

Reproducibility Standards in Economics (and beyond)

JHU FOSSProF Summative Event

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REMARK Motivation

- Econ lags in reproducibility practices
- State of field: for *published* papers
 - **.zip** archive has *some files*
 - ⇒ rarely works 'out of the box'
 - Top-5 journals have a 'data editor'
 - ⇒ Very expensive
 - ⇒ Excellent barrier to competition
 - ⇒ Data \neq results

Econ-ARK REMARK solutions

- *Standards* for reproducibility of compute
 - self-contained and complete projects
 - executable on any modern computer
- Emphasis on:
 - minimally good code
 - ⇨ enforced algorithmically
 - ⇨ would be huge improvement
 - ⇨ “ChatGPT, fix my documentation”
 - explicit claims (“Risk Aversion: [2.5,3.5]”)
 - standardized metadata

So Far: About 23+3 REMARKs

- Many replicating canonical papers
- Three new ones created for FossProF:
 - Imai_Keane (2004) by John Green
 - DeNardi (2004) by Ashish Kumar
 - Aiyagari (1994) by Adam Edwards
- Paul Romer:
 - This is the future of academic publishing

Jointly Reproducible: Code and Math and Text

- Solved: most computational aspects
 - [Docker containers](#) for universality
 - ↔ Linux, Windows, MacOS, AWS, ...
 - version control (git/[GitHub](#)) = ownership
 - [cff references](#) make it findable/indexable
 - [Zenodo](#): independent “release” archiving

Math and Text *with* Code?

- *L**A**T**E**X* is standard for text, but...
 - definitely *not lightweight*
 - no dynamically executable content
- Now: tenuous connection *between* text and code
 - “where is equation 18 implemented?”
 - ⇔ in a gestalt of interactions
- Future:
 - “this math: implemented by this code”

FOSSProF → Curvenote




















Funding let us hire open source contractor - To do things we could not do

At our direction:





- Integrated [MyST Markdown](#) into REMARK
- Filled gaps in tools to integrate text, math, and code
- Improved *L^AT_EX* → MyST engine
 - Tools required for some of our REMARKs

[Link to FOSSProF Final Report](#)

Curvenote: *L^AT_EX*

- ✓ Math spacing for latex export   [Fix math-spacing in paragraphs](#) [jupyter-book/mystmd#1032](#) [0.5 days]
- ✓ Parsing `longtable` and other tabular environments [2 days]   [Improve LaTeX table parsing](#) [jupyter-book/mystmd#1041](#)
- ✓ Simple table alignment `| c |`
- ✓ Better documentation of latex [0.5 days] --> myst   [Document writing in LaTeX](#) [jupyter-book/mystmd#1086](#)
- ✓ Recursive includes/inputs in latex [3 days]   [Support recursive includes in myst and tex](#) [jupyter-book/mystmd#1082](#)
- ✓  [Include latex snippets \(tables\)](#) [jupyter-book/mystmd#797](#)
- ✓ Page break: [1 day]  [Page break](#) [jupyter-book/mystmd#714](#)
- ✓ Supporting macros/frontmatter across files [1.5 days]   [Frontmatter in `include` files removed, math/abbreviations maintained](#) [jupyter-book/mystmd#1156](#)
- ✓ Supporting math macros information [2 days]   [Give title/description to math macros](#) [jupyter-book/mystmd#1218](#)
- ✓ Supporting extends [4 days]   [Add `extends` field to myst.yml for composing multiple yamls](#) [jupyter-book/mystmd#1215](#),   [Fetch config extensions from URL](#) [jupyter-book/mystmd#1251](#)
- ✓ Supporting `stigma` ([example](#))
- ✓ Sharing math macros, including via web-request  [Separate math macros file](#) [jupyter-book/mystmd#336](#)

Curvenote: Computation

- <https://github.com/econ-ark/EpiExp>
 - extend to computational models [1day]
- <https://github.com/llorracc/SolvingMicroDSOPs> [5days] (produces both paper and lecture notes)
 -   [Differentiate behavior of newcommand, renewcommand, providecommand](#) [jupyter-book/mystmd#1343](#)
 -   [Add wrapfigure latex environment](#) [jupyter-book/mystmd#1342](#)
 - Finish up work and present progress [1 day]
 - hpytertargets
 - example of subfiles
- <https://github.com/econ-ark/BufferStockTheory>

Journal of Open Source Economics

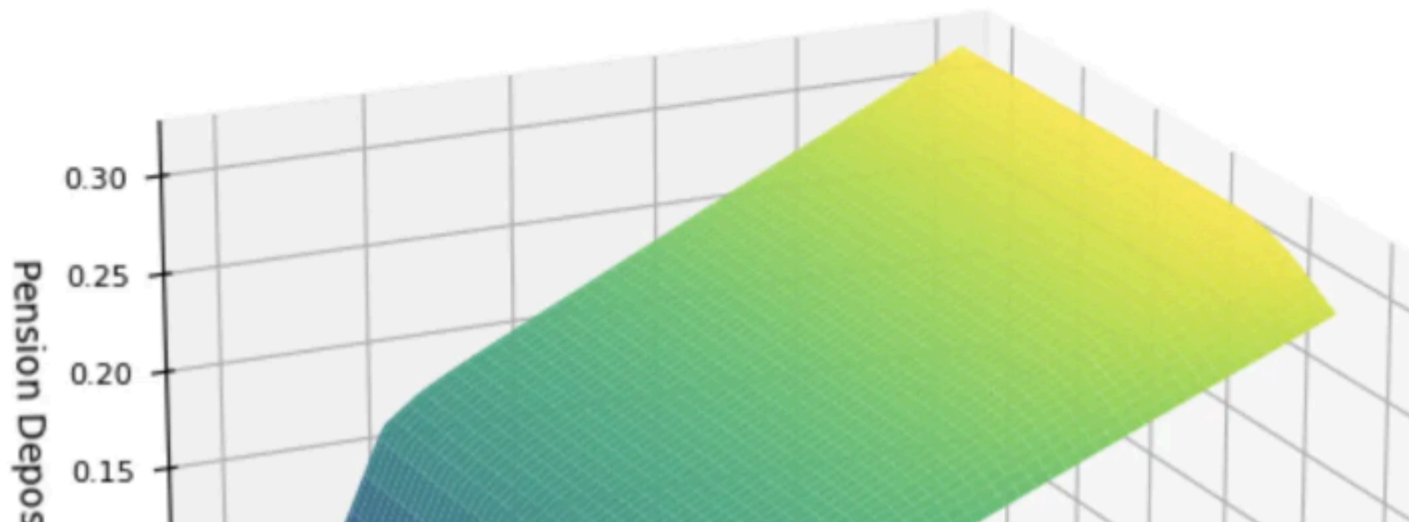
💡 Explorable Figures - Compute backed Interactivity

This paper contains interactive elements and includes a number of computational notebooks. Press the power and play button below to make this plot interactive. See all the code, run the notebook that creates this and a number of other notebooks in the [Supporting Documents sections](#).

🔄 Source: Jupyter Notebook



Cons Pension Model



Not Specific to Economics!

- conceived for projects using Econ-ARK
 - ... but doesn't require Econ-ARK
- Not bound to economics *in any way*

Rebranding: REMARK → SCI-PASS

- **S**cholarly **C**ommunication **I**nfrastructure for **P**ublishing and **A**rchiving **S**cientific **S**oftware
- Ambition:
 - universal standard for repr compute
 - ⇔ nothing now exists (we've looked)
- Also short for “**scientific passport**”
 - portability/sharing of research outputs

Long-Term Goal: ISO standard

- Adoptable by journals, libraries, archives ...
- Existing software standards got started this way
 - Somebody needed it for their own purposes
- Members of our team:
 - SB: “Information Science” PhD
 - ↔ connection to archivists, librarians
 - AS: Economics PhD
 - ↔ Vetted ISO software standards for Oz