MATLAB Documentation for Trew, 'Endogenous Infrastructure Development and Spatial Takeoff in the First Industrial Revolution'

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Description

The following are the main files and their structure. As a demonstration, just open `EISTinit.m`, point MATLAB to the folder and run with the given initial conditions. For the most part the code should be adequately annotated and straightforward to follow. Please get in touch with me if there is something unclear (alextrew@fastmail.fm).

1   `EISTinit.m` − master file

- Optionally run multiple instances by setting r > 1 (if you do, comment out the `EISTgraphs` and `EISTcf`)

- Parameterize

- Set model type

  - With endogenous infra or not

  - With counterfactuals or not (variables `infraavgr`, `smoother`, `timewarp`)

  - With subsidies or not

- Initial guess of $Ubar$, p_M, RI

- For each t

  - Call `EISTcalibinit.m` if $t == 1$

  - Call `pinfraopt.m` if $idum == 1$

  - Call `EISTsys.m`

  - Diffusion

- Call `EISTgraphs`

- Call `EISTcf`

- Save output to `/runs/` folder

2 `EISTcalibinit.m` − initial productivities, prices and wages

- Use initial guesses to get p_{Mg} and wg

- Invert data with price and wage guesses to get Z_A and Z_M

- Run a date 0 diffusion

- `fsolve EISTsysinit.m` given initial guesses

- Update guesses with the w and p_M that solve the model

- Pass productivities back to `EISTinit`

3 `EISTsysinit.m` − a run of one period

- Use initial productivities, prices to calculate wages, consumption, labour choices, non-innovating rent offers

- Calculate excess supplies

- Calculate prices

- Generate productivity draws

- Goods and labour market clearing

- Pass zeros or flags back to `EISTcalibinit`

4 `pinfraopt.m` − find optimal infrastructure

- Load vectors with parameters for parallel running

- Calculates permutations of infrastructure investments for each County

- Set kappa with and without for each County given Perms for other Counties

- Parfor over $Perms$

  - Call `EISTinfrasys` with and without
  - Evaluate gain

- Consolidate each time (if a County invests/doesn't in all Perms)

- Implement infra and pass kappa to `EISTinit`

5 `EISTinfrasys.m` − parallel version of `EISTsys.m` under each infra Perm

6 `EISTsys.m` − main solver at each t

- Calculate wages, consumption, labour choices, rent offers
- Innovation choices
- Calculate excess supplies
- Calculate prices
- Land sector decision
- Generate productivity draws
- Goods and labour market clearing
- Pass zeros or flags back to `EISTcalibinit`

7 `EISTgraphs.m`

Draw figures

8 `EISTcf.m`

Draw figures

9 `intPSTM500lat.mat`

- Adjusted interval representation of occupational data
- cols are:
  1. Primary
  2. Secondary
  3. Tertiary(ex profs and servs)
  4. Mining
  5. Textiles
  6. Total(P+S+T)

10   `indrevst2r.mat`

- Historical data (sources given in paper)

- cols are:

  1. year
  2. pc growth
  3. p_M/p_A
  4. real wage
  5. p_M/w
  6. agg. agriculture share (deprecated)
  7. northern agriculture share (deprecated)
  8. southern agriculture share (deprecated)
  9. land rent
  10. p_M
  11. net manu trade as a proportion of 1700 per capita
  12. linear trend of 11
  13. agg prim
  14. agg seco
  15. agg tert

11   `infraintdata.mat`

- To calculate initial distribution of transport costs from data. This is created by merging different modes as documented in paper.