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A comment on *Safe Assets* by Barro et al. (2022)

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Abstract

Barro et al. (2022) investigate the quantity of safe assets held in the cross-section of developed countries and find that the average safe-asset ratio (ratio of safe assets to total assets) was 37% in 2015 and has remained relatively stable over time. They also document a crowding-out coefficient for private bonds relative to public bonds of around -0.5. In the second part of the analysis, they simulate a heterogeneous agent model with rare disasters and risk aversion to match the empirical findings. This report seeks to reproduce and confirm their results. Overall, we were largely able to replicate their findings and propose a few robustness checks. Apart from two regression outputs for which the signs and significance do not change, our results are very close to those of the original paper. Alternative models and estimators do not change the signs or significance levels. A more systematic approach to the parameter values in the simulations also points towards solid conclusions.

KEYWORDS: Replication, reproducibility, robustness

JEL CODES: E44, E51, G11, G12, G51

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1. Introduction

The paper by Barro et al. (2022) uses financial balance sheet data from OECD countries (SNA 2008). The dataset covers 34 countries (33 OECD countries and Brazil). The time span varies across countries: data for the United States are available from 1950 to 2018, while for most other countries (24 out of 33), the data ranges from 1995 to 2015. In addition, the study uses the 2019 data from the US Survey of Consumer Finances (SCF).

The main goal of the reproduced article is to "*investigate the quantity of safe assets*". The paper is divided into an empirical part and a theoretical part. The first part presents descriptive statistics on the quantity of safe assets. These assets are defined as the sum of debt liabilities issued by the government, the central bank, and the financial sector. The authors consider four categories of debt liabilities: currency and deposits, debt securities, loans, and money-market fund shares. Following the methodology of Gorton et al. (2012), the authors estimate the safe-asset ratio for 34 OECD countries and find that, on average, this ratio was 37% in 2015. This safe-asset ratio has been relatively stable over time, with a share at around 30% for the US and approximately 43% for the other countries. Furthermore, the authors find a crowding out effect between public safe assets (issued by the government and central bank) and private safe assets (issued by financial institutions), highlighted on page 6 as "when public assets increase, private assets decline". Regression analysis of private safe assets on public safe assets yields a coefficient of -0.70 (SE 0.09) for the United States and -0.77 (SE 0.19) for non-US countries.

The present comment examines whether the analytical results of the paper by Barro et al. (2022) are reproducible and replicable. The OECD data are publicly available and can be downloaded from the OECD Statistics website at `https://stats.oecd.org`. Similarly, the SCF data are also publicly available and downloadable from `https://www.federalreserve.gov/econres/scfindex.htm.`. Our code, when added by the authors to the root of the provided replication package, can be easily executed.

We start by replicating the original Table 1 in the paper and find a weighted average safe-asset ratio of 36.9% across OECD countries, as shown in Table 1, in line with the main result in the paper. The safe-asset shares shown in the bottom panels of Figures 1, 2A, and 2B closely resemble the trend in the upper panels, which mirror the original Figures 1 and 2 from the paper. Moreover, our findings confirm the relatively stable nature of safe-asset ratios in the US and other OECD countries over time. A minor point related to Table 2 of the original paper is that the authors claim that "the cross-country correlation between the safe-asset ratio and the ratio of total assets to GDP is close to zero (Barro et al. 2022, p. 2080). We can confirm that the correlation coefficient is relatively low (0.10 for the whole panel data set), but the correlation coefficient is significantly different from zero (1 % significance level). Thus, there seems to be a relationship between the safe-assets ratio and the ratio of total assets to GDP. Furthermore, in Table 3, we replicate the original Table 3 in the paper and find a regression coefficient of private safe assets on public safe assets of -0.704 (SE 0.088) for the United States and -0.766 (SE 0.190) for non-US countries, consistent with the original results in the paper. However, when Table 3 is replicated using alternative software, the coefficient for the non-US countries decreases to -1.418 (SE 0.295). Finally, Table 4 reproduces Table 4 from the paper, which shows the distribution of wealth and safe asset holdings. Although we successfully replicated these results using the authors' original code, our attempt to replicate Table 4 using R, as we did for the previous outputs, was unsuccessful.

In the second part of the paper, Barro et al. (2022) establish a heterogeneous-agent model, similar to Longstaff and Wang (2012), incorporating risk aversion within a Lucas-tree world with rare macroeconomic disasters [Lucas (1978), Barro (2009)]. For most of the analysis, the authors assume log-utility. To solve the model beyond this simplified case, they use the Taylor projection algorithm proposed by Levintal (2018).

By calibrating the model to realistic parameters (i.e., including the average level of the safe-asset ratio, its stability over time, an annual risk-free rate of 1.0%, and an empirical unlevered equity premium of 4.2%), the authors underscore two noteworthy insights emerging from the model in the original paper. Firstly, these results in wealth and capital concentration levels are comparable to the high concentration found in empirical US data (where 5% of individuals own 60% of total wealth and 90% of aggregate capital). In addition, the model successfully reproduces the observed crowding-out effect between public and private safe assets, generating a negative correlation coefficient (-0.5), mirroring empirical observations.

To test the robustness of their model, the authors analyze steady-state variables (ownership shares of equity, financial assets, etc.) by systematically adjusting various model parameters individually. These parameters include the population share of type 1 agents (μ), the intertemporal elasticity of substitution (IES) (θ), the growth type change rate (ν) and the disaster probability (p). Summarizing their findings within this alternative framework, a change in the IES shows little impact on the steady-state safe asset ratio or rates of return. However, it significantly distorts the distribution of wealth and equity. An increase in the type-change rate leads to a substantial dilution of wealth and equity concentration, along with a significant drop in the safe-asset ratio. Moreover, an upward shift in the share of type 1 agents in the population increases the risk-free rate while reducing the equity premium. Nevertheless, this change has minimal impact on the steady state of the safe-asset ratio. Notably, the parameter with the most significant effect on steady-state variables compared to the model calibrated with empirical observations is the probability of disaster. Lower values lead the model to generate (mean) rates of return that are substantially different from those observed empirically (i.e., too high for the risk-free rate and too low for the equity premium) due to the low (average) volatility on the stock market. At the same time, in this scenario, the wealth and equity shares of type 1 agents, as well as the safe-asset ratio, fall considerably.

In our replication approach, we aim to delve deeper into the steady-state model's variables when adjusting parameters. From this perspective, we consider alternative parameter combinations rather than changing parameters individually. The results support the findings of the original paper. No parameter combination degrades the steady-state variables outrageously more, except when setting a low probability of disaster, which is in line with the findings of the original paper. Furthermore, we seek to replicate the dynamic paths following a disaster, as depicted in Figure 3 of the paper, using different model parameter settings. As shown in Figure 3, the dynamics of key variables, such as the type 1 agent's share of wealth and equity, the risk-free rate, and the safe-assets ratio, exhibit a similar trend to the original Figure 3 of the paper, even when deviating from empirically observed values. These variables all experience a decline of varying magnitudes before gradually returning to pre-disaster levels, assuming that no further disasters occur within the next ten years.

2. Reproducing the empirical results

In this comment, we aim to replicate four tables and three figures from Barro et al. (2022), which involve basic manipulations of the original raw data obtained from the OECD Statistics website, available for download at https://stats.oecd.org. We trust the authors and keep the files they provide. We proceed in two steps. First, we run the authors' Stata codes to reproduce the exact results from the paper. The codes are straightforward to execute and run flawlessly. Aside from a slight discrepancy observed in the last two columns of Table 2 in the original paper, the rest is accurately reproduced. In the second step, we translate all the Stata codes into R with the assistance of generative AI (ChatGPT). The results of this phase can be summarized as follows, where each object refers to the original content of the paper:

- **Table 1** is successfully reproduced.
- **Table 2** sees the first seven columns accurately reproduced, but the origin of the last two columns remains unclear.
- **Figure 1** closely matches the original, with a minor discrepancy noted around 2015 concerning the series of other OECD countries.
- **Figure 2A** is perfectly replicated.
- **Figure 2B** is almost perfectly reproduced, although there are slight deviations in the trends towards the end of the sample period.

Reproducing Table 3, which presents regression results that can be examined across different alternative specifications, requires additional time. Firstly, we encounter differences between Stata and R in certain instances, although these discrepancies do not significantly impact the conclusions drawn. Secondly, we explore the implications of employing HAC standard errors, which generally result in larger errors and reduced t-statistics. Although our figures reflect this, it does not push p-values over non-significant thresholds. Finally, we investigate the impact of adding time-fixed effects to the panel models proposed by the authors. While this adjustment reduces the magnitude of the estimates, it does not change their sign but reduces the level of statistical significance from the 1% significance level to the 5% significance level. Hence, despite exploring alternative model approaches, we conclude that all proposed coefficients are consistently negative.

Finally, we replicate Table 4 using the code provided by the authors. Although this section may not be central to the paper's core focus, the process of translating the corresponding Stata code to R presented more challenges compared to the rest of the replication package.

3. Reproducing the simulations

In the second part of the original paper, the authors conduct simulations using Matlab and set different parameter combinations. To provide a more systematic approach, we explore various combinations of the values presented in the original Tables 6 and 7. These parameters include

$$\Theta \in \{0.5, 1, 2\}, \qquad \mu \in \{0.05, 0.1\}, \qquad \nu \in \{0.02, 0.03\}, \qquad p \in \{0.02, 0.04\}.$$

The other values are fixed as follows:

$$\gamma_1 = 2.6,\ \ \gamma_2 = 4.15, \quad \text{or} \quad \gamma_1 = 2.5,\ \ \gamma_2 = 4.29, \quad \text{or} \quad \gamma_1 = 2.4,\ \ \gamma_2 = 4.54.$$

We present the alternative results in Tables 6a, 6b, and 6c below.

We find that no combination of parameters leads to conclusions significantly different from those in the original paper. Our replication notably led us to establish the following rule: the concentration of wealth and equity is all the more diluted when the gap between the risk aversion of the two agents is narrowed, when the IES and gross rate of the type change increase as well as when the share of type 1 agents in the population and the probability of disaster is shrunk. In addition, the safe asset ratio is shifted downwards by a reduction in the gap between agents' risk aversions and by a decrease in the probability of disaster.

In terms of asset returns, we observe that, as the probability of disaster decreases, the risk-free rate notably triples or even quadruples. However, a reduction in the probability of disaster moderately influences equity returns, especially when the IES is low. Nevertheless, for IES values equal to or exceeding 1, a significant divergence in equity returns emerges with the probability of encountering a disaster.

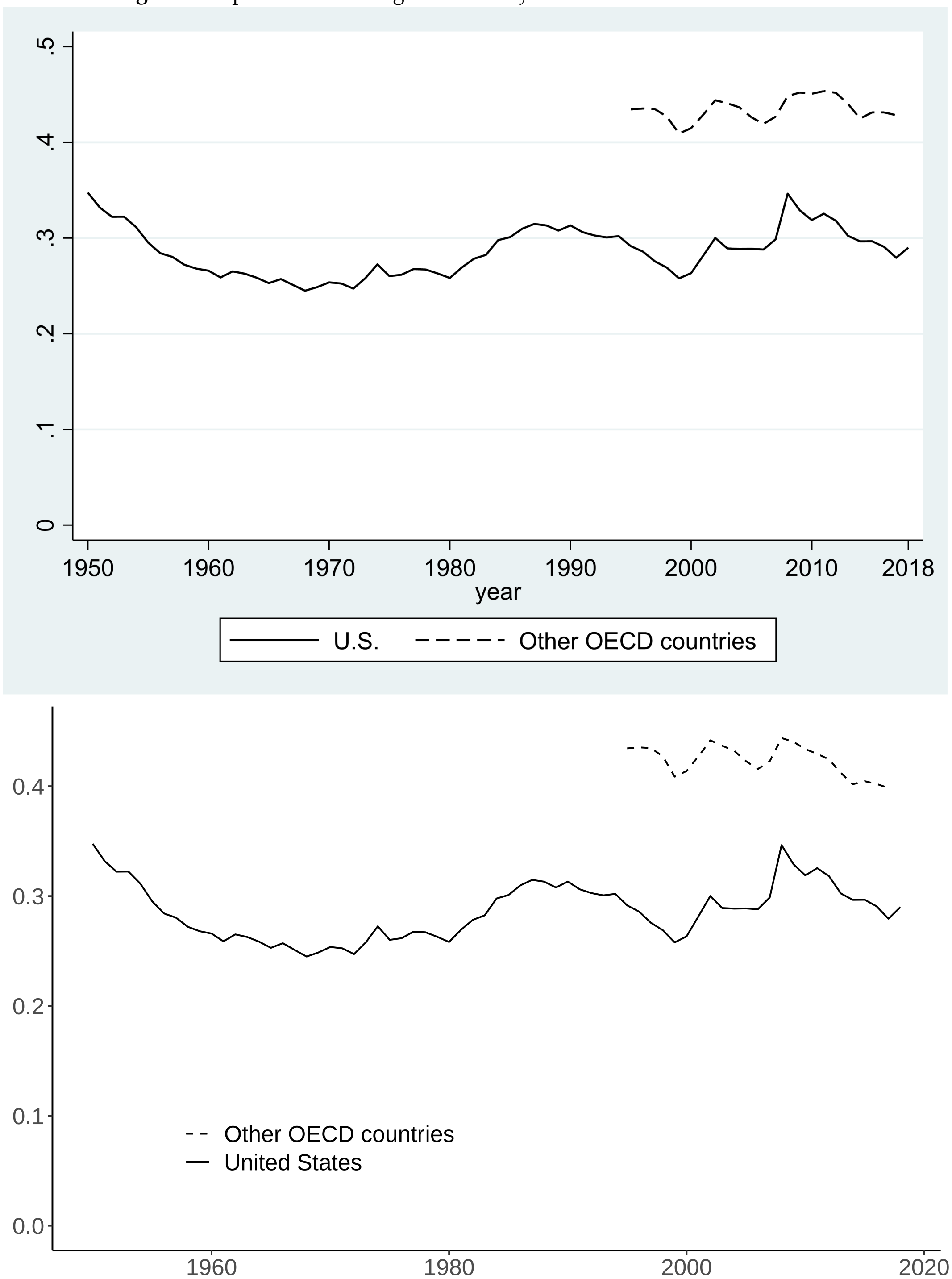
We also replicate Figure 3 in the original paper using alternative parameter values, as shown in Figure 3 below. The curves maintain the same shapes as in the original paper, with a steep decline in the first period followed by a linear increase. Despite the variations in the actual values, the observed patterns remain identical.

4. Conclusion

In this comment, we attempt to reproduce and replicate the findings of Barro et al. (2022). The vast majority of the results were successfully replicated, both in terms of empirical data and model simulations. Two regressions yielded different estimates, but the signs remained the same, as well as the significance level. Overall, the conclusions of the paper appear to be robust.

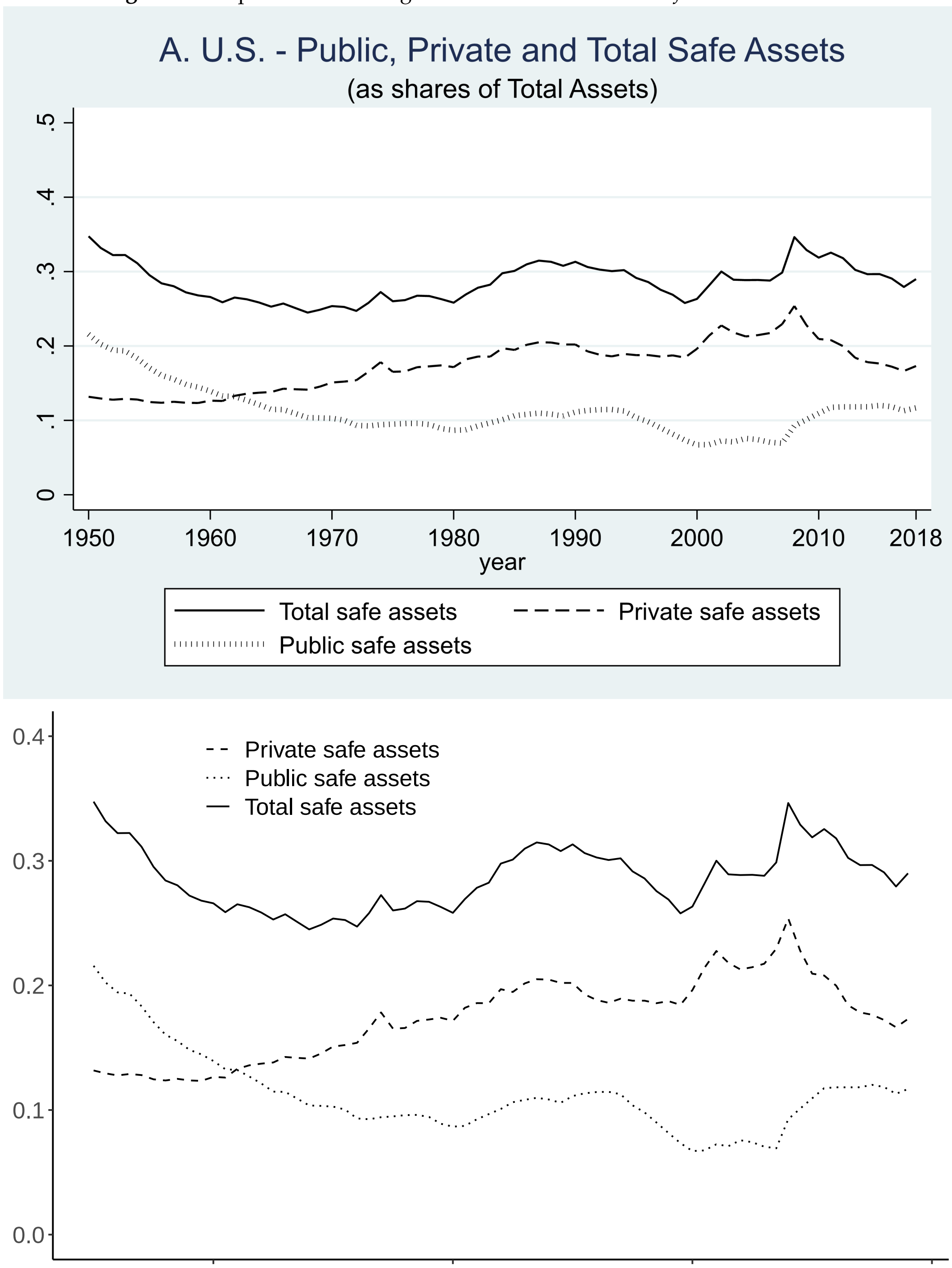
5. Figures

Figure 1. Reproduction of "Figure 1: *The Safe-Asset Ratio in OECD Countries*".



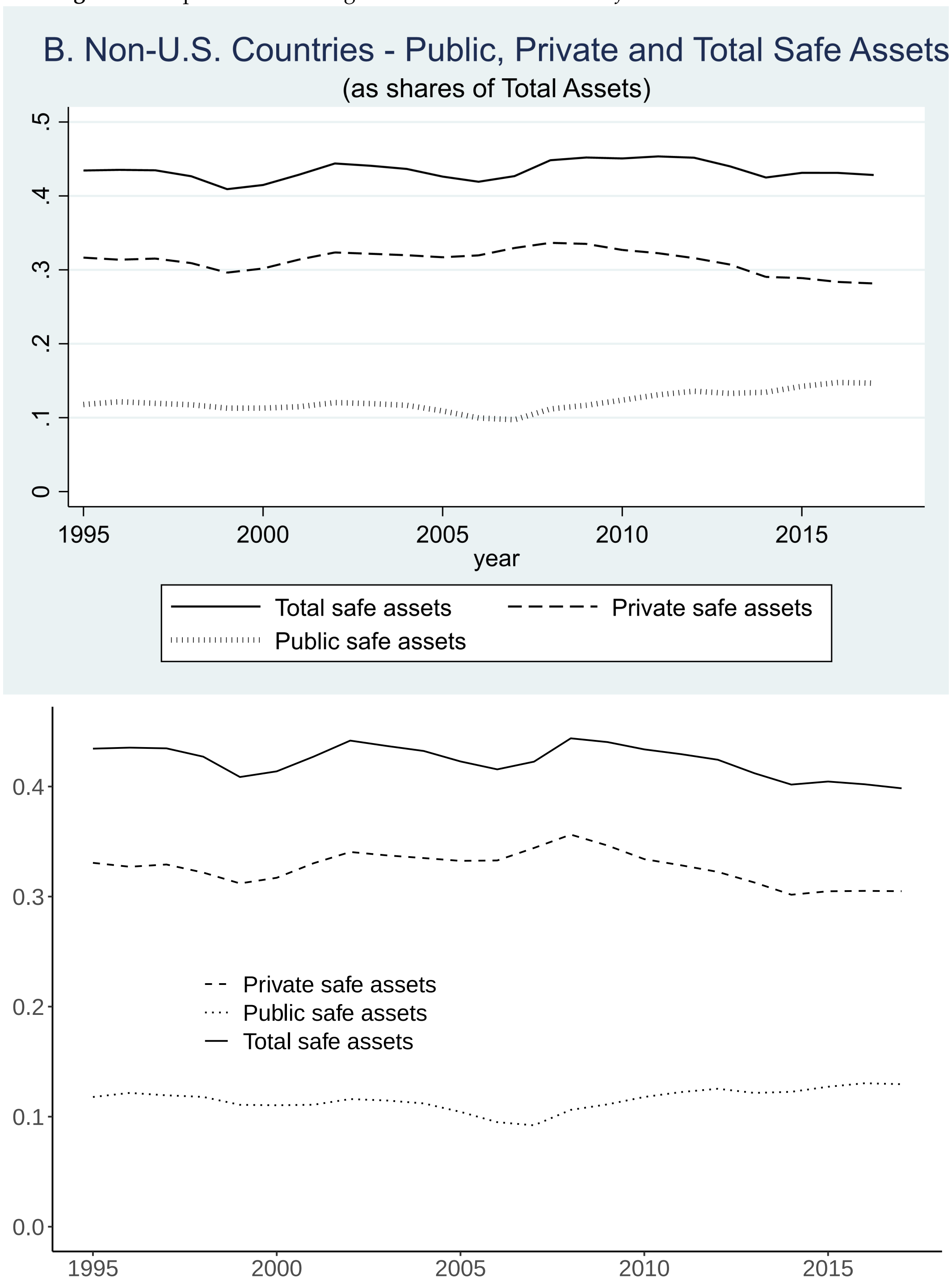
Note: The Top panel has been reproduced using the Stata code provided by the authors; the Bottom panel used the R code.

Figure 2A. Reproduction of "Figure 2A: *Public and Private Safe Assets in the US*".



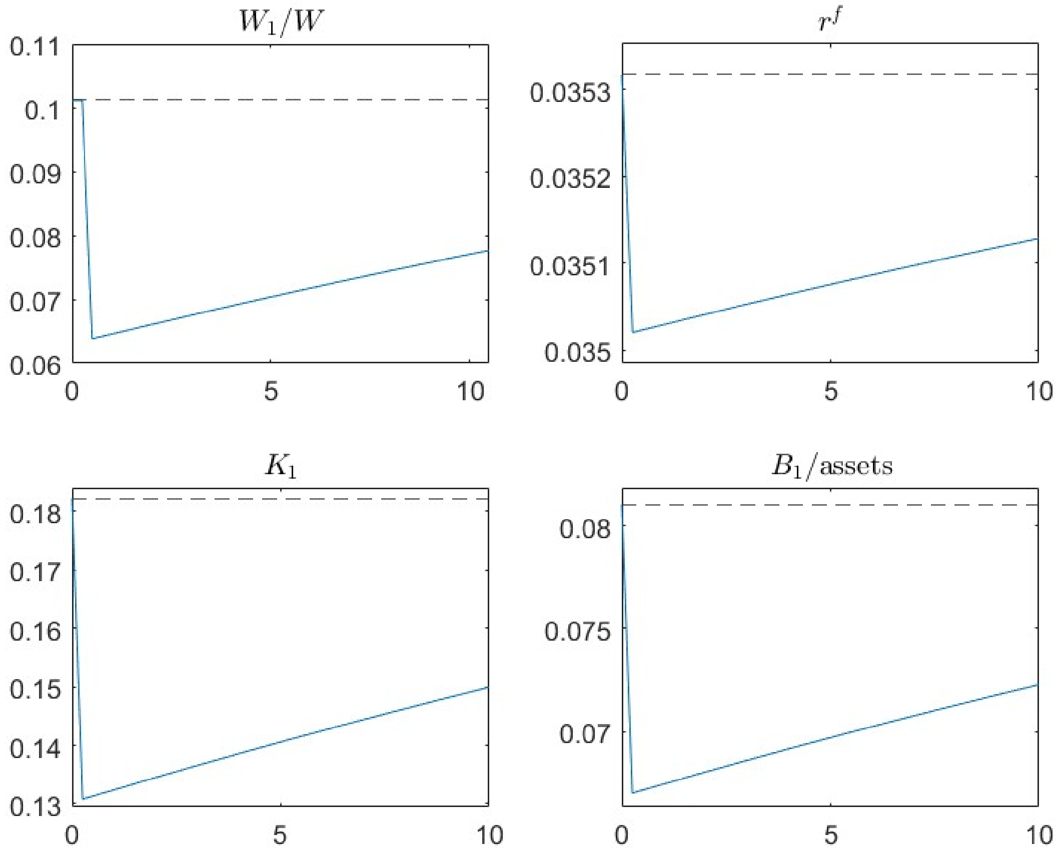
Note: The Top panel has been reproduced using the Stata code provided by the authors; the Bottom panel used the R code.

Figure 2B. Reproduction of "Figure 2A: *Public and Private Safe Assets in Non-US Countries*".



Note: The Top panel has been reproduced using the Stata code provided by the authors; the Bottom panel used the R code.

Figure 3. Replication of "Figure 3: *Dynamic Paths Following a Disaster.*"



Note: These results correspond to the case where $\Theta = 1.0$, $\gamma_1 = 2.6$, $\gamma_2 = 4.15$, $\mu = 0.05$, $\nu = 0.03$ and $p = 0.02$ in Table 6b. The simulated paths start from the steady-state value of $W1/W$, 0.101, then assume that a disaster of proportionate size 0.32 materialises in period 1. Subsequently, no further disasters occur. The panels show the dynamic paths after period 1 for agent 1's wealth share $W1/W$, the risk-free interest rate, r^f, agent 1's share of total equity, $K1$, and the ratio of the magnitude of safe assets to total assets over a period of ten years, $B1/assets$.

6. Tables

Table 1. Reproduction of "Table 1: *The Safe-Asset Ratio-OECD Countries (2015)*".

	$\frac{\text{Safe assets}}{\text{Tot assets}}$	$\frac{\text{Govt debt}}{\text{Tot assets}}$	$\frac{\text{CB debt}}{\text{Tot assets}}$	$\frac{\text{Fin debt}}{\text{Tot assets}}$	$\frac{\text{Tot assets}}{\text{GDP}}$
Austria	0.435	0.130	0.032	0.274	8.163
Belgium	0.366	0.113	0.014	0.240	12.217
Brazil	0.399	0.134	0.000	0.265	6.453
Canada	0.290	0.077	0.009	0.204	11.380
Chile	0.220	0.028	0.028	0.165	7.010
Czech Republic	0.396	0.101	0.070	0.225	4.817
Denmark	0.313	0.040	0.015	0.258	13.448
Estonia	0.269	0.030	0.050	0.189	6.000
Finland	0.343	0.082	0.026	0.235	8.522
France	0.374	0.092	0.022	0.260	12.454
Germany	0.456	0.103	0.037	0.316	7.608
Greece	0.655	0.267	0.123	0.265	6.965
Hungary	0.340	0.129	0.043	0.167	6.703
Iceland	0.252	0.054	0.029	0.169	12.857
Ireland	0.265	0.032	0.009	0.224	26.934
Israel	0.364	0.127	0.046	0.192	7.213
Italy	0.517	0.198	0.035	0.283	7.897
Japan	0.545	0.177	0.058	0.310	12.886
Korea	0.356	0.058	0.032	0.266	8.471
Latvia	0.432	0.088	0.088	0.255	4.868
Lithuania	0.388	0.155	0.073	0.159	3.854
Mexico	0.295	0.126	0.043	0.127	3.942
Netherlands	0.348	0.041	0.013	0.295	20.508
Norway	0.290	0.043	0.008	0.239	8.830
Poland	0.372	0.143	0.041	0.188	4.284
Portugal	0.463	0.167	0.055	0.241	10.329
Slovak Republic	0.430	0.176	0.000	0.255	4.221
Slovenia	0.428	0.209	0.042	0.178	5.216
Spain	0.477	0.136	0.040	0.301	9.595
Sweden	0.267	0.041	0.010	0.216	12.354
Switzerland	0.360	0.024	0.062	0.274	14.216
Turkey	0.338	0.085	0.042	0.211	3.921
United Kingdom	0.404	0.071	0.000	0.333	15.184
United States	0.297	0.097	0.024	0.176	10.388
weighted mean	0.369	0.103	0.027	0.240	11.420

Table 2. Reproduction of "Table 2: *Composition of Safe Liabilities Across Sectors (2015)*".

	Government		Central bank		Financial sector		
	Bonds	Deposits	Bonds	Deposits	Bonds	Deposits	MMF
Austria	0.802	0.198	0.000	1.000	0.224	0.776	0.000
Belgium	0.791	0.209	0.000	1.000	0.139	0.861	0.000
Brazil	0.758	0.242			0.233	0.767	0.000
Canada	0.946	0.054	0.000	1.000	0.306	0.694	0.000
Chile	0.967	0.033	0.459	0.541	0.231	0.692	0.078
Czech Republic	0.871	0.129	0.000	1.000	0.115	0.885	0.000
Denmark	0.739	0.261	0.224	0.776	0.488	0.512	0.000
Estonia	0.062	0.938	0.000	1.000	0.007	0.993	0.000
Finland	0.781	0.219	0.000	1.000	0.244	0.749	0.007
France	0.824	0.176	0.000	1.000	0.210	0.746	0.044
Germany	0.743	0.257	0.000	1.000	0.180	0.820	0.001
Greece	0.183	0.817	0.000	1.000	0.147	0.851	0.002
Hungary	0.854	0.146	0.000	1.000	0.075	0.894	0.030
Iceland	0.613	0.387	0.000	1.000	0.373	0.627	0.000
Ireland	0.646	0.354	0.000	1.000	0.331	0.669	0.000
Israel	0.967	0.033	0.301	0.699	0.213	0.770	0.017
Italy	0.817	0.183	0.000	1.000	0.226	0.774	0.000
Japan	0.865	0.135	0.000	1.000	0.134	0.866	0.000
Korea	0.911	0.089	0.432	0.568	0.223	0.750	0.027
Latvia	0.589	0.411	0.000	1.000	0.026	0.974	0.000
Lithuania	0.687	0.313	0.000	1.000	0.002	0.998	0.000
Mexico	0.894	0.106	0.018	0.982	0.111	0.889	0.000
Netherlands	0.705	0.295	0.000	1.000	0.329	0.669	0.002
Norway	0.506	0.494	0.000	1.000	0.365	0.623	0.012
Poland	0.738	0.262	0.234	0.766	0.036	0.964	0.000
Portugal	0.493	0.507	0.000	1.000	0.181	0.819	0.000
Slovak Republic	0.625	0.375			0.064	0.936	0.000
Slovenia	0.766	0.234	0.000	1.000	0.034	0.966	0.000
Spain	0.742	0.258	0.000	1.000	0.240	0.688	0.072
Sweden	0.758	0.242	0.267	0.733	0.418	0.566	0.015
Switzerland	0.658	0.342	0.000	1.000	0.084	0.916	0.000
Turkey	0.846	0.154	0.000	1.000	0.063	0.937	0.000
United Kingdom	0.872	0.128			0.193	0.807	0.000
United States	0.998	0.002	0.000	1.000	0.398	0.520	0.082

Notes: We did not replicate the last column of the original Table for Real Returns.

Table 3. Reproduction of "Table 3: *Regressions of Private Safe Assets on Public Safe Assets.*".

Case	Replication	Language	Coef.	SE	t-stat.	p-val.
United States	Original paper	STATA	−0.70	0.09	−7.778	0.000
	Run code	STATA	−0.704	0.088	−7.977	0.000
	R translation	R	−0.704	0.088	−7.977	0.000
	HAC SE	STATA	−0.704	0.075	−9.414	0.000
	HAC SE	R	−0.704	0.090	−7.822	0.000
Non-US countries	Original paper	STATA	−0.77	0.19	−4.053	0.000
	Run code	STATA	−0.766	0.190	−4.021	0.001
	R translation	R	−1.418	0.295	−4.810	0.000
	HAC SE	STATA	−0.766	0.171	−4.466	0.000
	HAC SE	R	−1.418	0.477	−2.973	0.007
OECD	Original paper	STATA	−0.70	0.24	−2.917	0.000
	Run code	STATA	−0.703	0.239	−2.941	0.008
	R translation	R	−0.943	0.275	−3.425	0.003
	HAC SE	STATA	−0.703	0.229	−3.070	0.006
	HAC SE	R	−0.943	0.324	0.910	0.008
OECD balanced panel	Original paper	STATA	−0.31	0.04	−7.750	0.000
	Run code	STATA	−0.311	0.038	−8.097	0.000
	R translation	R	−0.311	0.038	−8.097	0.000
	HAC SE	STATA	−0.311	0.078	−4.010	0.001
	HAC SE	R	−0.311	0.077	−4.013	0.000
	Year FE + HAC	STATA	−0.220	0.111	−1.974	0.060
	Year FE + HAC	R	−0.220	0.109	−2.014	0.044
OECD unbalanced panel	Original paper	STATA	−0.34	0.03	−11.333	0.000
	Run code	STATA	−0.335	0.033	−10.041	0.000
	R translation	R	−0.335	0.033	−10.041	0.000
	HAC SE	STATA	−0.335	0.073	−4.617	0.000
	HAC SE	R	−0.335	0.073	−4.62	0.000
	Year FE + HAC	STATA	−0.228	0.102	−2.246	0.034
	Year FE + HAC	R	−0.228	0.094	−2.425	0.016

Note: The first row of each panel reports the original values from the paper (2 digits for coefficients and standard errors). For the panel models, we enforced country-wise fixed effects. HAC SE refers to HAC estimations for standard errors. Year FE implies that we have added annual fixed effect *in addition* to the country-level fixed effects already present in the panel models.

Table 4. Reproduction of "Table 4: *Distribution of Wealth and Risky Assets (%).*".

	Bottom 90 %	90-95%	Top 5%	Top 1%
Net worth	23.5	11.5	64.9	37.2
All equity	11.5	9.6	79.0	50.0
Stocks	7.7	7.3	84.9	50.7
Stock funds	7.3	7.5	85.2	51.5
Business	6.0	5.1	88.8	64.6
Indirect stock holdings	25.0	19.5	55.5	23.7
Real estate	41.0	12.3	46.6	21.6
Other	29.6	9.3	61.1	37.0
Vehicles	74.9	8.3	16.8	6.3

Note: The Table has been reproduced using Stata.

Table 6a. Replication of "Table 6: *Alternative Parameter Values*" using $\Theta = 0.5$.

μ	ν	p	γ_1	γ_2	r^e	r^f	σ^e	σ^f	K_1	W_1/W	$\|B_1\|/W$	$\|B_1\|/Y$
0.1	0.03	0.02	2.6	4.15	0.053	0.031	0.046	0	0.384	0.229	0.155	1.5
0.1	0.03	0.02	2.5	4.29	0.053	0.031	0.046	0	0.459	0.266	0.193	1.86
0.1	0.03	0.02	2.4	4.54	0.053	0.03	0.046	0	0.586	0.331	0.255	2.44
0.1	0.03	0.04	2.6	4.15	0.053	0.014	0.065	0.001	0.636	0.429	0.207	1.67
0.1	0.03	0.04	2.5	4.29	0.054	0.014	0.065	0.001	0.778	0.516	0.262	2.11
0.1	0.03	0.04	2.4	4.54	0.054	0.014	0.066	0.001	0.99	0.647	0.343	2.75
0.1	0.02	0.02	2.6	4.15	0.053	0.032	0.046	0	0.52	0.336	0.184	1.78
0.1	0.02	0.02	2.5	4.29	0.053	0.032	0.046	0	0.635	0.402	0.233	2.25
0.1	0.02	0.02	2.4	4.54	0.053	0.032	0.046	0	0.82	0.51	0.31	2.98
0.1	0.02	0.04	2.6	4.15	0.053	0.016	0.065	0.001	0.942	0.688	0.254	2.07
0.1	0.02	0.04	2.5	4.29	0.053	0.017	0.065	0.001	1.115	0.803	0.311	2.54
0.1	0.02	0.04	2.4	4.54	0.053	0.017	0.066	0.001	1.341	0.954	0.387	3.15
0.05	0.03	0.02	2.6	4.15	0.053	0.03	0.046	0	0.225	0.133	0.092	0.89
0.05	0.03	0.02	2.5	4.29	0.053	0.029	0.046	0	0.284	0.163	0.121	1.15
0.05	0.03	0.02	2.4	4.54	0.054	0.028	0.046	0	0.398	0.225	0.174	1.64
0.05	0.03	0.04	2.6	4.15	0.054	0.011	0.065	0.001	0.457	0.307	0.15	1.2
0.05	0.03	0.04	2.5	4.29	0.054	0.011	0.065	0.001	0.614	0.407	0.207	1.65
0.05	0.03	0.04	2.4	4.54	0.054	0.011	0.065	0.001	0.867	0.567	0.299	2.37
0.05	0.02	0.02	2.6	4.15	0.053	0.031	0.046	0	0.341	0.219	0.122	1.17
0.05	0.02	0.02	2.5	4.29	0.053	0.03	0.046	0	0.455	0.288	0.167	1.61
0.05	0.02	0.02	2.4	4.54	0.053	0.03	0.046	0	0.662	0.413	0.249	2.38
0.05	0.02	0.04	2.6	4.15	0.053	0.014	0.065	0.001	0.816	0.596	0.221	1.78
0.05	0.02	0.04	2.5	4.29	0.053	0.015	0.065	0.001	1.025	0.738	0.286	2.32
0.05	0.02	0.04	2.4	4.54	0.053	0.016	0.066	0.001	1.295	0.923	0.373	3.01

Table 6b. Replication of "Table 6: *Alternative Parameter Values*" using $\Theta = 1.0$.

μ	ν	p	γ_1	γ_2	r^e	r^f	σ^e	σ^f	K_1	W_1/W	$\|B_1\|/W$	$\|B_1\|/Y$
0.1	0.03	0.02	2.6	4.15	0.058	0.037	0.046	0	0.325	0.183	0.142	1.18
0.1	0.03	0.02	2.5	4.29	0.058	0.036	0.046	0	0.38	0.206	0.174	1.45
0.1	0.03	0.02	2.4	4.54	0.058	0.035	0.046	0	0.472	0.246	0.226	1.88
0.1	0.03	0.04	2.6	4.15	0.052	0.011	0.065	0.001	0.478	0.301	0.177	1.48
0.1	0.03	0.04	2.5	4.29	0.052	0.01	0.065	0.001	0.583	0.358	0.225	1.87
0.1	0.03	0.04	2.4	4.54	0.052	0.009	0.065	0.001	0.752	0.451	0.3	2.5
0.1	0.02	0.02	2.6	4.15	0.058	0.037	0.046	0	0.396	0.238	0.158	1.32
0.1	0.02	0.02	2.5	4.29	0.058	0.037	0.046	0	0.475	0.277	0.198	1.65
0.1	0.02	0.02	2.4	4.54	0.058	0.036	0.046	0.001	0.603	0.342	0.262	2.18
0.1	0.02	0.04	2.6	4.15	0.052	0.013	0.065	0.001	0.659	0.446	0.212	1.77
0.1	0.02	0.04	2.5	4.29	0.052	0.013	0.065	0.001	0.804	0.534	0.269	2.24
0.1	0.02	0.04	2.4	4.54	0.052	0.013	0.065	0.002	1.016	0.662	0.354	2.95
0.05	0.03	0.02	2.6	4.15	0.058	0.035	0.046	0	0.182	0.101	0.081	0.67
0.05	0.03	0.02	2.5	4.29	0.058	0.034	0.046	0	0.221	0.118	0.102	0.85
0.05	0.03	0.02	2.4	4.54	0.058	0.032	0.046	0	0.291	0.151	0.14	1.16
0.05	0.03	0.04	2.6	4.15	0.052	0.008	0.065	0	0.304	0.19	0.113	0.95
0.05	0.03	0.04	2.5	4.29	0.052	0.007	0.065	0.001	0.401	0.247	0.155	1.29
0.05	0.03	0.04	2.4	4.54	0.052	0.005	0.065	0.001	0.578	0.348	0.229	1.91
0.05	0.02	0.02	2.6	4.15	0.058	0.036	0.046	0	0.235	0.14	0.095	0.79
0.05	0.02	0.02	2.5	4.29	0.058	0.035	0.046	0	0.299	0.173	0.125	1.04
0.05	0.02	0.02	2.4	4.54	0.058	0.033	0.046	0	0.416	0.236	0.18	1.5
0.05	0.02	0.04	2.6	4.15	0.052	0.01	0.065	0.001	0.487	0.33	0.157	1.31
0.05	0.02	0.04	2.5	4.29	0.052	0.01	0.065	0.001	0.649	0.433	0.216	1.8
0.05	0.02	0.04	2.4	4.54	0.052	0.01	0.065	0.002	0.899	0.588	0.311	2.59

Table 6c. Replication of "Table 6: *Alternative Parameter Values*" using $\Theta = 2.0$.

μ	ν	p	γ_1	γ_2	r^e	r^f	σ^e	σ^f	K_1	W_1/W	$\lvert B_1\rvert/W$	$\lvert B_1\rvert/Y$
0.1	0.03	0.02	2.6	4.15	0.069	0.047	0.046	0	0.293	0.158	0.135	0.88
0.1	0.03	0.02	2.5	4.29	0.069	0.046	0.046	0	0.338	0.174	0.164	1.08
0.1	0.03	0.02	2.4	4.54	0.068	0.044	0.046	0	0.412	0.202	0.21	1.4
0.1	0.03	0.04	2.6	4.15	0.049	0.008	0.064	0.001	0.411	0.246	0.164	1.48
0.1	0.03	0.04	2.5	4.29	0.048	0.007	0.064	0.001	0.497	0.288	0.208	1.9
0.1	0.03	0.04	2.4	4.54	0.047	0.005	0.063	0.002	0.646	0.363	0.283	2.66
0.1	0.02	0.02	2.6	4.15	0.069	0.048	0.046	0	0.333	0.188	0.145	0.94
0.1	0.02	0.02	2.5	4.29	0.069	0.047	0.046	0	0.391	0.213	0.178	1.17
0.1	0.02	0.02	2.4	4.54	0.069	0.045	0.045	0.001	0.49	0.257	0.234	1.55
0.1	0.02	0.04	2.6	4.15	0.049	0.009	0.064	0.001	0.523	0.334	0.19	1.69
0.1	0.02	0.04	2.5	4.29	0.049	0.009	0.063	0.001	0.642	0.399	0.243	2.19
0.1	0.02	0.04	2.4	4.54	0.048	0.008	0.062	0.002	0.839	0.506	0.333	3.06
0.05	0.03	0.02	2.6	4.15	0.069	0.046	0.046	0	0.16	0.085	0.075	0.5
0.05	0.03	0.02	2.5	4.29	0.069	0.044	0.046	0	0.189	0.096	0.093	0.62
0.05	0.03	0.02	2.4	4.54	0.068	0.041	0.046	0	0.242	0.118	0.124	0.83
0.05	0.03	0.04	2.6	4.15	0.048	0.004	0.064	0.001	0.247	0.147	0.099	0.91
0.05	0.03	0.04	2.5	4.29	0.048	0.002	0.064	0.001	0.318	0.185	0.133	1.25
0.05	0.03	0.04	2.4	4.54	0.046	-0.001	0.063	0.002	0.459	0.26	0.199	1.92
0.05	0.02	0.02	2.6	4.15	0.069	0.046	0.046	0	0.188	0.105	0.083	0.55
0.05	0.02	0.02	2.5	4.29	0.069	0.045	0.046	0	0.229	0.124	0.106	0.7
0.05	0.02	0.02	2.4	4.54	0.068	0.042	0.046	0.001	0.309	0.162	0.147	0.98
0.05	0.02	0.04	2.6	4.15	0.049	0.006	0.064	0.001	0.349	0.223	0.126	1.15
0.05	0.02	0.04	2.5	4.29	0.048	0.005	0.063	0.001	0.466	0.292	0.175	1.61
0.05	0.02	0.04	2.4	4.54	0.047	0.004	0.063	0.002	0.681	0.415	0.266	2.51

References

Barro, R. J.: 2009, Rare Disasters, Asset Prices, and Welfare Costs, *American Economic Review* **99**(1), 243–64.

Barro, R. J., Fernández-Villaverde, J., Levintal, O. and Mollerus, A.: 2022, Safe Assets, *The Economic Journal* **132**(646), 2075–2100.

Gorton, G., Lewellen, S. and Metrick, A.: 2012, The Safe-Asset Share, *American Economic Review* **102**(3), 101–06.

Levintal, O.: 2018, Taylor Projection: A New Solution Method for Dynamic General Equilibrium Models, *International Economic Review* **59**(3), 1345–1373.

Longstaff, F. A. and Wang, J.: 2012, Asset Pricing and the Credit Market, *The Review of Financial Studies* **25**(11), 3169–3215.

Lucas, R. E.: 1978, Asset Prices in an Exchange Economy, *Econometrica* **46**(6), 1429–1445.