

Adventures in Open & Reproducible Research

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LCDS and Nuffield College, University of Oxford

A talk at Xi'an Jiaotong University, 27th June, 2023



In the spirit of ‘Open Science’:

crahal.github.io/files/xian_talk.pdf

and *all* of the research you see here today is at:

github.com/crahal

Lots of examples: hopefully something for everyone!

Everything here is made with free, and ‘Open’ tools:

- Linux (operating system)
- Python (data wrangling and statistical software)
- $\text{\LaTeX}$ (typesetting)

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Why mention this? We’re talking about ‘Open’ Science!

What is ‘Open Science’?

‘Open science ... promotes transparency, accessibility, and collaboration throughout the research process. It involves making scientific knowledge, data, and methodologies openly available to the public, researchers, and other stakeholders, without restrictions or barriers.’

Source: ChatGPT

What is the ‘Scientific Record’?

‘The scientific record is crucial for the advancement of knowledge and serves as a foundation for scientific progress. It provides a means for scientists to communicate their research findings to the broader scientific community, allowing for scrutiny, validation, and further exploration.’

Source: ChatGPT

Pragmatically ‘Open Science’:

1. Allows creation of value and advancement.
2. Allows verification of the scientific record.
3. Allows public disclosure and engagement.
4. Allows science to become accessible/transparent.

*"If I have seen further, it is by standing on the
shoulders of giants."*

Source: Isaac Newton to Robert Hooke, in February 1676

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 3. Critically analyze everyone else's data.

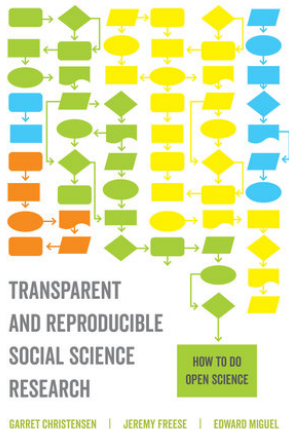
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- Disclaimer: presently the LNL Co-ordinator for UKRN.

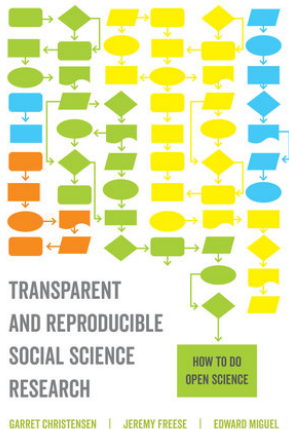
More traditional motivation, just in case you aren't sold...:



This book...

Is most definitely worth
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*Not just because one of
the authors is a coauthor of
a paper included later!

It does an **excellent** job of
motivating replications.

One of the most important parts of the book is this table:

Compared to Original	Original Procedures	Key Differences
Same Data	Verification	Reanalysis
Different Data	Direct Replication	Extension

- Maybe you've heard 'Verification' called 'Exact Replication'.
- Increasing push towards teaching concepts of 'Replication'.
- One area where Sociology has really progressed forwards.

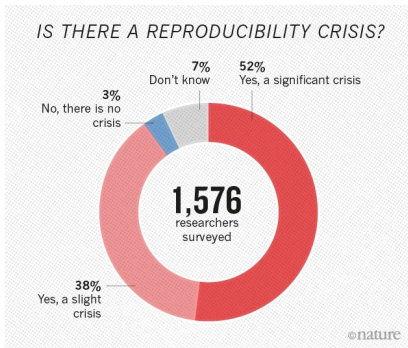
How it started:

Why Most Published Research Findings Are False

John P. A. Ioannidis

Published: August 30, 2005 • <https://doi.org/10.1371/journal.pmed.0020124>

How it's going:



What does ‘Open Science’ look like?

1. Preprints and ‘Open Access’.
2. Publicly available data.
3. Open source code



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A dataverse is a container for all your datasets, files, and metadata.

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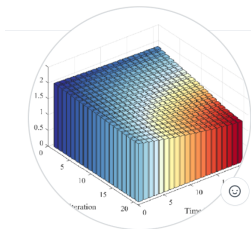
Publishing your data is easy on Harvard Dataverse!

Learn about getting started creating your own dataverse repository here.

Getting started ↗

What does 'Open Science' look like in practice?

1. Preprints and 'Open Access'.
2. Publicly available data.
3. Open source code



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A Scientometric Review of Genome Wide Association Studies

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Introducing the InterModel Vigorish (IMV)

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[OxfordDemSci/gwasdiversitymonitor](#)

Public ::

Source code for the GWAS Diversity Monitor

CSS ☆ 12 🍷 1

These slides are made with an open source typesetting language!

I_make_this_slide.tex

```
\begin{frame}[]  
  These slides are made with an open source typesetting language!  
  \begin{center}  
    \begin{scriptsize}  
      \begin{minipage}{.95\linewidth}  
        \begin{myenv}{guess$_\_what$__this$__does.py}  
          \begin{minted}{latex}  
            # Hello friends :)  
          \end{minted}  
        \end{myenv}  
      \end{minipage}  
    \end{scriptsize}  
  \end{center}  
\end{frame}
```

Open source statistical code can come in the form of Python (or R):

guess_what_this_does.py

```
import json, io, imageio, requests
from PIL import Image

def get_cat_bounded(url):
    api_ret = requests.get(url)
    if api_ret.status_code==200:
        text = json.loads(api_ret.text)
        while (text[0]['width']<=400 or text[0]['width']>=600) or \
            (text[0]['height']<=400 or text[0]['height']>=600):
            api_ret = requests.get(url)
            if api_ret.status_code==200:
                text = json.loads(api_ret.text)
        r = requests.get(api_text[0]['url'])
        return Image.open(io.BytesIO(r.content))

url = 'https://api.thecatapi.com/v1/images/search'
images = []
for _ in range(0, 50):
    images.append(get_cat_bounded(url))
imageio.mimsave('CATS.gif', images, fps=1)
```

Thats right: Cats!

Why show you this? Well, Python is great at lots of useful things:

1. Scientific Computing (SciPy, numpy)
2. Data visualisation (Matplotlib, seaborn)
3. Web scraping (requests)
4. Data wrangling (Pandas)

A natural choice for un/semi-structured data. Python also excels at NLP/ML, but maybe a little less with classical statistics.

Python is **great** at building new datasets. But why bother?

'We have been using the same data sets over and over again, and since we wanted new answers, we have been developing new econometric techniques to try to transform the data, and get more meaningful information out of them. Just having a fresh, new data set brings a whole new perspective, and I think people are starting to realize that, and gradually people are becoming more interested in data collection itself'

A. Cavallo, 15 November 2012 in Taylor et al. (2014)

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New datasets allow fresh **insight** and are typically **open**!

But what is **semi-structured** data?

“A form of structured data that does not obey the tabular structure of data models associated with relational databases or other forms of data tables, but nonetheless contains tags or other markers to separate semantic elements”

Different to **tabular** surveys classical social scientists are used to.

But, often, our goal is to parse it and make it tabular all the same.

A lot of my semi-structured work is ‘**scientometric**’ and ‘**bibliometric**’ in nature:

- **Scientometrics** is the field of study which concerns itself with measuring and analysing science.
- **Bibliometrics** is the use of statistical methods to analyze quantitative information pertaining to books, articles and other publications.

These fields are naturally related to ‘**Open Science**’.

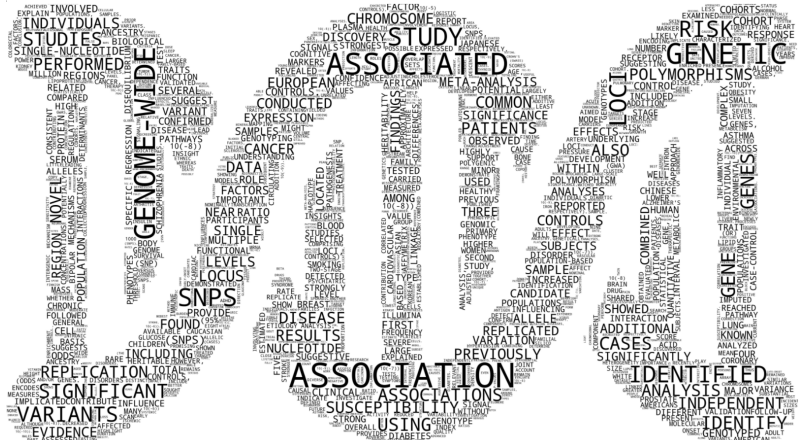
Data comes from various providers (usually APIs).

Lets use a 'Traffic Light' system to rank by openness:

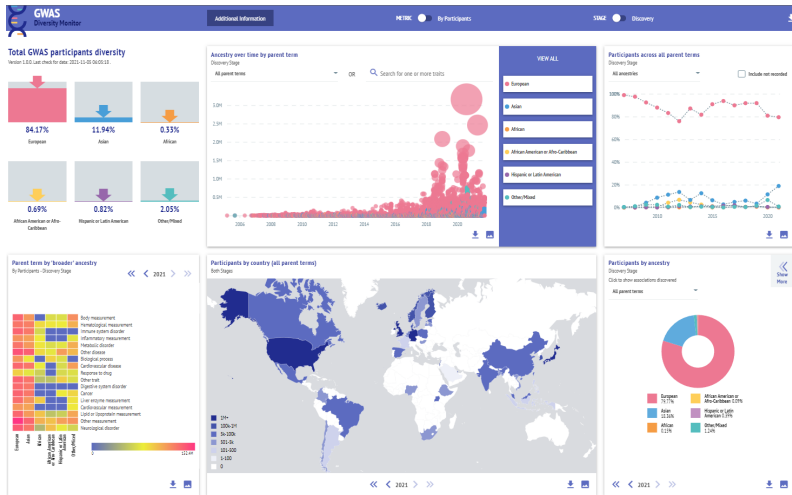
- Web of Science
- Google Scholar
- Scopus
- PubMed
- JSTOR/Constellate
- CrossRef
- The General Index
- Dimensions

This list gets longer every day...

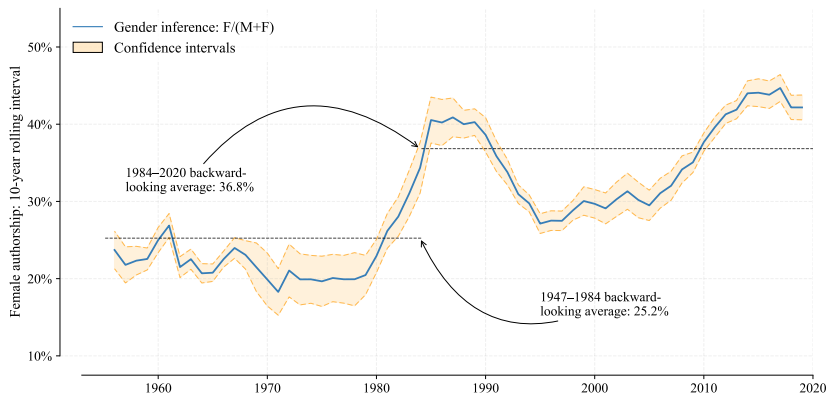
- My early scientometric work analyzed GWAS.
- It took curated lists of catalogued information from the European Bioinformatics Institute. It then called **semi-structured** data from PubMed.
- We published two papers which:
 1. Conduct a thorough scientometric review.
 2. Launch a substantial interactive dashboard.



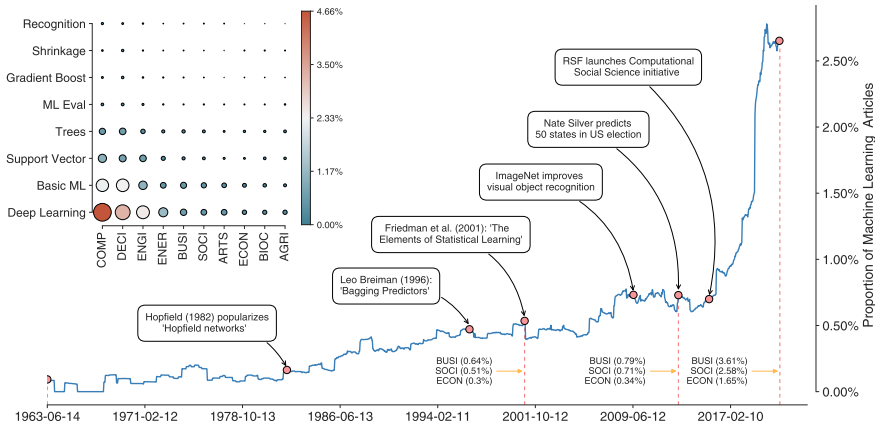
'The Scientometrics of Genome Wide Association Studies'
With Melinda C. Mills



‘The GWAS Diversity Monitor Tracks Diversity in Real Time’
with Melinda C. Mills



‘Population Studies at 75 Years: An empirical review’
With Melinda C. Mills



'The Rise of Machine Learning in the Academic Social Sciences'

With Dave Kirk and Mark Verhagen

Administrative Data is an invaluable resource for Good.

ADR UK (2018)

- UK leads the world in terms of ‘Openness’ of government data.
- The value of public government data is increasingly recognised.
 - Increasingly recognised by the ESRC (e.g. ADRNs).
- For better or worse:
 - I’m more interested in ‘hard to use’, semi-structured data.

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- For better or worse:
 - I’m more interested in ‘hard to use’, semi-structured data.
 - Using curated data from the ONS SRS would be too easy.

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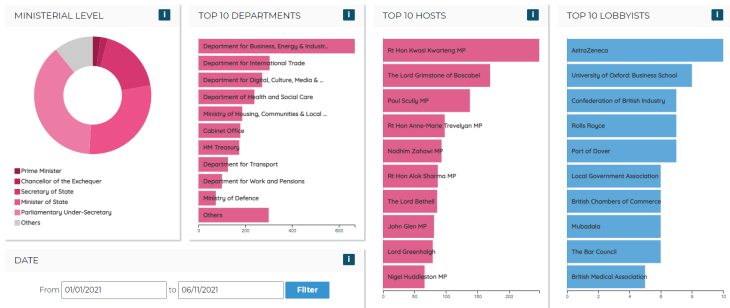
2,623 out of 74,435 meetings

SEARCH BY LOBBYIST, HOST, SUBJECT

Reset

UK GOVERNMENT

LOBBYIST



openaccess.transparency.org.uk

With Ian Knowles, Paulo Serôdio, David Stuckler and TI UK

Procurement Data

- David Cameron opened data on government contracts (2010).
- This provided a totally new type of semi-structured data.
- From from local authorities, to the NHS, to central government.
- This sounds like it might be useful for academic research...
- However, the raw data is **unbelievably** messy.

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However, I am currently working with the ONS to improve collection!

Lets list a few of the problems with procurement data. Some are common to semi-structured data, some are not:

1. Some organisations don't believe in their legal obligation.
2. Every file is in a heterogeneous format in a different location.
(There are **thousands** of locations on the internet.)
3. Data commonly converted from a tabular file...

Lets list a few of the problems with procurement data. Some are common to semi-structured data, some are not:

1. Some organisations don't believe in their legal obligation.
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(There are **thousands** of locations on the internet.)
3. Data commonly converted from a tabular file... **into** a .pdf!
(This is a **direct** downgrade in the Berners-Lee 5* schema.)
4. Naturally, of course, there are no supplier UUIDs.

Just one quick example, followed by what we can do...

[illegible]

A3131

Expenditure Over Threshold

Department/Entity	City	Entity	Entity Sector	Subject	Transaction number	AP Amount	VAT registration number	Purchase Invoice number
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Clinic Public Sector	COMMUNITY SERVICES	11599633	606 000.00	6100071863
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Clinic Public Sector	COMMUNITY SERVICES	11599635	124 000.00	6100071861
Department of health	Norw	Bevco	CG04201	Other Gen Supplies & Inv	COMMUNITY SERVICES	11599637	165 669.00	6100071862
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Clinic Public Sector	WYLLER RESTAURANT	11599642	64 000.00	6100071867
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11600729	88 226.00	604948667
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11600730	165 000.00	6100071868
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Voluntary Sector	COMMISSIONING - NON ACUTE	11611604	30 000.00	6100071869
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Independent Sector	ACUTE COMMISSIONING	11611604	38 526.24	787424655
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11611604	58 137.4	HL00056682
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Voluntary Sector	HOSPICES	11623337	218 000.00	871
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11636401	444 000.00	6448267
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11636401	213 162.1	6448267
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11642864	25 672.53	48413715
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11642923	-38 068.00	1000004184
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11642923	200 000.00	100004139
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11644232	-3 662 119.34	CM00218970
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	AMBUANCE SERVICES	11663375	26 332.45	816 0667
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11663375	587 757.29	10011114
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11666893	768 636.00	227 489
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11666893	760 530.34	233561
Department of health	Norw	Bevco	CG04201	Cont Care Adult 100% Fully Funded	FUNDED NURSING CARE	11669882	26 512.00	2387911641
Department of health	Norw	Bevco	CG04201	Charges From CSU	RECHARGES	11669895	85 249.00	ALM3036307CM305888
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11671003	278 326.00	1206094
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11680115	82 568.00	600129403
Department of health	Norw	Bevco	CG04201	Hithou-Foundation Trusts	COMMUNITY SERVICES	11701702	228 869.00	278586
Department of health	Norw	Bevco	CG04201	Hithou-Foundation Trusts	COMMUNITY SERVICES	11701702	141 917.00	37932
Department of health	Norw	Bevco	CG04201	Hithou-Foundation Trusts	COMMUNITY SERVICES	11701710	807 726.00	37892
Department of health	Norw	Bevco	CG04201	Income Tax - 11%	BALANCE SHEET	11720668	47 733.1	604462331
Department of health	Norw	Bevco	CG04201	Income Tax - 11% Student Loans	BALANCE SHEET	11720668	738.00	10000055770 MAR 18
Department of health	Norw	Bevco	CG04201	National Insurance - 1 vNE-RMS	BALANCE SHEET	11720668	29 114.84	604462331
Department of health	Norw	Bevco	CG04201	National Insurance - 1 vNE-RMS	BALANCE SHEET	11720668	19 284.18	10000055770 MAR 18
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11724081	213 245.00	2001026
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11724081	288 141.00	2293884
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11724081	27 000.00	2001026
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11724081	268 424.00	231364
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11724114	224 749.00	2001026
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Clinic Public Sector	HEALTH CARE	11724114	440.00	2001026
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11738262	-26 056.34	1365
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11738262	53 540.00	CM009848
Department of health	Norw	Bevco	CG04201	Hithou-Foundation Trusts	COMMUNITY SERVICES	11748440	248 505.00	17541
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11748438	47 300.00	201000982
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11771723	16 100.00	263322
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11771723	2 691 512.00	100004139
Department of health	Norw	Bevco	CG04201	Hithou-Foundation Trusts	MENTAL HEALTH CONTRACTS	11777727	25 202.00	80007387
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Independent Sector	COMMUNITY SERVICES - NON ACUTE	11777727	56 381.00	100004139
Department of health	Norw	Bevco	CG04201	Hithou-Foundation Trusts	MENTAL HEALTH CONTRACTS	11782324	1 728 324.00	37897
Department of health	Norw	Bevco	CG04201	Hithou-Foundation Trusts	MENTAL HEALTH CONTRACTS	11801176	36 000.00	37898
Department of health	Norw	Bevco	CG04201	HEALTH AND FACILITIES	PROPERTY SERVICES TO	11801176	15 000.00	484138351
Department of health	Norw	Bevco	CG04201	Hithou-Foundation Trusts	CHILD AND ADOLESCENT MENTAL HEALTH	11818020	258 781.00	37895
Department of health	Norw	Bevco	CG04201	Hithou-Foundation Trusts	CHILD AND ADOLESCENT MENTAL HEALTH	11818020	58 506.00	37894
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Clinic Public Sector	HEALTHY SUFFICIENT LIVES	11818020	4 416.00	1000019263
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Clinic Public Sector	DAY THERAPIES	11818190	276 741.00	589
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Clinic Public Sector	DAY THERAPIES	11818190	25 589.00	60428016
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Clinic Public Sector	ACUTE COMMISSIONING	11824000	1 869 511.00	243431
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Clinic Public Sector	LEARNING DIFFICULTIES	11854467	250 000.00	6100071247
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11854467	1 176 126.00	60428016
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Independent Sector	COMMUNITY SERVICES	11963191	66 592.39	BA-0320156
Department of health	Norw	Bevco	CG04201	Healthcare Srv Res CCG	NHS 111	13263323	71 747.88	1002102149
Department of health	Norw	Bevco	CG04201	Clinical/Medical-Independent Sector	COMMUNITY SERVICES	13263323	26 700.00	60428016
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11903373	1 137 848.98	234487
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	ACUTE COMMISSIONING	11931140	1 455 963.00	604923417
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11931140	3 133 524.00	604923417
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11933581	-129 548.00	8486605
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11951210	1 187 569.00	233736
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11951210	1 056 561.00	CM00218929
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11951210	229 254.29	233542
Department of health	Norw	Bevco	CG04201	Heath Srv Res P8th Trust-Contract Baseline	PLANNED CARE	11951210	-413 000.00	CM00218929
Department of health	Norw	Bevco	CG04201	Cont Care Adult 100% Fully Funded	CHC AD FULL FUND PERKS HLTH PRG	11961590	269 574.97	6100071866
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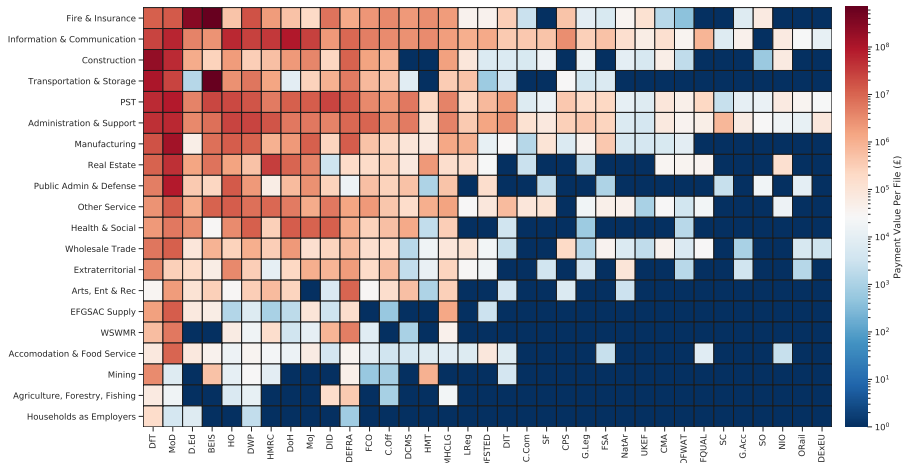
Expenditure Over Threshold

HOSPITAL EXPENDITURE										Transaction summary: AP Amount - VAT registration number - Purchase medical sector			
Department name	Fully	Date	Expenditure Type	Expenditure area	Vendor	Transaction number	AP Amount	VAT	Registration number	Purchase medical sector			
Department of health	NSH	Beasey	COG	10/04/2021	Clinical/Medical-Other Public Sector	COMMUNITY SERVICES	BEKLEY COUNCIL	659,000.00			6100071658		
Department of health	NSH	Beasey	COG	10/04/2021	Clinical/Medical-Other Public Sector	COMMUNITY SERVICES	BEKLEY COUNCIL	195,000.00			6100071661		
Department of health	NSH	Beasey	COG	10/04/2021	Other Supplies & Srv	COMMUNITY SERVICES	BEKLEY COUNCIL	90,000.00			6100071674		
Department of health	NSH	Beasey	COG	10/04/2021	Clinical/Medical-Other Public Sector	WYTH FELTRINA	11255562	64,000.00			6100071687		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec Pbn Trust-Contract Baseline	ACUTE COMMISSIONING	UNIVERSITY COLLEGE LONDON HOSPITALS NHS FOUNDATION TRUST	186,000.00			6100071694		
Department of health	NSH	Beasey	COG	10/04/2021	Cont Care - Adult 100% Fully Funded	CHIC ADULT FULLY FUNDED	BRAGGWOOD OAKS GROUP PRIMARY	16,250.00		654848867	101006444		
Department of health	NSH	Beasey	COG	10/04/2021	Clinical/Medical-Non ACUTE	COMMUNITY SERVICES	BEKLEY COUNCIL	195,000.00			6100071700		
Department of health	NSH	Beasey	COG	10/04/2021	Clinical/Medical-Independent Sector	ACUTE COMMISSIONING	HEALTH LTD	19,150.04			6100055582		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec Pbn Trust-Contract Baseline	ACUTE COMMISSIONING	MEDWAY NHS FOUNDATION TRUST	59,384.00			2383		
Department of health	NSH	Beasey	COG	10/04/2021	Clinical/Medical-Other Public Sector	COMMUNITY SERVICES	BEKLEY COUNCIL	195,000.00			6100071701		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	ACUTE COMMISSIONING	LEWISHAM & GREENWICH NHS TRUST	4,440.144.00			84426367		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PROGRAMME PROJECTS	NHS PROPERTY SERVICES LTD	216,726.14			84460296		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PROGRAMME PROJECTS	NHS PROPERTY SERVICES LTD	19,426.84			84461378		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	ACUTE COMMISSIONING	DARTFORD AND GRAVESEND NHS TRUST	-30,300.00			2000004184		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	ACUTE COMMISSIONING	DARTFORD AND GRAVESEND NHS TRUST	-30,300.00			100004130		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	ACUTE COMMISSIONING	KING'S COLLEGE HOSPITAL, NHS FOUNDATION TRUST	-3,654.00			6100018929		
Department of health	NSH	Beasey	COG	10/04/2021	Clinical/Medical-Commercial Sector	COMMUNITY SERVICES	BEKLEY HEALTH LTD	29,930.40			6100019029		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	AMBULANCE SERVICES	LONDON AMBULANCE SERVICE NHS TRUST	887,733.20		654867192	10111214		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	AMBULANCE SERVICES	LONDON AMBULANCE SERVICE NHS TRUST	887,733.20			10111214		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	KING'S COLLEGE HOSPITAL, NHS FOUNDATION TRUST	16,650.50			233541		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	KING'S COLLEGE HOSPITAL, NHS FOUNDATION TRUST	17,659.00			233541		
Department of health	NSH	Beasey	COG	10/04/2021	Cont Care - Adult 100% Fully Funded	RECHARGES	CHIC OUTPATIENT CARE	2,337.6161			4-0530333TOTAL M03888		
Department of health	NSH	Beasey	COG	10/04/2021	Charges from CSU	RECHARGES	NHS SOUTH EAST CSU	65,250.00			610019029		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec Pbn Trust-Contract Baseline	PLANNED CARE	KING'S COLLEGE HOSPITAL, NHS FOUNDATION TRUST	219,920.00			220806		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	ACUTE COMMISSIONING	MOORFLOUDES EYE HOSPITAL NHS FOUNDATION TRUST	16,688.11			6100055582		
Department of health	NSH	Beasey	COG	10/04/2021	Hilbrow Foundation Trust	COMMUNITY SERVICES	OCEANIX NHS FOUNDATION TRUST	221,095.00			33922		
Department of health	NSH	Beasey	COG	10/04/2021	Hilbrow Foundation Trust	COMMUNITY SERVICES	OCEANIX NHS FOUNDATION TRUST	141,917.00			33932		
Department of health	NSH	Beasey	COG	10/04/2021	Hilbrow Foundation Trust	COMMUNITY SERVICES	OCEANIX NHS FOUNDATION TRUST	807,720.00			33922		
Department of health	NSH	Beasey	COG	10/04/2021	Income tax +117	BALANCE SHEET	HUB&B	471,630.60		654463331	120P-05046770 MAR 18		
Department of health	NSH	Beasey	COG	10/04/2021	Income tax +119-Student Loans	BALANCE SHEET	HUB&B	336.00		654463331	120P-05046770 MAR 18		
Department of health	NSH	Beasey	COG	10/04/2021	National Insurance + 119e-End	BALANCE SHEET	HUB&B	336.00		654463331	120P-05046770 MAR 18		
Department of health	NSH	Beasey	COG	10/04/2021	National Insurance + 119E-End	BALANCE SHEET	HUB&B	336.00		654463331	120P-05046770 MAR 18		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec Pbn Trust-Contract Baseline	PLANNED CARE	KING'S COLLEGE HOSPITAL, NHS FOUNDATION TRUST	21,455.00			255296		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec Pbn Trust-Contract Baseline	PLANNED CARE	KING'S COLLEGE HOSPITAL, NHS FOUNDATION TRUST	21,455.00			255296		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec Pbn Trust-Contract Baseline	PLANNED CARE	KING'S COLLEGE HOSPITAL, NHS FOUNDATION TRUST	21,455.00			255296		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec Pbn Trust-Contract Baseline	PLANNED CARE	KING'S COLLEGE HOSPITAL, NHS FOUNDATION TRUST	21,455.00			255296		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec Pbn Trust-Contract Baseline	PLANNED CARE	KING'S COLLEGE HOSPITAL, NHS FOUNDATION TRUST	21,455.00			255296		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec Pbn Trust-Contract Baseline	PLANNED CARE	KING'S COLLEGE HOSPITAL, NHS FOUNDATION TRUST	21,455.00			255296		
Department of health	NSH	Beasey	COG	10/04/2021	Clinical/Medical-Other Public Sector	RESEMBLY	BEKLEY COUNCIL	468,334.90			6690071676		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec Pbn Trust-Contract Baseline	ACUTE COMMISSIONING	QUEEN VICTORIA HOSPITAL NHS FOUNDATION TRUST	17,783.00			6100055582		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec Pbn Trust-Over Under Performance	ACUTE COMMISSIONING	MOORFLOUDES EYE HOSPITAL NHS FOUNDATION TRUST	30,540.00			6100055582		
Department of health	NSH	Beasey	COG	10/04/2021	Hilbrow Foundation Trust	COMMUNITY SERVICES	OCEANIX NHS FOUNDATION TRUST	47,400.00			33941		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec Pbn Trust-Contract Baseline	COMMUNITY SERVICES	QUEEN VICTORIA HOSPITAL, NHS FOUNDATION TRUST	47,400.00			6100055582		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	ACUTE COMMISSIONING	BARTS HEALTH NHS TRUST	80,287.00			244522		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	ACUTE COMMISSIONING	DARTFORD AND GRAVESEND NHS TRUST	2,691,965.00			100004130		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	ACUTE COMMISSIONING	DARTFORD AND GRAVESEND NHS TRUST	2,691,965.00			100004130		
Department of health	NSH	Beasey	COG	10/04/2021	Hilbrow Foundation Trust	MENTAL HEALTH CONTRACTS	MENTAL HEALTH CONTRACTS	17,775.00			100003327		
Department of health	NSH	Beasey	COG	10/04/2021	Clinical/Medical-Voluntary Sector	COMMISIONING - NON ACUTE	BEKLEY COUNCIL	34,961.80			6690071680		
Department of health	NSH	Beasey	COG	10/04/2021	Hilbrow Foundation Trust	MENTAL HEALTH CONTRACTS	OCEANIX NHS FOUNDATION TRUST	17,775.00			100003327		
Department of health	NSH	Beasey	COG	10/04/2021	Hilbrow Foundation Trust	MENTAL HEALTH CONTRACTS	OCEANIX NHS FOUNDATION TRUST	17,775.00			100003327		
Department of health	NSH	Beasey	COG	10/04/2021	Hilbrow Foundation Trust	MENTAL HEALTH CONTRACTS	OCEANIX NHS FOUNDATION TRUST	17,775.00			100003327		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		
Department of health	NSH	Beasey	COG	10/04/2021	Health Srv Rec NHS Trust-Contract Baseline	PLANNED CARE	NHS PROPERTY SERVICES LTD	1,000,000.00			44414351		

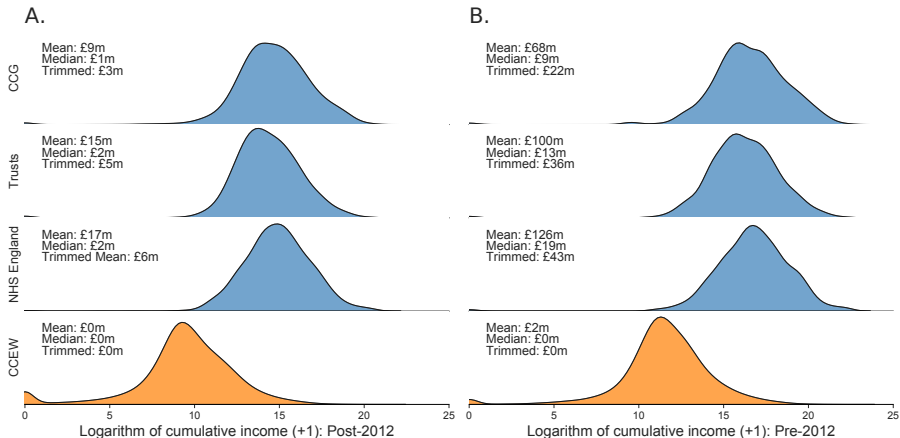
A3131

Expenditure Over Threshold

Department Name	Fund	Category	Date	Expense Type	Expense Area	Vendor	Transaction Number	AP Amount	YTD	YTD Acquisition Number	Purchase Invoice Number
Department of Health	NHS	Beasey	COG	10/04/2021	Clinical/Medical-Off Public Sector	COMMUNITY SERVICES	BEKLEY COUNCIL	11059633	658.00	000	6100071658
Department of Health	NHS	Beasey	COG	10/04/2021	Clinical/Medical-Off Public Sector	COMMUNITY SERVICES	BEKLEY COUNCIL	11059632	658.00	000	6100071661
Department of Health	NHS	Beasey	COG	10/04/2021	Other Goods/Supplies & Srv	COMMUNITY SERVICES	BEKLEY COUNCIL	11059637	97.00	000	6100071674
Department of Health	NHS	Beasey	COG	10/04/2021	Clinical/Medical-Off Public Sector	WYTH RESEARCH	11059662	84.00	000	6100071687	
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	ACUTE COMMISSIONING	UNIVERSITY COLLEGE LONDON HOSPITALS NHS FOUNDATION TRUST	11060237	116,000.00	000	6100080444
Department of Health	NHS	Beasey	COG	10/04/2021	Cont Care - Adult, 100% Fully Funded	CHIC ADULT FULLY FUNDED	CRAGGWOOD D&S GROUP PRIORITY	11060225	176.00	000	6100080390
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	ACUTE COMMISSIONING - NON ACUTE	BEKLEY COUNCIL	11059636	18.00	000	6100080392
Department of Health	NHS	Beasey	COG	10/04/2021	Clinical/Medical-Independent Sector	ACUTE COMMISSIONING	INPHATH LTD	11059704	39.50	000	6100080582
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	ACUTE COMMISSIONING	MEOWAY NHS FOUNDATION TRUST	11059724	35.00	000	6100080583
Department of Health	NHS	Beasey	COG	10/04/2021	Clinical/Medical-Independent Sector	ACUTE COMMISSIONING	WYTH RESEARCH & BEKLEY COMMUNITY HOSPICE	11059724	35.00	000	6100080583
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	ACUTE COMMISSIONING	LEIGHAM & GREENWOOD NHS TRUST	11059840	4,440.14	000	6100080587
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	ACUTE COMMISSIONING	NHS PROPERTY SERVICES LTD	11061697	216.72	000	6100080596
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	ACUTE COMMISSIONING	NHS PROPERTY SERVICES LTD	11062084	181.17	000	6100080596
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	ACUTE COMMISSIONING	DARTFORD AND GRAVESEND NHS TRUST	11062423	-30.30	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	ACUTE COMMISSIONING	DARTFORD AND GRAVESEND NHS TRUST	11062427	10,000.00	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	ACUTE COMMISSIONING	KING'S COLLEGE HOSPITAL NHS FOUNDATION TRUST	11062509	-3,000.00	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Clinical/Medical-Commercial Sector	COMMUNITY SERVICES	BEKLEY HEALTH CARE	11062539	28.93	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	AMBULANCE SERVICES	LONDON AMBULANCE SERVICE NHS TRUST	11063378	587.73	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	ACUTE COMMISSIONING	KING'S COLLEGE HOSPITAL NHS FOUNDATION TRUST	11063389	1,449.00	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	KING'S COLLEGE HOSPITAL NHS FOUNDATION TRUST	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
Department of Health	NHS	Beasey	COG	10/04/2021	Healthcare Svc Nhs Pbn Trust-Contract Baseline	PLANNED CARE	PLANNED CARE	11063905	760.50	000	6100080614
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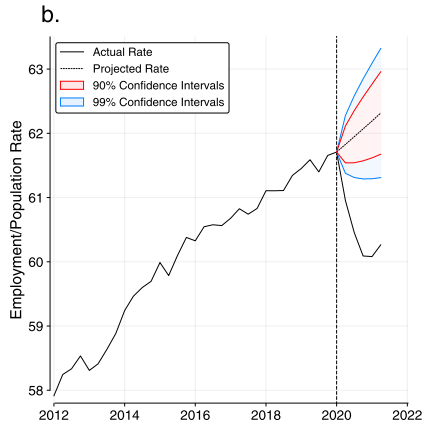
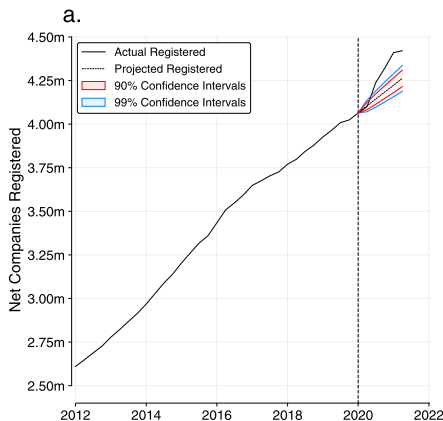
‘Tools for Transparency in Central Government Spending’



‘The Role of Non-Profits in Public Health Service Provision’ With John Mohan

'Creeping Commercialization in the NHS'

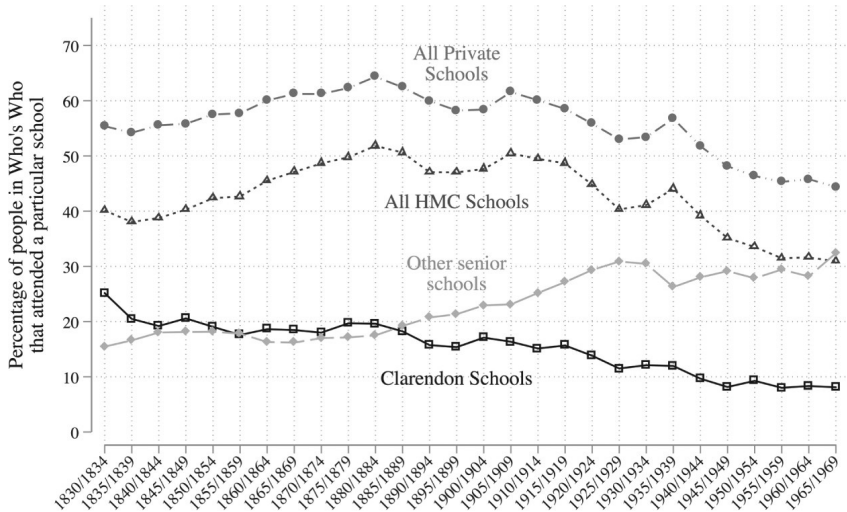
By Ben Goodair and Aaron Reeves



‘Modelling Labour Market Inequalities and the Covid-19 Pandemic’
With Aaron Reeves and Naomi Muggleton

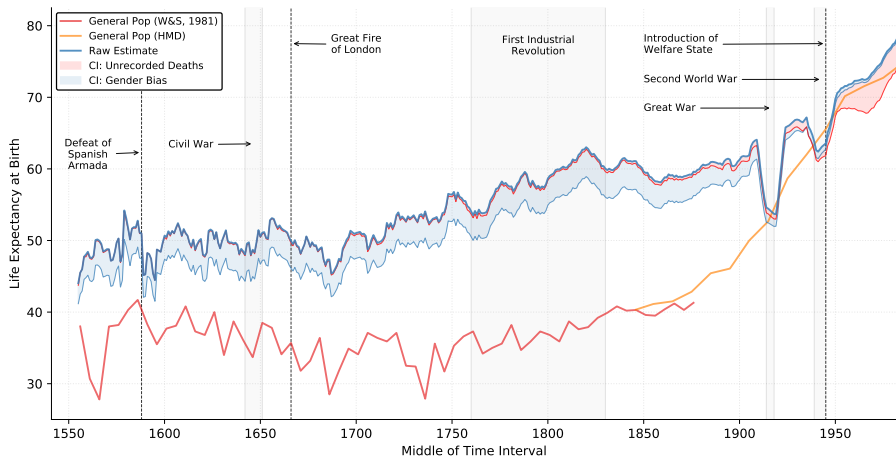
Semi-Structured Data for Inequality Research

- Data doesn't always come from APIs.
- Sometimes, it can come from raw `.html` itself.
- One example of this is when we scraped Who's Who to get information on education background of 'elites'.
- Another is when we scraped `thepeerage.com` to get data on dates of birth and death of British Peers.
- We might want to (there are competing views):
 - Check ToS and `robots.txt`.
 - Contact the webmaster first.



‘The decline and persistence of the old boy’

With Aaron Reeves, Sam Friedman. and Magne Flemmen



‘The Legacy of Longevity: Inequalities in UK Life Expectancy 1500-2016’ with Aaron Reeves, Felix Tropsch and Darryl Lundy

Ongoing research (With Aaron Reeves and Naomi Muggleton) uses and probate records from 1858-1996.

The idea is to:

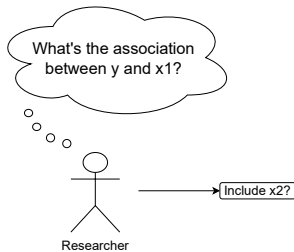
1. Scrape 800k .pdfs containing 24m probates: **Done!**
2. Preprocess images ready for OCR: **Done!**
3. Run OCR on HPC in parallel: **Done!**
4. Build lifetables to calculate e_0 by wealth at death...: **Pending!**

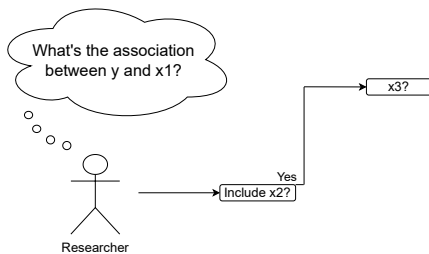
[illegible]

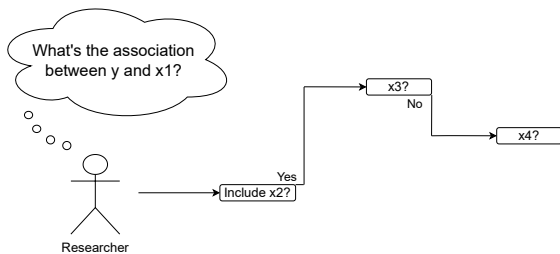
- There are close links between ‘Open Science’ and traditional modeling paradigms!
- By **opening** research, we can examine the certainty of statistical results.
- Does β_1 really equal 7.12452?

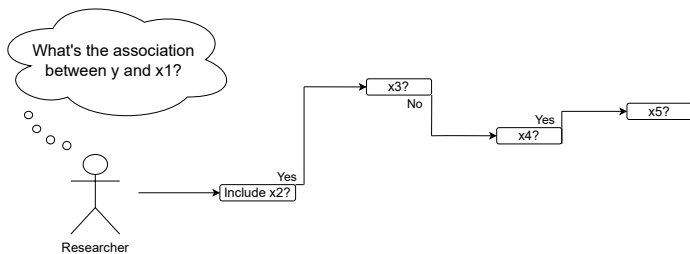
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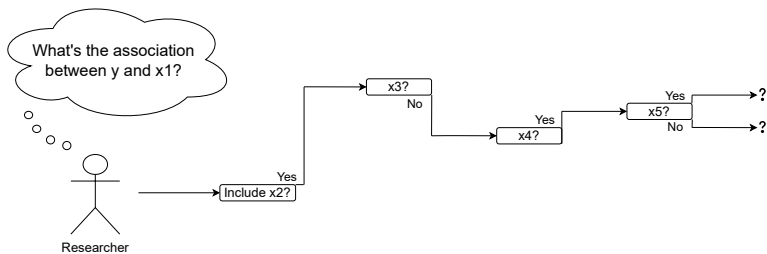
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- By **opening** research, we can examine the certainty of statistical results.
- Does β_1 really equal 7.12452?
- How can we "take the ‘con’ out of econometrics"?
- Transparency and more computational procedures!

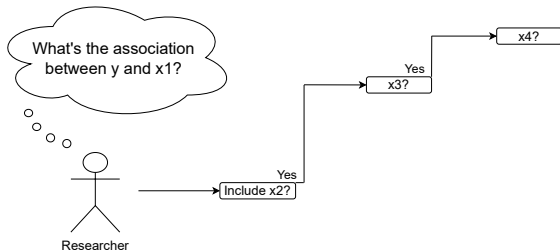


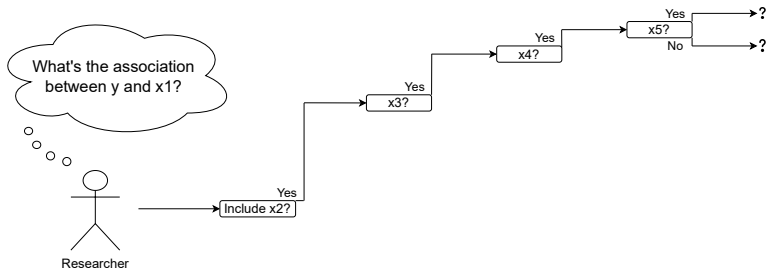


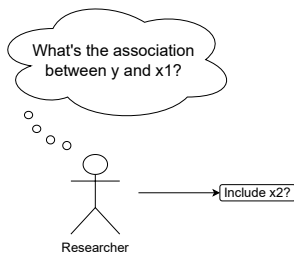


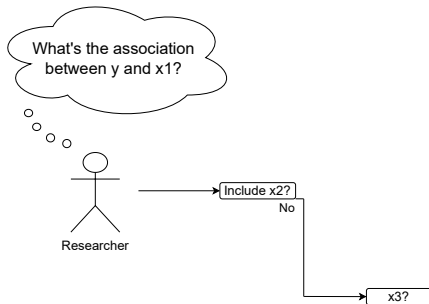


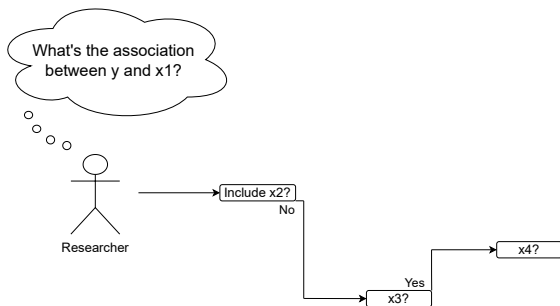


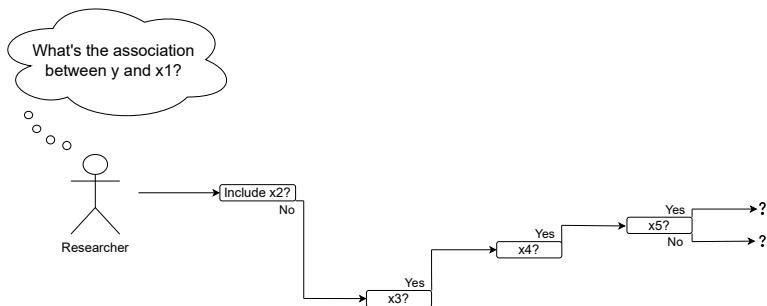


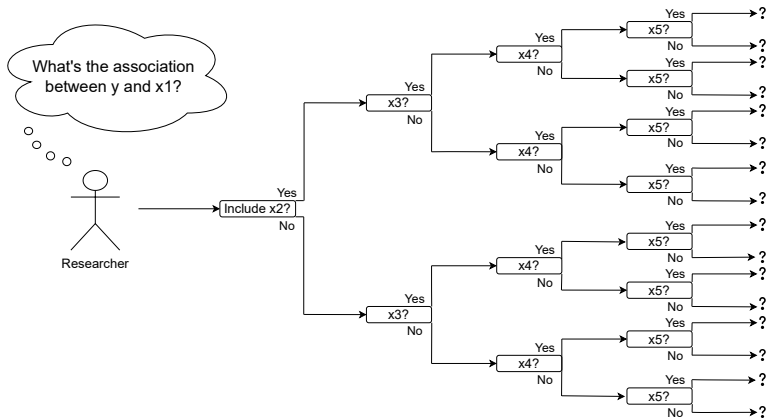




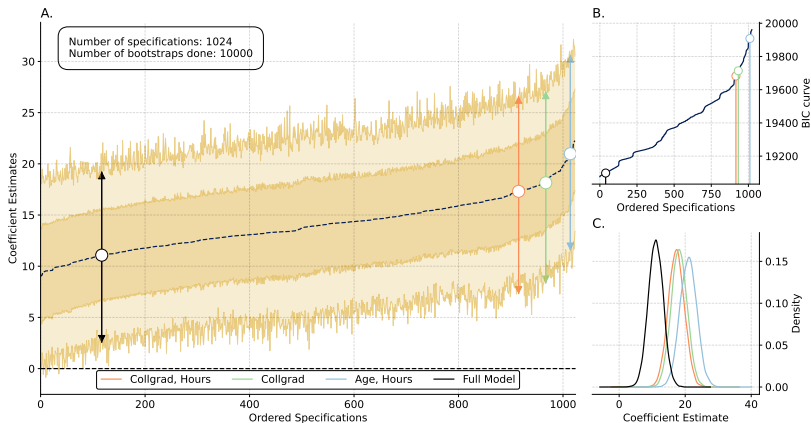




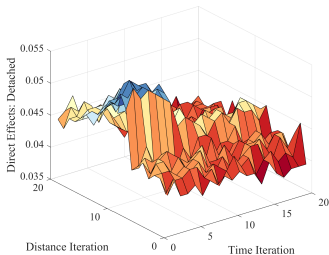
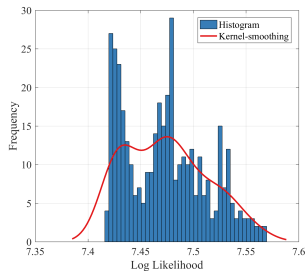
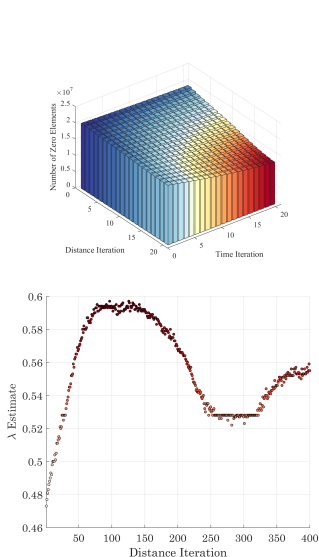




- Our work tackling this type of uncertainty is still in progress!



- The idea is to advance the **specification curve literature**.
- In particular: selection, **averaging**, and **influence analysis**.
- See github.com/centre-for-care/nrobust for updates!



'A Grid Based Approach to Analysing Spatial Weighting Matrix Specification'

Pseudo-Random Number Generation

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- **Q:** How did you decide on what seed to use?
- Maybe to eliminate variation in algorithms with PRNGs?
 - This seems to be the current 'best practice' advice.
- We argue this is the **opposite of what we want!**
 - We propose you pre-specify **multiple** (complex) seeds.

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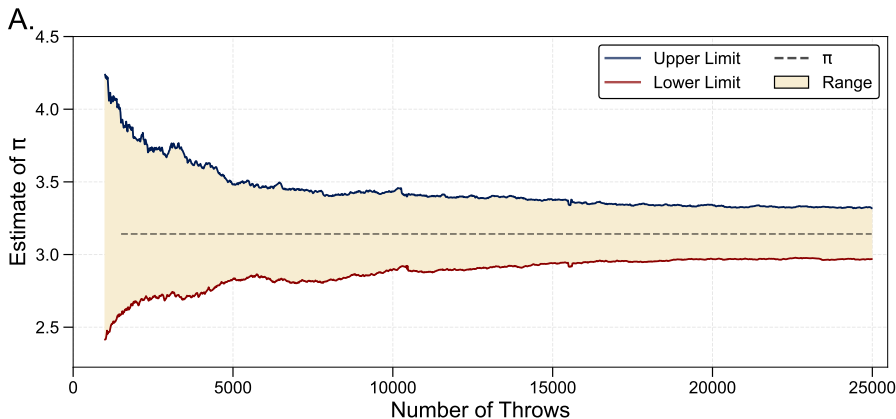
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- This is an extremely important and scarcely research problem.
- Pseudo-Random Number Generators occur **everywhere!**
- The variation in estimand can be **huge**.
- We bring attention to this through multiple types of replications.
 - Simulations, machine learning, and inferential research.

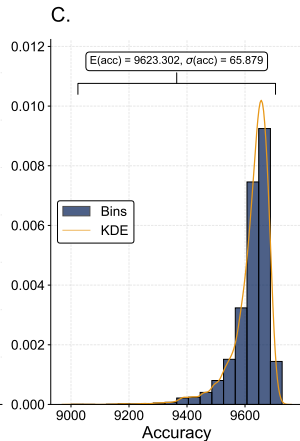
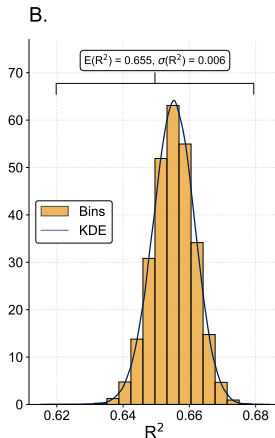
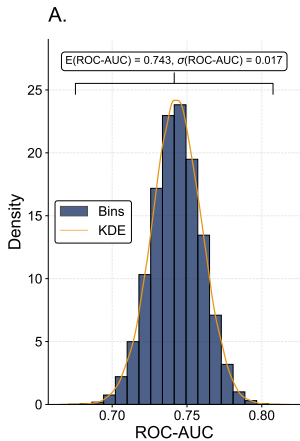
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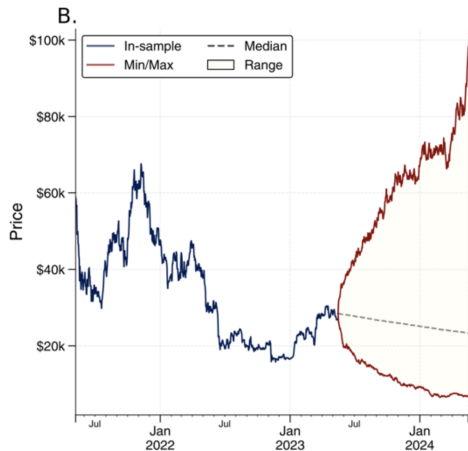
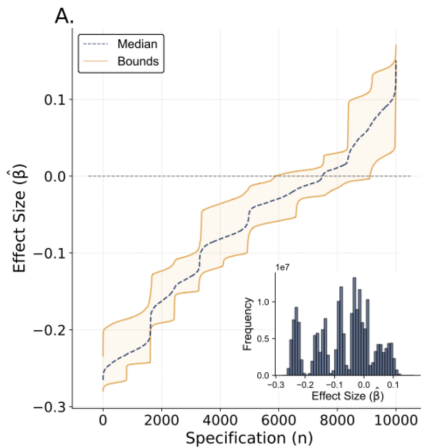
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- **Replication:** We can consider whether an original result is in the tail of our distribution (or IQR?) or not.



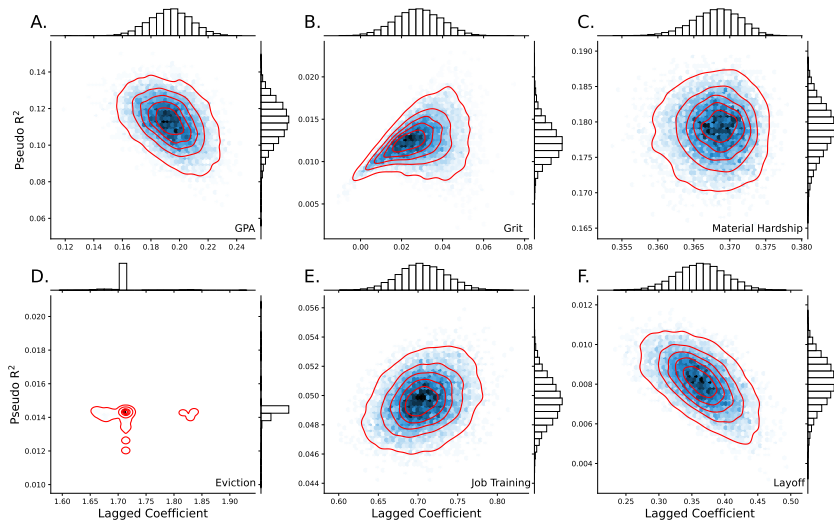
‘From a Seed of Doubt Grows a Forest of Uncertainty’
With Arun Frey, Jiani Yan and Mark Verhagen



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I hope I've been able confer my excitement, enthusiasm and inspiration for:

- 'Assumption free' social science.
- 'Semi-structured' data found 'in the wild'.
- Openness and Transparency in research.

If just one paper, program, or better estimators enters scientific record, everything worth while it 😊.

Thank you for attending!

Thank you to my collaborators!

Don't hesitate to get in touch at:

charles.rahall@demography.ox.ac.uk

and

github.com/crahall!

Temporary page!

$\text{\LaTeX}$ was unable to guess the total number of pages correctly, so there was some unprocessed data that should have been at the end of the final page this extra page has been added to receive it. If you rerun the document (without altering it) this surplus page will go away, because $\text{\LaTeX}$ now knows how many pages to expect at the end of this document.