Credit Cycles, Fiscal Policy, and Global Imbalances*

Online Appendix

Not for Publication

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A Additional Tables

Tables A.1 to A.3 provide additional empirical results on the correlation between credit-to-GDP and the current account and different horizons.

Table A.1: Correlation Between 1Y Δ in Credit-to-GDP at t+k and the Current Account at t

Country \ k	-3	-2	-1	0	1	2	3
Argentina	0.00	-0.20	-0.37	-0.17	-0.02	-0.17	-0.14
Australia	0.22	0.07	-0.12	-0.48	-0.46	-0.25	-0.19
Austria	-0.12	-0.14	-0.11	-0.07	0.02	-0.02	-0.06
Belgium	-0.10	-0.04	0.02	-0.31	-0.08	-0.08	-0.10
Brazil	0.02	0.06	0.25	0.17	-0.10	-0.22	-0.03
Canada	-0.08	0.01	0.01	-0.29	-0.41	-0.37	-0.40
Chile	-0.28	-0.11	-0.06	-0.55	-0.40	-0.06	-0.23
China	0.17	0.17	0.05	-0.21	-0.42	-0.49	-0.30
Colombia	0.11	-0.02	-0.42	-0.63	-0.61	-0.36	-0.29
Czech Republic	0.08	0.26	0.15	0.05	0.31	0.45	0.40
Denmark	-0.07	-0.09	-0.20	-0.28	-0.24	-0.21	-0.08
Finland	0.29	0.15	-0.05	-0.22	-0.31	-0.41	-0.38
France	-0.14	-0.16	-0.38	-0.49	-0.55	-0.52	-0.62
Germany	-0.19	-0.23	-0.28	-0.35	-0.42	-0.45	-0.41
Greece	-0.64	-0.69	-0.72	-0.73	-0.67	-0.49	-0.33
Hungary	-0.73	-0.64	-0.60	-0.49	-0.28	-0.01	0.11
India	0.56	0.46	0.32	0.08	0.19	-0.05	-0.14
Indonesia	0.12	0.03	-0.27	-0.44	-0.53	-0.48	-0.39
Ireland	0.53	0.20	-0.09	-0.41	-0.49	-0.61	-0.65
Italy	-0.01	-0.28	-0.61	-0.74	-0.79	-0.73	-0.61
Korea	0.22	-0.02	-0.47	-0.41	0.00	0.10	-0.01
Japan	0.07	0.32	0.38	0.00	-0.11	-0.25	-0.49
Malaysia	-0.09	-0.28	-0.51	-0.59	-0.47	-0.26	-0.23
Mexico	0.49	0.32	0.08	-0.44	-0.64	-0.61	-0.55
Netherlands	-0.01	-0.21	-0.39	-0.31	-0.14	-0.11	-0.12
Norway	0.36	0.44	0.34	0.06	-0.02	0.19	0.43
Peru	-0.01	-0.06	-0.30	-0.50	-0.43	-0.36	-0.25
Poland	-0.24	-0.32	-0.20	-0.44	-0.52	-0.46	-0.02
Portugal	-0.35	-0.59	-0.63	-0.66	-0.57	-0.50	-0.35
Russia	0.36	0.32	0.13	-0.10	0.09	0.09	-0.20
South Africa	0.27	0.23	0.05	-0.22	-0.25	-0.09	0.09
Spain	-0.21	-0.42	-0.66	-0.83	-0.91	-0.83	-0.66
Sweden	0.39	0.42	0.38	0.23	0.14	0.02	-0.08
Switzerland	0.15	0.02	-0.38	-0.34	0.04	-0.10	-0.07
Thailand	-0.18	-0.44	-0.70	-0.69	-0.46	-0.28	-0.11
Turkey	-0.55	-0.54	-0.50	-0.78	-0.63	-0.49	-0.59
United Kingdom	0.47	0.33	0.22	0.11	0.15	0.30	0.20
United States	0.07	-0.18	-0.46	-0.51	-0.48	-0.46	-0.45
Full sample, Mean	0.03	-0.05	-0.19	-0.34	-0.30	-0.25	-0.22
Full sample, Median	0.01	-0.03	-0.20	-0.38	-0.40	-0.25	-0.21
AEs, Mean	0.04	-0.04	-0.18	-0.32	-0.27	-0.24	-0.23
AEs, Median	0.03	-0.03	-0.16	-0.33	-0.27	-0.25	-0.26
EMDEs, Mean	0.00	-0.07	-0.19	-0.37	-0.34	-0.27	-0.21
EMDEs, Median	0.01	-0.04	-0.24	-0.44	-0.42	-0.27	-0.21

Sources: IMF World Economic Outlook database, Bank for International Settlements, World Development Indicators and authors' calculations.

Table A.2: Correlation Between 2Y Δ in Credit-to-GDP at t+k and the Current Account at t

Country \ k	-3	-2	-1	0	1	2	3
Argentina	-0.18	-0.50	-0.47	-0.17	-0.17	-0.28	-0.20
Australia	0.16	0.00	-0.30	-0.55	-0.42	-0.23	-0.20
Austria	-0.16	-0.15	-0.10	-0.03	0.01	-0.05	-0.14
Belgium	-0.15	-0.05	-0.27	-0.32	-0.12	-0.14	-0.14
Brazil	0.04	0.21	0.29	0.07	-0.18	-0.14	-0.01
Canada	-0.05	0.01	-0.21	-0.51	-0.57	-0.57	-0.50
Chile	-0.26	-0.11	-0.40	-0.60	-0.29	-0.18	-0.35
China	0.22	0.13	-0.14	-0.42	-0.60	-0.52	-0.31
Colombia	0.04	-0.28	-0.59	-0.73	-0.56	-0.36	-0.36
Czech Republic	0.23	0.28	0.13	0.24	0.50	0.57	0.58
Denmark	-0.07	-0.16	-0.24	-0.29	-0.25	-0.16	0.02
Finland	0.28	0.06	-0.17	-0.33	-0.45	-0.49	-0.50
France	-0.17	-0.31	-0.51	-0.61	-0.64	-0.69	-0.69
Germany	-0.35	-0.39	-0.46	-0.52	-0.59	-0.58	-0.50
Greece	-0.76	-0.81	-0.84	-0.82	-0.68	-0.48	-0.29
Hungary	-0.77	-0.68	-0.60	-0.45	-0.18	0.05	0.17
India	0.62	0.48	0.23	0.17	0.09	-0.12	-0.34
Indonesia	0.08	-0.15	-0.44	-0.59	-0.61	-0.53	-0.41
Ireland	0.45	0.06	-0.31	-0.49	-0.60	-0.69	-0.68
Italy	-0.14	-0.46	-0.71	-0.82	-0.82	-0.73	-0.58
Japan	0.23	0.40	0.14	-0.10	-0.22	-0.43	-0.49
Korea	0.14	-0.31	-0.55	-0.24	0.09	0.05	-0.03
Malaysia	-0.22	-0.46	-0.65	-0.61	-0.42	-0.28	-0.30
Mexico	0.41	0.22	-0.18	-0.59	-0.69	-0.65	-0.59
Netherlands	-0.14	-0.39	-0.45	-0.29	-0.16	-0.15	-0.20
Norway	0.51	0.48	0.30	0.07	0.15	0.42	0.58
Peru	-0.05	-0.19	-0.45	-0.52	-0.46	-0.32	-0.24
Poland	-0.31	-0.29	-0.35	-0.54	-0.55	-0.27	0.14
Portugal	-0.53	-0.68	-0.72	-0.69	-0.60	-0.49	-0.31
Russia	0.44	0.27	0.00	-0.01	0.11	-0.08	-0.34
South Africa	0.30	0.17	-0.09	-0.29	-0.21	0.01	0.24
Spain	-0.31	-0.55	-0.77	-0.90	-0.90	-0.78	-0.63
Sweden	0.48	0.47	0.38	0.24	0.12	0.00	-0.09
Switzerland	0.10	-0.22	-0.42	-0.16	-0.01	-0.07	-0.08
Thailand	-0.34	-0.64	-0.77	-0.63	-0.41	-0.21	-0.02
Turkey	-0.64	-0.61	-0.76	-0.81	-0.64	-0.62	-0.57
United Kingdom	0.44	0.29	0.16	0.14	0.27	0.31	0.21
United States	-0.06	-0.35	-0.53	-0.54	-0.52	-0.51	-0.50
Full sample, Mean	-0.01	-0.14	-0.31	-0.38	-0.32	-0.27	-0.23
Full sample, Median	-0.05	-0.16	-0.37	-0.47	-0.41	-0.28	-0.30
AEs, Mean	0.01	-0.13	-0.29	-0.34	-0.29	-0.27	-0.23
AEs, Median	-0.06	-0.15	-0.30	-0.32	-0.34	-0.33	-0.24
EMDEs, Mean	-0.04	-0.15	-0.34	-0.42	-0.36	-0.28	-0.22
EMDEs, Median	0.00	-0.17	-0.42	-0.53	-0.41	-0.28	-0.31

Sources: IMF World Economic Outlook database, Bank for International Settlements, World Development Indicators and authors' calculations.

Table A.3: Correlation Between 3Y Δ in Credit-to-GDP at t+k and the Current Account at t

Country \ k	-3	-2	-1	0	1	2	3
Argentina	-0.46	-0.60	-0.45	-0.29	-0.27	-0.33	-0.30
Australia	0.09	-0.15	-0.45	-0.56	-0.35	-0.23	-0.21
Austria	-0.16	-0.13	-0.05	-0.01	-0.02	-0.11	-0.16
Belgium	-0.11	-0.29	-0.28	-0.36	-0.19	-0.19	-0.24
Brazil	0.22	0.37	0.24	-0.12	-0.23	-0.17	-0.06
Canada	-0.04	-0.15	-0.40	-0.63	-0.70	-0.63	-0.56
Chile	-0.26	-0.39	-0.55	-0.55	-0.36	-0.32	-0.38
China	0.20	-0.04	-0.36	-0.65	-0.68	-0.55	-0.26
Colombia	-0.22	-0.48	-0.74	-0.72	-0.55	-0.40	-0.24
Czech Republic	0.26	0.23	0.26	0.43	0.55	0.64	0.68
Denmark	-0.09	-0.21	-0.26	-0.30	-0.22	-0.08	0.15
Finland	0.17	-0.06	-0.27	-0.43	-0.50	-0.56	-0.57
France	-0.28	-0.43	-0.60	-0.68	-0.74	-0.74	-0.73
Germany	-0.48	-0.54	-0.60	-0.64	-0.68	-0.63	-0.60
Greece	-0.83	-0.87	-0.87	-0.78	-0.62	-0.41	-0.19
Hungary	-0.77	-0.67	-0.56	-0.35	-0.10	0.09	0.17
India	0.60	0.39	0.24	0.09	0.00	-0.27	-0.43
Indonesia	-0.07	-0.32	-0.59	-0.69	-0.66	-0.54	-0.41
Ireland	0.31	-0.14	-0.43	-0.60	-0.69	-0.73	-0.75
Italy	-0.31	-0.59	-0.80	-0.86	-0.82	-0.70	-0.49
Japan	0.33	0.19	0.00	-0.20	-0.36	-0.44	-0.46
Korea	-0.14	-0.48	-0.44	-0.12	0.06	0.01	-0.15
Malaysia	-0.40	-0.63	-0.70	-0.58	-0.42	-0.35	-0.43
Mexico	0.32	-0.04	-0.50	-0.68	-0.70	-0.65	-0.51
Netherlands	-0.30	-0.44	-0.38	-0.27	-0.17	-0.20	-0.30
Norway	0.58	0.51	0.32	0.21	0.38	0.61	0.63
Peru	-0.16	-0.37	-0.52	-0.56	-0.41	-0.32	-0.22
Poland	-0.31	-0.39	-0.47	-0.58	-0.42	0.02	0.18
Portugal	-0.62	-0.74	-0.73	-0.70	-0.58	-0.44	-0.23
Russia	0.45	0.12	0.00	0.02	-0.02	-0.24	-0.52
South Africa	0.23	0.01	-0.22	-0.29	-0.13	0.13	0.27
Spain	-0.43	-0.68	-0.86	-0.92	-0.87	-0.74	-0.59
Sweden	0.55	0.51	0.40	0.25	0.12	0.01	-0.06
Switzerland	-0.12	-0.29	-0.26	-0.13	0.02	-0.04	-0.17
Thailand	-0.54	-0.76	-0.75	-0.57	-0.34	-0.13	0.08
Turkey	-0.67	-0.78	-0.81	-0.78	-0.70	-0.61	-0.51
United Kingdom	0.40	0.22	0.16	0.25	0.32	0.31	0.21
United States	-0.24	-0.47	-0.59	-0.59	-0.58	-0.57	-0.60
Full sample, Mean	-0.09	-0.25	-0.37	-0.39	-0.33	-0.28	-0.24
Full sample, Median	-0.13	-0.30	-0.44	-0.55	-0.36	-0.32	-0.25
AEs, Mean	-0.07	-0.23	-0.32	-0.35	-0.30	-0.27	-0.25
AEs, Median	-0.12	-0.25	-0.39	-0.40	-0.35	-0.32	-0.24
EMDEs, Mean	-0.11	-0.29	-0.42	-0.46	-0.38	-0.29	-0.22
EMDEs, Median	-0.19	-0.38	-0.51	-0.57	-0.39	-0.32	-0.28

Sources: IMF World Economic Outlook database, Bank for International Settlements, World Development Indicators and authors' calculations.

B Equilibrium of the Model

The equilibrium consists of the following equations for the home and foreign economies.

1) Consumption choices are optimized

$$c_t(v) = \min\left[\frac{v}{\frac{\beta}{q_t}P_t\mathbb{E}_t\mu_{t+1}}, x_t\right] \tag{B.1}$$

$$c_t^*(v) = \min\left[\frac{v}{\frac{\beta}{q_t}P_t^*\mathbb{E}_t\mu_{t+1}^*}, x_t^*\right] \tag{B.2}$$

2) Funds allocated to the goods market are optimized

$$P_t\mu_t = \frac{\beta}{q_t}P_t\mathbb{E}_t\mu_{t+1} + P_t\int_0^1 \xi_t(v)dF(v) \tag{B.3}$$

$$P_t^*\mu_t^* = \frac{\beta}{q_t}P_t^*\mathbb{E}_t\mu_{t+1}^* + P_t^*\int_0^1 \xi_t^*(v)dF(v) \tag{B.4}$$

3) Gross savings are allocated

$$a_{t+1} = \frac{P_t}{q_t}(x_t - c_t) \tag{B.5}$$

$$a_{t+1}^* = \frac{P_t^*}{q_t}(x_t^* - c_t^*) \tag{B.6}$$

4) Optimal private debt choice

$$q_t\mu_t = \beta\mathbb{E}_t\mu_{t+1} + q_t\lambda_t \tag{B.7}$$

$$q_t\mu_t^* = \beta\mathbb{E}_t\mu_{t+1}^* + q_t\lambda_t^* \tag{B.8}$$

5) Intermediate home goods markets demand

$$y_t^H = \kappa\left(\frac{P_t^H}{P_t}\right)^{-\sigma} y_t \tag{B.9}$$

$$y_t^{*H} = (1-\kappa^*)\left(\frac{P_t^H}{P_t^*}\right)^{-\sigma} y_t^* \tag{B.10}$$

6) Intermediate foreign goods markets demand

$$y_t^F = (1-\kappa)\left(\frac{P_t^F}{P_t}\right)^{-\sigma} y_t \tag{B.11}$$

$$y_t^{*F} = \kappa^*\left(\frac{P_t^F}{P_t^*}\right)^{-\sigma} y_t^* \tag{B.12}$$

7) Intermediate goods markets clear

$$\tilde{y}_t = y_t^H + y_t^{H*} \tag{B.13}$$

$$\tilde{y}_t^* = y_t^F + y_t^{*F} \tag{B.14}$$

8) Intermediate goods market production

$$\tilde{y}_t = \xi_{z,t} k_{t-1}^{\omega} n_t^{1-\omega} \tag{B.15}$$

$$\tilde{y}_t^* = \xi_{z,t}^* (k_{t-1}^*)^{\omega} (n_t^*)^{1-\omega} \tag{B.16}$$

9) Marginal product of capital

$$r_t = \omega\left(\frac{P_t^H}{P_t}\right)\xi_{z,t}\left(\frac{n_t}{k_{t-1}}\right) \tag{B.17}$$

$$r_t^* = \omega\left(\frac{P_t^F}{P_t^*}\right)\xi_{z,t}^*\left(\frac{n_t^*}{k_{t-1}^*}\right)^{1-\omega} \tag{B.18}$$

10) Marginal product of labor

$$w_t = (1-\omega)\left(\frac{P_t^H}{P_t}\right)\xi_{z,t}\left(\frac{n_t}{k_{t-1}}\right)^{-\omega} \tag{B.19}$$

$$w_t^* = (1-\omega)\left(\frac{P_t^F}{P_t^*}\right)\xi_{z,t}^*\left(\frac{n_t^*}{k_{t-1}^*}\right)^{-\omega} \tag{B.20}$$

11) Final goods price indices

$$P_t = \left[\kappa \left(P_t^H\right)^{1-\sigma} + (1-\kappa)\left(P_t^F\right)^{1-\sigma}\right]^{\frac{1}{1-\sigma}} \tag{B.21}$$

$$P_t^* = \left[(1-\kappa^*)\left(P_t^H\right)^{1-\sigma} + \kappa^*\left(P_t^F\right)^{1-\sigma}\right]^{\frac{1}{1-\sigma}} \tag{B.22}$$

12) Final good market clearing condition

$$y_t = c_t + i_t + g_t \tag{B.23}$$

$$y_t^* = c_t^* + i_t^* + g_t^* \tag{B.24}$$

13) Investment dynamics

$$i_t = k_t - (1-\delta)k_{t-1} + \frac{\phi_k}{2}k_{t-1}\left(\frac{k_t}{k_{t-1}} - 1\right)^2 \tag{B.25}$$

$$i_t^* = k_t^* - (1-\delta)k_{t-1}^* + \frac{\phi_k}{2}k_{t-1}^*\left(\frac{k_t^*}{k_{t-1}^*} - 1\right)^2 \tag{B.26}$$

14) Household budget constraints are satisfied

$$P_t x_t + e_t(h_{t+1} - h_t) + P_t i_t = w_t n_t + q_t b_{t+1} - b_t + a_t + r_{kt}k_{t-1} - P_t t_t + b_t^g - \frac{1}{R_t}b_{t+1}^g \tag{B.27}$$

$$P_t^* x_t^* + e_t^*(h_{t+1}^* - h_t^*) + P_t^* i_t^* = w_t^* n_t^* + q_t b_{t+1}^* - b_t^* + a_t^* + r_{kt}^* k_{t-1}^* - P_t^* t_t^* + b_t^{g*} - \frac{1}{R_t^*}b_{t+1}^{g*} \tag{B.28}$$

15) Housing choices are optimized

$$\lambda_t m_t e_t + \beta\eta^h \mathbb{E}_t \frac{1}{h_{t+1}} = \mu_t e_t - \beta\mathbb{E}_t e_{t+1}\mu_{t+1} \tag{B.29}$$

$$\lambda_t^* m_t^* e_t^* + \beta\eta^h \mathbb{E}_t \frac{1}{h_{t+1}^*} = \mu_t^* e_t^* - \beta\mathbb{E}_t e_{t+1}^*\mu_{t+1}^* \tag{B.30}$$

16) Capital stock choices are optimized

$$P_t\mu_t + \phi_k P_t\mu_t\left(\frac{k_t}{k_{t-1}} - 1\right) = \beta\mathbb{E}_t\mu_{t+1}\left[P_{t+1}\left(1-\delta\right) + r_{k,t+1}\right] + \beta\frac{\phi_k}{2}\mathbb{E}_t P_{t+1}\mu_{t+1}\left(\frac{k_t^2}{k_{t-1}^2} - 1\right) \tag{B.31}$$

$$P_t^*\mu_t^* + \phi_k P_t^*\mu_t^*\left(\frac{k_t^*}{k_{t-1}^*} - 1\right) = \beta\mathbb{E}_t\mu_{t+1}^*\left[P_{t+1}^*\left(1-\delta\right) + r_{k,t+1}^*\right] + \beta\frac{\phi_k}{2}\mathbb{E}_t P_{t+1}^*\mu_{t+1}^*\left(\frac{(k_t^*)^2}{(k_{t-1}^*)^2} - 1\right) \tag{B.32}$$

17) Housing markets clear

$$h_{t+1} = 1 \tag{B.33}$$

$$h_{t+1}^* = 1 \tag{B.34}$$

18) Borrowing constraints bind

$$q_t b_{t+1} = m_t e_t h_{t+1} \tag{B.35}$$

$$q_t b_{t+1}^* = m_t^* e_t^* h_{t+1}^* \tag{B.36}$$

19) Optimal labor choices

$$n_t^\nu = w_t\mu_t \tag{B.37}$$

$$(n_t^*)^\nu = w_t^*\mu_t^* \tag{B.38}$$

20) Optimal government debt choice

$$\frac{1}{R_t}\mu_t = \beta\mathbb{E}_t\mu_{t+1} \tag{B.39}$$

$$\frac{1}{R_t^*}\mu_t^* = \beta\mathbb{E}_t\mu_{t+1}^* \tag{B.40}$$

21) Government budget constraints bind

$$\frac{1}{R_t}b_{t+1}^g - b_t^g = P_t g_t - P_t t_t \tag{B.41}$$

$$\frac{1}{R_t^*} b_{t+1}^{g*} - b_t^{g*} = P_t^* g_t^* - P_t^* t_t^* \tag{B.42}$$

22) Government spending rule

$$g_t = \frac{g}{y} y_t + \xi_{g,t} \tag{B.43}$$

$$g_t^* = \frac{g^*}{y^*} y_t^* + \xi_{g,t}^* \tag{B.44}$$

23) Government lump-sum tax rule

$$\frac{t_t}{y_t} = \frac{t}{y} + \phi_b \left(\frac{b_{t+1}^g}{P_t y_t} - \frac{b^g}{Py} \right) \tag{B.45}$$

$$\frac{t_t^*}{y_t^*} = \frac{t^*}{y^*} + \phi_b^* \left(\frac{b_{t+1}^{g*}}{P_t^* y_t^*} - \frac{b^{g*}}{P^* y^*} \right) \tag{B.46}$$

Note that the global asset market clearing condition is $b_t + b_t^* = a_t + a_t^*$ which follows from the household and government budget constraints, the optimal savings allocations, goods market clearing conditions, and housing market clearing conditions.

B.1 Solution for Consumption

To solve for consumption c_t, we have, from $c_t(v) = \min \left[\frac{v}{\frac{\beta}{q_t} P_t \mathbb{E}_t \mu_{t+1}}, x_t \right]$,

$$c_t = \int_0^\infty c_t(v) f(v) dv = \int_1^{\bar{v}} \frac{v}{\frac{\beta}{q_t} P_t \mathbb{E}_t \mu_{t+1}} \alpha v^{-\alpha-1} dv + \int_{\bar{v}}^\infty x_t \alpha v^{-\alpha-1} dv,$$

and since $\bar{v} = \frac{x_t}{\frac{\beta}{q_t} P_t \mathbb{E}_t \mu_{t+1}}$, evaluating this expression gives

$$\frac{c_t}{\underline{c}_t} = \frac{\alpha}{\alpha - 1} \left[1 - \frac{1}{\alpha} \left(\frac{\underline{c}_t}{x_t} \right)^{\alpha - 1} \right].$$

So we can substitute the expressions for consumption above with the ratio of consumption to minimum consumption and use the definitions for minimum consumption

$$\underline{\mathrm{c}}_t = \frac{1}{\frac{\beta}{q_t} P_t \mathbb{E}_t \mu_{t+1}}.$$

C Additional Results on Macroprudential Rules

C.1 Welfare Function

The household's utility function is

$$U = \max \sum_{t=0}^{\infty} \beta^t \left(\int_0^1 v_{it} \log c_{it} \, \mathrm{d}i + \eta^h \log h_t - \frac{1}{1+\nu} n_t^{1+\nu} \right)$$

which, integrating over the Pareto distribution and the solution for consumption, the first term can be written as

$$\int_0^1 v_{it} \log c_{it} \, \mathrm{d}i = \frac{\alpha}{\alpha - 1} \log \left(\underline{c}_t \right) \left(1 - \bar{v}_t^{1-\alpha} \right) + \frac{\alpha}{(\alpha-1)^2} \left[1 - \bar{v}_t^{1-\alpha} \left(1 + (\alpha - 1) \log \bar{v}_t \right) \right] + \frac{\alpha}{\alpha - 1} \log \left[x_t \right] \bar{v}_t^{1-\alpha},$$

where $\bar{v} = \frac{x_t}{\frac{\beta}{q_t} P_t \mathbb{E}_t \mu_{t+1}}$. We can then write U in recursive form.

C.2 Welfare-Based Coefficients

Figure C.1 shows plots of the welfare function under a second-order approximation over values of the ϕ_m weight in the candidate macroprudential rules. The left panel shows welfare over the macroprudential rule that responds to lagged debt shocks, while the right panel shows welfare over coefficients of the macroprudential rule that responds to house price deviations from steady-state. Under the debt-shock rule, welfare is maximized at $\phi_m = 0.8$, while under the house price rule, welfare is maximized at $\phi_m = 8.4$.

The optimal coefficient for the fiscal policy rule in the response to the growth rate of output

Figure C.1: Optimal Macroprudential Rule Coefficients

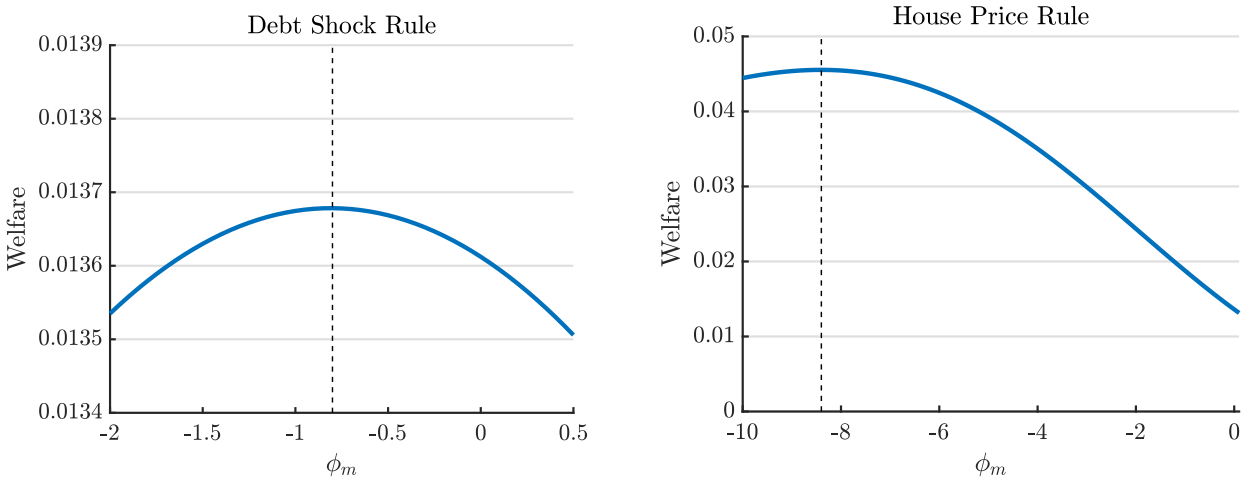
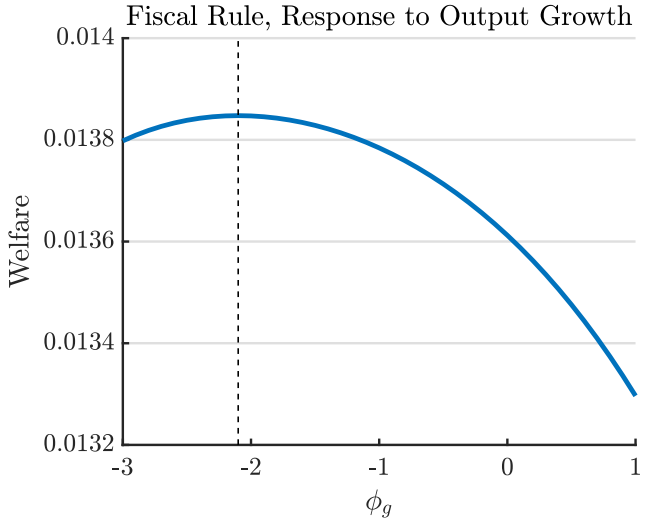


Figure C.2: Optimal Fiscal Rule Coefficients



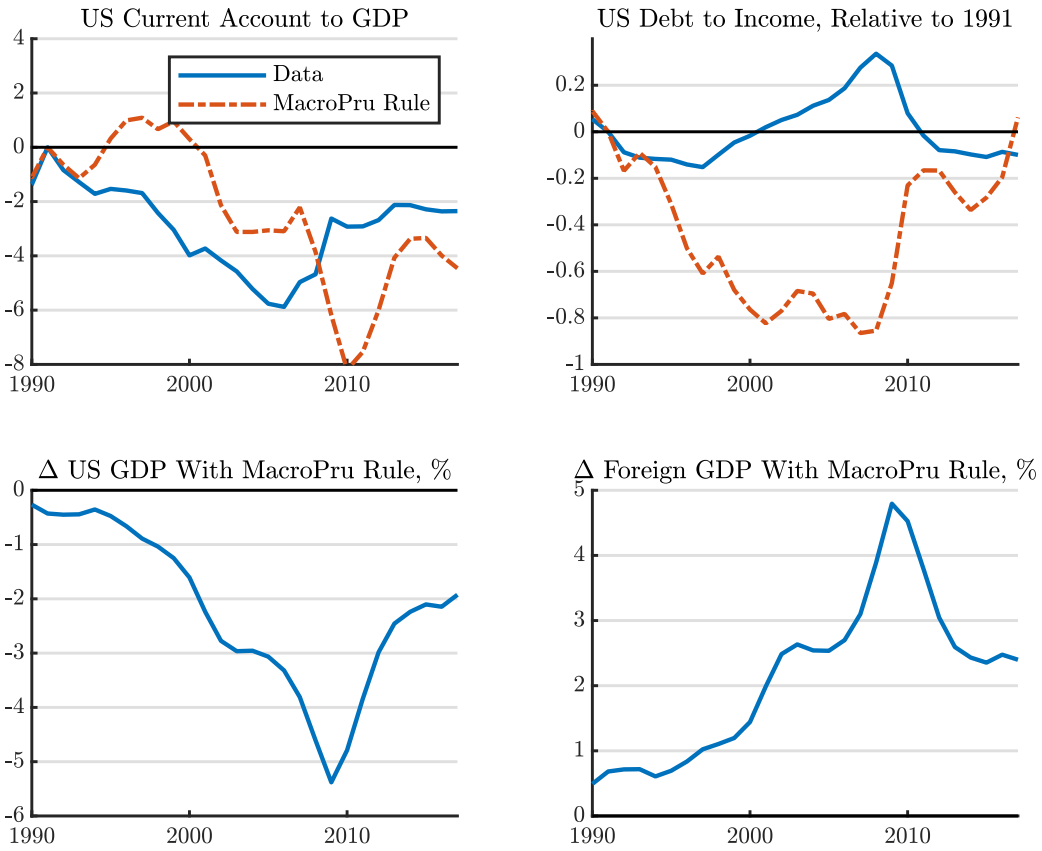
is shown in Figure C.2, with welfare maximized around a coefficient of $\phi_g = -0.7$.

C.3 Macropru Rule Targeting House Prices at Optimal Coefficients

Here, we present the counterfactual paths under the macroprudential rule targeting house prices, and with the coefficient $\phi_m = 8.4$, in line with the optimal coefficients that maximize welfare under a second-order approximation.

$$\text{macropru}_t = 1 - \phi_m \left(\frac{e_{t-1}}{e} - 1 \right). \tag{C.1}$$

Figure C.3: Macroprudential Rule Responding to House Price Fluctuations



As shown in Figure C.3, the rule would generate a significantly flatter profile for debt-to-income, with debt-to-income falling between 1991 and 1997, and remaining around that level until 2009. During the period that debt contracts in the data, the macroprudential rule (C.1) with a coefficient of 8.4 would call for significantly looser credit, expanding household debt, and causing the current account-to-GDP ratio to fall by about 6 percentage points between 2007 and 2010. US output in this counterfactual would expand, helping to offset the recessionary shocks associated with the Great Recession.