in economics dedicated to the publication of replication studies. The ZBW has initiated and designed IREE to support replication studies in economics. → iree.eu

What can I publish in IREE?

IREE publishes replications from the fields of microeconomics, macroeconomics, operations research, management, finance, and of experiments. It also accepts submissions from disciplines closely related to economics.

Must a replication in IREE falsify the original results?

No. Publication of a replication in IREE does not depend on the results of the replication study. All replication results can be of interest to the economics community. While a failed replication can indicate a need for further discussion, a successful replication can support the robustness and generalisability of a result.

Do authors need to pay for publishing in IREE?

IREE is an Open Access e-journal and does not demand author fees.

Is IREE listed?

Yes, IREE is listed with the American Economic Association (AEA), the Directory of Open Access Journals (DOAJ) and RePEc.

Why does economic research need a replication journal?

The replication of empirical findings is a fundamental principle of good scientific practice. Replication studies are a scientific tool for identifying robust and reproducible findings. Only robust findings should be generalised and used for evidence-based policy consulting.

Nevertheless, at present replications are only rarely published by economics journals. Authors of replication studies are thus finding it hard to gain recognition for their work, which immensely reduces the incentives for this important type of studies. The situation affects the credibility of economic research, which has been debating the “replication crisis” for many years now. This is the reason why the ZBW founded *International Journal for Re-Views in Empirical Economics (IREE)*.

Who finances IREE?

At the beginning, the project was funded by the German Research Foundation (DFG). At present, IREE is financed by the Joachim Herz Foundation and the ZBW – **Leibniz Information Centre for Economics**.

Who can submit articles to IREE?

High-quality submissions are the lifeblood of the journal and the key to securing future funding. It welcomes submissions from all empirical economists, be they prominent and established researchers or PhD candidates and early career researchers.

Can students also submit papers to IREE?

Yes, absolutely! Many master and PhD programmes include replications in their study and PhD degree regulations as part of empirical training. Students and PhD candidates therefore should consider IREE as a publishing option for their replication studies. If these papers meet the journal’s quality standards, they can be published in IREE independent of their result. Please take note of the guidelines: → zbw.to/guidelines_IREE

What are current publications in IREE like?

The list of published studies includes replications of papers published in renowned journals. Among these are:

- American Economic Review,
- Quarterly Journal of Economics,
- American Economic Journal: Applied Economics,
- Review of Economics and Statistics,
- Oxford Bulletin of Economics and Statistics
- and others.

Publications in IREE are disseminated via → EconStor.eu, RePEc and the ReplicationWiki and thus receive further digital visibility. You can find a list of the published replication studies here: → www.iree.eu/publications/

If you have any questions, please contact the Managing Editor Dr Martina Grunow at iree@zbw.eu.

Are you interested in replications of economic research?

Read the interviews in the Open Science Magazine with Jörg Peters, Maren Duvendack or Susann Fiedler. → www.open-science-magazin.de

Practical guide EconStor

Publishing papers on EconStor – THE Open Access Repository for economics

What is EconStor?

EconStor is an Open Access repository for scholarly literature in economics. It is operated by the ZBW – Leibniz Information Centre for Economics as a non-commercial public service. The collected full-texts (mostly working papers, but also journal articles and conference proceedings) are all freely and permanently accessible according to the principles of Open Access. → econstor.eu

Who can publish on EconStor?

Economic research institutions which publish their own series and/or journals (e-journals) can make these publications fully available on EconStor. For existing series and journals EconStor offers a “full service”, i.e. the EconStor team handles the entire process from recording title data and additional metadata like abstracts, keywords and JEL codes (if available in the document) to the final batch-importing of PDF files.

Back issues of your series and journals can also be deposited in EconStor. New issues are imported into EconStor as soon as they are published on your website or as soon as you provide them to us by other means.

The service includes the transfer of title data into international databases and portals:

- RePEc.org
- EconBiz.de
- scholar.google.de
- BASE-serach.netz
- WorldCat.org
- OpenAIRE.eu

Can I publish a paper independently of an institution if I am the author?

If you are an individual researcher at a university, and also if you are retired, you can use the self-upload to provide published and/or reviewed documents as postprints (author versions, final drafts) or as original versions (publishers' versions).

You can submit the following **types of publications** via self-upload in EconStor:

- articles
- book part
- working paper / preprint
- conference paper
- doctoral thesis
- book
- research report
- proceedings
- book review

After you have signed in (with login and password) you enter your personal area on EconStor (“my EconStor”) where you can submit your papers. You can upload your documents (PDF only) via an online form in five easy steps:

1. Select a collection that corresponds to your type of publication.
2. Enter descriptive bibliographic data for your publication.
3. Upload the electronic full-text to EconStor.
4. Verify the bibliographic data and the uploaded document.
5. Sign a licence agreement (→ zbw.to/Lizenzvereinbarung).

After you have submitted your publication, the team at EconStor will check the information you provide and supplement it if necessary. After this, your document will be released and thus be accessible in Open Access. You will receive confirmation by email, which will also contain the persistent citable link to your publication. All publications submitted through self-upload can be found in the collection of EconStor Direct → zbw.to/EconStor_Direct.

In which languages can I publish?

EconStor only accepts papers with scholarly content from economics in German or English.

How much does it cost to publish on EconStor?

EconStor demands no fees for hosting and disseminating your publication.

Can I track if my publication is read?

EconStor offers various usage statistics, e.g.

- Overall statistics of all downloads from EconStor
On the overall statistics page aggregated download numbers are provided for all documents on EconStor in a selected time span (data available since October 2012), a TOP 10 ranking list of most downloaded documents, the distribution of downloads over the selected time span and the countries of origin where the downloads have occurred.
- Access via single title view
Every EconStor document offers a link to “Counter Statistics” in the single title view which leads to detailed usage statistics for this document. These usage statistics show in the selected time span (data available since October 2012) the total number of downloads of each PDF document, the temporal distribution as well as the countries of origin where the downloads have occurred.

Why does it make sense to publish my paper on EconStor?

EconStor helps you make your publications more visible and disseminate them more effectively. Dissemination in databases and portals such as RePEc or Google Scholar also gives you international visibility.

Who else publishes on EconStor?

More than 500 research institutions worldwide use EconStor to disseminate their publications. Among the customers are all German economic research institutes and many economics faculties at universities, but also the London School of Economics (LSE), the University of Oxford, Yale, NBER, ETH Zürich. All in all more than 130,000 authors are represented on EconStor with their work.

→ econstor.eu/participants

How many full-texts are stored on EconStor?

In summer 2020, EconStor passed the mark of 200,000. More and more Open Access monographs from economics are available, too, which renowned publishers have put under a CC licence. All in all, there are almost 2,000 freely accessible books from nearly 50 publishers!

Can I use EconStor as a search engine?

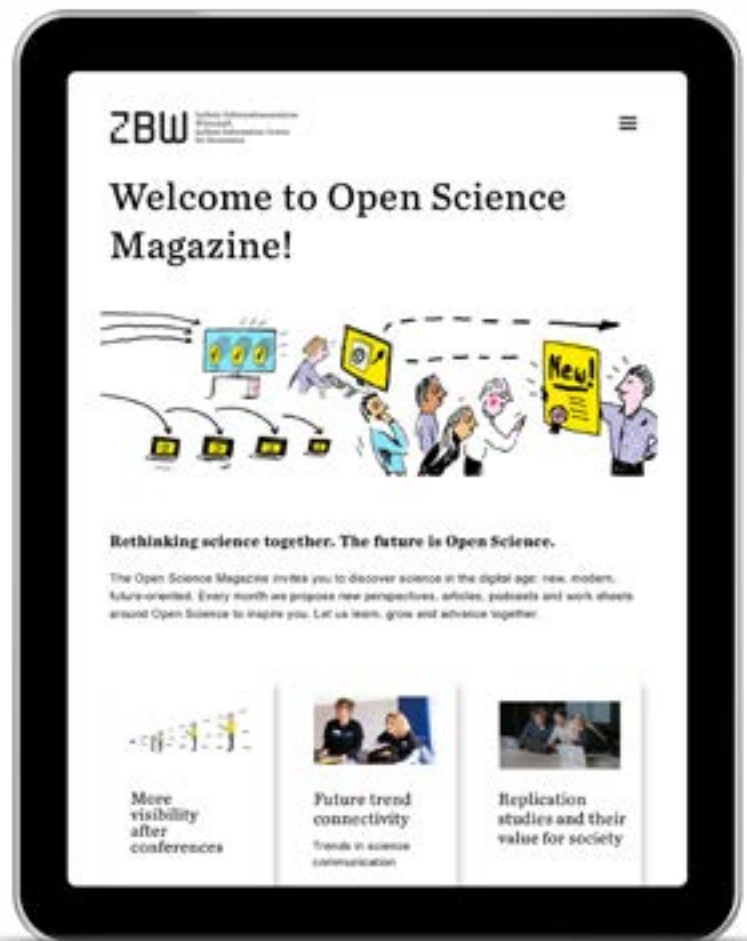
You can browse EconStor by author, institution, collection, document type, year of publication, journal, and publisher's monograph.

What would impress me most?

Our statistics! Global use of EconStor is heavy. The number of downloaded documents grew from 4 million in 2018 to more than 9 million in 2020. More than 75 per cent of all downloads were made from foreign countries. As of June, the number of downloads this year has reached 7,309,538.

→ zbw.to/EconStor_stats

The **Open Science Magazine of the ZBW – Leibniz Information Centre for Economics** provides economists with the Best Practice experiences of their peers, work sheets with concrete tips, guides to good science communication, background information on current Open Science developments and interviews with inspiring transformation ideas.



Imprint

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