README for code associated with solving the transition dynamics and steady state of of Equilibrium Technology Diffusion, Trade, and Growth by Perla, Tonetti, and Waugh (AER 2020)

Julia Source

The files in this package are installed and executed through installation in the top-level README.md. The files are:

- `params.jl` organizes parameters, settings, and initial conditions.
  - All of these may be swapped out using the named tuples.
  - To speed up loading pre-solved versions of the model, we store a cache in the `/data` folder where the name is defined by `model_cachename(...)` function in this file. The cachename is calculated by hashing all parameters and settings.
  - `load_parameters(..)` takes a CSV file with calibrated parameters (generated from the `/src/calibration` etc.) and creates the necessary structure for the Julia files.
- `static.jl` directly maps equations from the paper for the static equilibrium calculations from the parameters and intermediate values.
- `stationary.jl` calculates the stationary equilibrium and associated welfare analysis.
  - In particular `stationary_algebraic(parameters, settings)` solves the model as the system of equations specified in the main paper, and using the `static.jl` functions
  - `stationary_numerical(parameters, settings)` solves for the equilibrium using upwind-finite difference methods for the ODEs rather than solving as a system of equations. This is primarily used as the initial condition for the transition dynamics (which require ODEs).
  - `steady_state_from_g` is used by the `total_derivative` the welfare analysis
- `dynamic.jl` calculates the transition dynamics of the equilibrium between the two steady-states
  - The main entry-point is `solve_transition(parameters, settings)` which calculates the two steady states for the system of DAEs.
  - That, in turn iterates on the stock of varieties, `Ω` and solves the system of DAEs conditional on that sequence with `solve_dynamics(...)`. Convergence occurs when the entry residual is minimized, while the adoption decision is encapsulated in the DAE.
  - Finally, `prepare_results` generates a dataframe from the results.