

Readme-File for “Mortgage Default during the U.S. Mortgage Crisis” by Thomas Schelkle

General Remarks

The Zip-File contains the computer code and the publicly available data used to generate the results of the paper. The mortgage data from LPS is proprietary such that this data cannot be posted here (contact LPS to obtain this data from their online tool McDash Online). The code consists of 10 Matlab m-files (which were run on Matlab R2012a) and 11 data files in txt- or Excel-format in the subfolder “data”. In the following I explain how to generate all the results of the paper.

Data Preparation and Descriptive Statistics

Files: preparedata, descriptivestats

Run “preparedata” to load the mortgage data from 20 different Excel-Files and to save the relevant information in Matlab-Format. The code includes detailed comments on the format and content of these files, which shows how the mortgage data was downloaded from the LPS online tool.

Run “descriptivestats” to generate the descriptive statistics on loan characteristics at origination as reported in section 2.2 and all results reported in appendix A. The file also generates descriptive statistics of other variables, which are used to parameterize the structural model in section 5.

Reduced Form Models

Files: main_redform, simul_rfmodel

Run “main_redform” to generate the results of the reduced form models in the main text. In order to generate the results of the various robustness checks mentioned in the main text or contained in appendix B make the following changes to “main_redform” one at a time. In addition for each of these experiments one needs to change the range of grid points for the parameter estimation specified in the variables `defcutvec` and `defprobvec` such that the algorithm finds an interior minimum. For this purpose manually specify the boundaries of the grid such that it includes the respective estimated values of ϕ and ψ , which for convenience are reported in brackets below.

- Base default decision on nominal variables: `opt_realcond=false` ($\phi=-11.6\%, \psi=1.05\%$):
- Threshold model with a threshold depending on current price: `opt_cutPt=true` ($\phi=-13.5\%, \psi=1.05\%$)
- Estimate models on other cohorts: `cohortfit=2` (2003, $\phi=-10.5\%, \psi=1.25\%$), 4 (2005, $\phi=-13.9\%, \psi=1.49\%$), 7 (2008, $\phi=-17.5\%, \psi=1.23\%$)
- Estimate models on all cohorts/in sample fit: `cohortfit=8` ($\phi=-15.9\%, \psi=1.36\%$)
- Abstract from changes to LTV distributions across cohorts: `opt_varorig_LTV=false` ($\phi=-11.1\%, \psi=1.05\%$)
- Abstract from within cohort differences in initial LTVs: `opt_LTVheterog=false` ($\phi=-10.6\%, \psi=1.11\%$)

- Abstract from within cohort differences in initial LTVs, and from changes to the initial LTV and mortgage rate across cohorts: `opt_LTVheterog=false; opt_varorig_LTV=false; opt_varorig_rm=false` ($\phi=-10.4\%, \psi=1.14\%$)
- Use uniform distribution of individual house price shocks: `opt_hpind_dist=2` ($\phi=-11.0\%, \psi=1.03\%$)
- Allow default parameters to vary over the course of the loan: `opt_timespecpara=true`
- Use 120+ days default definition: `defdatanumb=120; backdate=3` ($\phi=-11.9\%, \psi=0.83\%$)
- Use in foreclosure default definition: `defdatanumb=180; backdate=6` ($\phi=-12.4\%, \psi=0.70\%$)
- Use data for initial LTVs of 75-84% without second mortgages: `LTVnumb=8` ($\phi=0\%, \psi=99.56\%$)
- Use data for initial LTVs of 75-84% with second mortgages: `LTVnumb=8; opt_secondmortgage=true` ($\phi=-7.8\%, \psi=2.25\%$)

Structural Model

Files: `main`, `distancefunc`, `solvepolicy`, `simulmodel`, `params`, `inspect_theta`

Requirements: “`solvepolicy`” uses the function “`qnwnorm`” of Miranda/Fackler’s `CompEcon` toolbox for Matlab (available at: <http://www4.ncsu.edu/~pfackler/compecon/toolbox.html>)

Run “`main`” to generate the results of the structural model in the main text. In order to generate the results of the various robustness checks and alternative specifications mentioned in the main text or contained in appendix C make the following changes one at a time. In addition one needs to change the range of grid points for the parameter estimation specified in the variable `thetavec` in “`main`” such that the algorithm finds an interior minimum. For this purpose manually specify the boundaries of the grid such that it includes the respective estimated value of θ , which for convenience is reported in brackets below.

- Lower β : `betta=0.85` in “`params`” ($\theta=0.39$)
- Higher β : `betta=0.95` in “`params`” ($\theta=0.16$)
- Lower γ : `gama=2` in “`params`” ($\theta=0.06$)
- Higher γ : `gama=8` in “`params`” ($\theta=0.64$)
- Role of direct utility benefit (The code does not allow to directly estimate β instead of θ . Instead the idea is to manually change β until the code estimates θ equal to 0): `betta=0.997` in “`params`”, `thetavec=[-0.01:0.005:0.01]` in “`main`”
- Role of direct utility benefit for $\gamma=2$: `betta=0.947` in “`params`”, `thetavec=[-0.01:0.005:0.01]` in “`main`”
- Role of direct utility benefit for $\gamma=8$: `betta=1.042` in “`params`”, `thetavec=[-0.01:0.005:0.01]` in “`main`”
- Role of Inflation: `pii=0.01` in “`params`” ($\theta=0.44$)
- Use 120+ days default definition: `defdatanumb=120; backdate=3` in “`main`” ($\theta=0.32$)
- Use variable separation and finding rates: `opt_var_sf = false` in “`params`” ($\theta=0.27$)
- Higher house price expectations: `mu_rh_agg = ... + 0.01./[1;4;12]` in “`params`” ($\theta=0.26$)

- Value of $\theta=0.28$ in terms of permanent income change: First compute benchmark results, then compute results with $DTI=0.394$ in “params” and $opt_estalg=0$, $\theta=0$ in “main”, afterwards run “inspect_theta”
- Structural Single-Trigger Model: $\rho=1$, $DTI=0.4085$, $\psi=75$, $opt_bufferA0=false$, $gp_x0=300$, $gp_s0=3000$, $curvpara=1$ in “params” ($\theta=-0.035$)

Hints:

- Start a matlabpool before estimating θ to make use of parallelization.
- The code conducts the policy analysis also during the estimation of θ . If one is either not interested in the policy analysis for a certain robustness checks or if `thetavec` has more elements than the number of available workers then this is unnecessary and time consuming. An alternative is to first switch off the policy analysis by setting $opt_bailout=false$ in “params” and then run “main” to estimate θ . Afterwards one can set $opt_bailout=true$ again in “params” and set $opt_estalg=0$, $opt_solvesimul=[false;true]$ and $\theta=$ the respective previously estimated value of θ in “main” and then run “main” again which now simulates the model including the policy analysis only for the estimated value of θ .