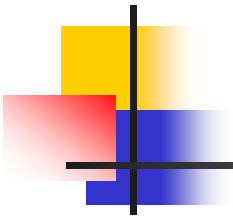
How much depreciation of the US dollar for sustainability of the current accounts?

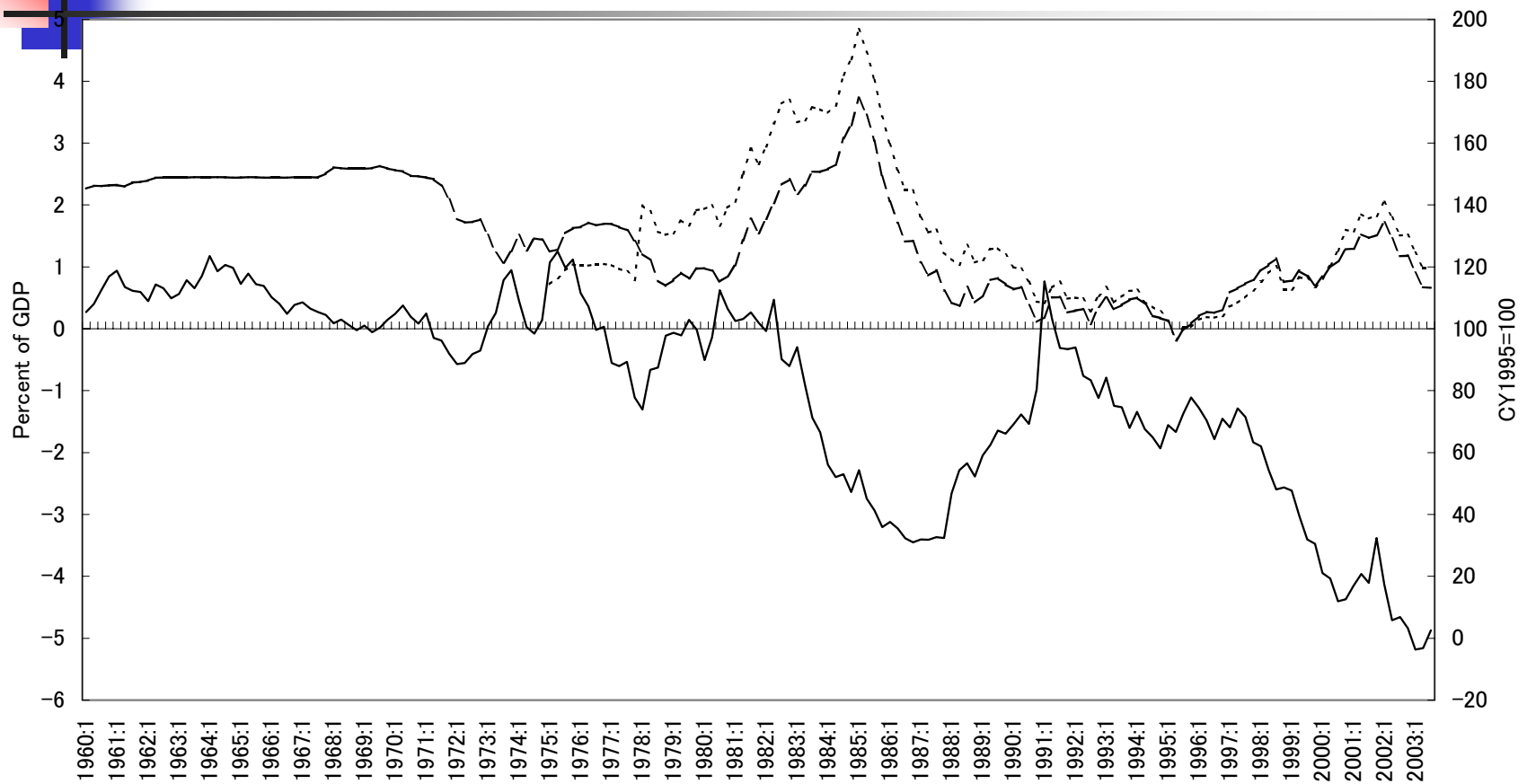
Hitotsubashi University
Eiji Ogawa and Takeshi Kudo



Motivation

- The recent US current account deficits are going beyond a dangerous level by comparing the recent situation with that in the mid of 1980s.
- The current account deficits are unsustainable at the current level of the exchange rates.
- This paper investigates how much the US dollar should be depreciated for reducing the US current account deficits.

Figure 1: Current Account and Effective Exchange Rates



Sources: Current account, Bureau of Economic Analysis. Effective exchange rates, International Financial Statistics, IMF.

Current account (left axis) — — — Nominal effective exchange rate (right axis) - - - - - - Real effective exchange rate (right axis)

Contents

- To explain unsustainable US current account deficits (Kudo and Ogawa (2003)) .
- To conduct a simulation analysis to investigate how much depreciation of the US dollar is needed to reduce the current account deficits in the near future.

Kudo and Ogawa (2003) empirical analysis

- Kudo and Ogawa (2003) conducted empirical analyzes on the sustainability of the current account deficits from perspectives of the domestic investment-saving relationship, the international trade flows, and the international capital flows according to Mann (2002).

Methodology

- A unit-root test was used to investigate whether the current account deficit is stationary.
- The Johansen's method was to investigate whether the relevant variables are cointegrated after the current account deficit was divided into some variables from the above three perspectives.

Data

- The original variables and the standardized variables by GDP are prepared for all of the data.
- Data came from the "National Income and Production Account Tables" and the "International Transactions Accounts" of the Bureau of Economic Analysis
- The sample period covers from 1960:Q1 to 2002:Q4.

Cointegration relation in the domestic saving-investment balance

- Cointegration relation

(1) RD+PI+GE−PS−GS

(2) RD+NI−NS

(3) RD+PIS+GIS

(4) RD+NIS

Analytical results of cointegration relation in the domestic saving-investment balance

- Eqs. (1), (2), and (3): each of the systems is not cointegrated in terms of both the non-standardized and standardized data.
- Eq. (4): the system is not cointegrated in terms of the standardized data.
- The US current account deficit is unsustainable from the perspective of the domestic saving-investment balance.

Cointegration relation in the international trade flow

- Cointegration relation

(5) RD+IM−EX

(6) MM−EX

(7) RD−TB

(8) CAD

Analytical results of cointegration relation in the international trade flow

- Eqs. (5), (6), and (7): each of the systems are not cointegrated
- Eq. (8): we cannot reject any unit-roots for the current account deficit.
- The US current account deficit is unsustainable from the perspective of the international trade flows.

Finance for current account deficits

- We investigate which items in the international capital inflows finance the current account deficit in the long run.

(1) We analyze the cointegration relationship among the current account deficit, the international capital flows, and the change in the foreign reserves.

(2) We conduct the analysis by decomposing the financial balance into the direct investment, the portfolio investment and the other investment.

Analytical results of finance for current account deficits (1)

- In the case of using the non-standardized data, the rank of cointegration is full-rank and it contradicts with the assumptions. In the case of using the standardized data, we can find a cointegration vector in the system that includes the current account deficit and the financial balance.

Analytical results of finance for current account deficits (2)

- The cointegration has full-rank and it contradicts with the assumptions of the analysis in the case of using the non-standardized data. On one hand, there is a cointegration vector in the system which includes the current account deficit and the portfolio investment balance in the case of using the standardized data.
- The huge US current account deficit has been financed by the portfolio investment from other countries in the long run in terms of the stationary relationship.

Simulation analysis on depreciation of the US dollar for sustainable current account deficits

- Investigate how impact depreciation of the US dollar would give on the US current account deficits and how much depreciation of the US dollar is needed to make the current account deficits sustainable.

Methodology

- We simulate how much depreciation the US dollar is needed for the current account sustainability by using the estimated parameters of three VAR models.

(1) Model 1: 2 variables VAR model (the exchange rate and the current account)

(2) Model 2: 3 variables VAR model (the exchange rate, trade balance, and factor income receipt from abroad) from a viewpoint of international trade flows

(3) Model 3: 3 variables VAR model (the exchange rate, saving-investment balances for the private and the public sectors) from a viewpoint of domestic investment saving balance.

VAR models

- We estimate the three VAR models in this analysis.

(1) Model 1 -> Table 7

(2) Model 2 -> Table 8

(3) Model 3 -> Table 9

Table 7: VARs contain the Exchange rate and the Current account (Model 1)

(Levels of variables)

	Dependent	Exchange rate		Current account		Exchange rate		Current account		Exchange rate		Current account	
	# of lags	Optimal(1)				1				4			
	Sample	1975:2-2003:3				1975:2-2003:3				1976:1-2003:3			
Regressors	# of obs.	114				114				111			
Constant		0.115		1.115		0.115		1.115		0.146		0.926	
(s.e.)		0.100		1.028		0.100		1.028		0.105		1.082	
Exchange rate(-1)		0.978	***	-0.249		0.978	***	-0.249		1.109		-1.407	
(s.e.)		0.021		0.212		0.021		0.212		0.097	***	1.005	
Exchange rate(-2)										-0.152		1.271	
(s.e.)										0.144		1.481	
Exchange rate(-3)										0.121		0.574	
(s.e.)										0.143		1.473	
Exchange rate(-4)										-0.108		-0.649	
(s.e.)										0.097		1.005	
Current account(-1)		0.005	**	0.974	***	0.005	**	0.974	***	0.001		0.964	***
(s.e.)		0.002		0.022		0.002		0.022		0.009		0.098	
Current account(-2)										0.015		-0.037	
(s.e.)										0.013		0.135	
Current account(-3)										-0.028	**	0.224	
(s.e.)										0.013		0.135	
Current account(-4)										0.015		-0.181	*
(s.e.)										0.010		0.099	
Adjusted R-square		0.952		0.945		0.952		0.945		0.952		0.939	
Log-likelihood		173.846				173.846				173.136			
AIC		-167.846				-167.846				-155.136			

(Differences of variables)

	Dependent	Exchange rate		Current account		Exchange rate		Current account		Exchange rate		Current account	
	# of lags	Optimal(1)				1				4			
	Sample	1975:3-2003:3				1975:3-2003:3				1976:2-2003:3			
Regressors	# of obs.	113				113				110			
Constant		0.000		-0.055		0.000		-0.055		0.000		-0.038	
(s.e.)		0.003		0.035		0.003		0.035		0.004		0.037	
Exchange rate(-1)		0.135		-1.220		0.135		-1.220		0.144		-1.153	
(s.e.)		0.095		0.956		0.095		0.956		0.099		0.992	
Exchange rate(-2)										-0.011		-0.383	
(s.e.)										0.100		1.001	
Exchange rate(-3)										0.109		0.585	
(s.e.)										0.099		0.987	
Exchange rate(-4)										0.077		-1.034	
(s.e.)										0.099		0.988	
Current account(-1)		0.002		-0.031		0.002		-0.031		0.001		-0.030	
(s.e.)		0.009		0.095		0.009		0.095		0.010		0.098	
Current account(-2)										0.017	*	-0.059	
(s.e.)										0.010		0.096	
Current account(-3)										-0.011		0.169	*
(s.e.)										0.010		0.098	
Current account(-4)										0.005		0.126	
(s.e.)										0.010		0.099	
Adjusted R-square		0.000		-0.003		0.000		-0.003		0.008		0.005	
Log-likelihood		169.088				169.088				170.161			
AIC		-163.088				-163.088				-152.161			

1) Optimal number of lags are determined by Akaike Information Criteria (AIC).
2) *, **, *** mean that the null hypotheses are rejected by 10%,5%,1%.

Table 8: External Balance VARs (Model 2)

(Levels of variables)

Dependent	Exchange rate	Trade balance	Income receipt	Exchange rate	Trade balance	Income receipt	Exchange rate	Trade balance	Income receipt
# of lags		Optimal(1)			1			4	
Sample		1975:2-2003:3			1975:2-2003:3			1976:1-2003:3	
Regressors # of obs.		114			114			111	
Constant	0.425 ***	2.484 **	−0.968 *	0.425 ***	2.484 **	−0.968 *	0.611 ***	4.735 ***	0.695
(s.e.)	0.139	1.169	0.559	0.139	1.169	0.559	0.183	1.444	0.686
Exchange rate(−1)	0.904 ***	−0.583 **	0.239 *	0.904 ***	−0.583 **	0.239 *	1.011 ***	−0.805	−0.677 *
(s.e.)	0.031	0.259	0.124	0.031	0.259	0.124	0.100	0.789	0.375
Exchange rate(−2)							−0.119	−0.349	0.607
(s.e.)							0.142	1.124	0.534
Exchange rate(−3)							0.087	0.582	0.009
(s.e.)							0.142	1.122	0.533
Exchange rate(−4)							−0.117	−0.539	−0.082
(s.e.)							0.096	0.759	0.360
Trade balance(−1)	−0.006	0.910 ***	0.049 ***	−0.006	0.910 ***	0.049 ***	−0.021 *	0.971 ***	−0.020
(s.e.)	0.004	0.035	0.017	0.004	0.035	0.017	0.012	0.097	0.046
Trade balance(−2)							0.026	−0.090	0.049
(s.e.)							0.017	0.133	0.063
Trade balance(−3)							−0.022	0.227 *	0.002
(s.e.)							0.017	0.132	0.063
Trade balance(−4)							0.004	−0.288 ***	−0.023
(s.e.)							0.012	0.094	0.045
Income receipt(−1)	0.052 ***	0.263 ***	0.793 ***	0.052 ***	0.263 ***	0.793 ***	0.043	−0.008	0.473 ***
(s.e.)	0.015	0.129	0.062	0.015	0.129	0.062	0.026	0.208	0.099
Income receipt(−2)							0.005	0.136	0.248 **
(s.e.)							0.029	0.233	0.111
Income receipt(−3)							−0.011	0.528 **	0.044
(s.e.)							0.029	0.233	0.111
Income receipt(−4)							0.035	−0.077	0.244 **
(s.e.)							0.028	0.221	0.105
Adjusted R-square	0.955	0.944	0.862	0.955	0.944	0.862	0.955	0.944	0.878
Log-likelihood		270.234			270.234			289.258	
SBIC		−235.225			−235.225			−175.999	

(Differences of variables)

Dependent	Exchange rate	Trade balance	Income receipt	Exchange rate	Trade balance	Income receipt	Exchange rate	Trade balance	Income receipt
# of lags		Optimal(1)			1			4	
Sample		1975:3-2003:3			1975:3-2003:3			1976:2-2003:3	
Regressors # of obs.		113			113			110	
Constant	0.000	−0.046	−0.008	0.000	−0.046	−0.008	0.001	−0.018	−0.008
(s.e.)	0.003	0.029	0.013	0.003	0.029	0.013	0.004	0.029	0.013
Exchange rate(−1)	0.137	0.014	−0.664	0.137	0.014	−0.664	0.121	0.045	−0.539
(s.e.)	0.094	0.775	0.347	0.094	0.775	0.347	0.100	0.783	0.360
Exchange rate(−2)							0.002	−0.590	0.003
(s.e.)							0.102	0.796	0.366
Exchange rate(−3)							0.088	0.316	0.064
(s.e.)							0.101	0.793	0.364
Exchange rate(−4)							0.101	−0.844	−0.166
(s.e.)							0.101	0.786	0.361
Trade balance(−1)	−0.010	0.060	−0.007	−0.010	0.060	−0.007	−0.010	0.077	−0.026
(s.e.)	0.012	0.096	0.043	0.012	0.096	0.043	0.013	0.099	0.046
Trade balance(−2)							0.018	−0.029	0.039
(s.e.)							0.012	0.097	0.045
Trade balance(−3)							−0.008	0.216 **	0.030
(s.e.)							0.012	0.096	0.044
Trade balance(−4)							−0.003	0.065	0.025
(s.e.)							0.013	0.098	0.045
Income receipt(−1)	0.030	0.010	−0.391 ***	0.030	0.010	−0.391 ***	0.052 *	0.023	−0.472 ***
(s.e.)	0.024	0.196	0.088	0.024	0.196	0.088	0.028	0.221	0.102
Income receipt(−2)							0.047	0.009	−0.214 **
(s.e.)							0.031	0.243	0.112
Income receipt(−3)							0.027	0.439 *	−0.156
(s.e.)							0.031	0.241	0.111
Income receipt(−4)							0.038	0.288	0.134
(s.e.)							0.028	0.221	0.102
Adjusted R-square	0.014	−0.024	0.149	0.014	−0.024	0.149	−0.006	0.008	0.171
Log-likelihood		263.438			263.438			274.021	
SBIC		−228.482			−228.482			−235.021	

(Vector error correction model)

Dependent	Exchange rate	Trade balance	Income receipt	Exchange rate	Trade balance	Income receipt	Exchange rate	Trade balance	Income receipt
# of lags		Optimal(1)			1			4	
Sample		1975:3-2003:3			1975:3-2003:3			1976:2-2003:3	
Regressors # of obs.		113			113			110	
Constant	0.012	-0.119	0.095 ***	0.012	-0.119	0.095 ***	0.008	-0.082	0.105 ***
(s.e.)	0.009	0.073	0.031	0.009	0.073	0.031	0.009	0.074	0.032
Error-correction	-0.011	0.067	0.093 ***	-0.011	0.067	0.093 ***	-0.007	0.058	-0.103 ***
(s.e.)	0.007	0.061	0.026	0.007	0.061	0.026	0.008	0.062	0.026
Exchange rate(-1)	0.124	0.095	-0.776 **	0.124	0.095	-0.776 **	0.118	0.077	-0.596 *
(s.e.)	0.094	0.778	0.331	0.094	0.778	0.331	0.100	0.784	0.337
Exchange rate(-2)							-0.008	-0.514	-0.133
(s.e.)							0.102	0.800	0.344
Exchange rate(-3)							0.079	0.384	-0.058
(s.e.)							0.102	0.796	0.342
Exchange rate(-4)							0.093	-0.776	-0.285
(s.e.)							0.101	0.790	0.339
Trade balance(-1)	-0.008	0.052	0.004	-0.008	0.052	0.004	-0.010	0.072	-0.017
(s.e.)	0.012	0.096	0.041	0.012	0.096	0.041	0.013	0.100	0.043
Trade balance(-2)							0.018	-0.027	0.037
(s.e.)							0.012	0.097	0.042
Trade balance(-3)							-0.008	0.212 **	0.038
(s.e.)							0.012	0.096	0.041
Trade balance(-4)							-0.002	0.060	0.033
(s.e.)							0.013	0.098	0.042
Income receipt(-1)	0.028	0.025	-0.412 ***	0.028	0.025	-0.412 ***	0.047	0.058	-0.534 ***
(s.e.)	0.024	0.197	0.084	0.024	0.197	0.084	0.029	0.225	0.096
Income receipt(-2)							0.042	0.051	-0.289 ***
(s.e.)							0.032	0.247	0.106
Income receipt(-3)							0.024	0.468 *	-0.209 **
(s.e.)							0.031	0.243	0.104
Income receipt(-4)							0.034	0.324	0.069
(s.e.)							0.029	0.225	0.097
Adjusted R-square	0.060	-0.022	0.233	0.060	-0.022	0.233	-0.008	0.007	0.277
Log-likelihood		271.254			271.254			282.623	
SBIC		-227.559			-227.559			-160.842	

1) Optimal number of lags are determined by Schwartz Bayesian Information Criterion (SBIC).
2) *, **, *** mean that the null hypotheses are rejected by 10%,5%,1%.

Table 9: Domestic Saving-investment balance VARs (Model 3)

(Levels of variables)

Dependent	Exchange rate	Private sector	Public sector	Exchange rate	Private sector	Public sector	Exchange rate	Private sector	Public sector
# of lags		Optimal(1)			1			4	
Sample		1975:3-2003:3			1975:3-2003:3			1976:2-2003:3	
Regressors # of obs.		113			113			110	
Constant	0.119	-2.478	4.009 **	0.119	-2.478	4.009 **	0.061	-1.914	2.613
(s.e.)	0.097	2.281	1.857	0.097	2.281	1.857	0.112	2.200	1.604
Exchange rate(-1)	0.983 ***	0.525	-0.885 **	0.983 ***	0.525	-0.885 **	0.946 ***	-0.636	-2.096
(s.e.)	0.020	0.474	0.386	0.020	0.474	0.386	0.102	1.994	1.454
Exchange rate(-2)							-0.063	2.922	1.249
(s.e.)							0.142	2.791	2.035
Exchange rate(-3)							0.128	-1.518	-0.309
(s.e.)							0.145	2.837	2.068
Exchange rate(-4)							-0.015	-0.393	0.589
(s.e.)							0.104	2.047	1.492
Private sector(-1)	0.010 ***	0.932 ***	-0.027	0.010 ***	0.932 ***	-0.027	0.011 *	1.012 ***	-0.012
(s.e.)	0.003	0.062	0.050	0.003	0.062	0.050	0.007	0.128	0.093
Private sector(-2)							0.003	0.009	-0.128
(s.e.)							0.009	0.179	0.131
Private sector(-3)							0.001	-0.202	0.267 **
(s.e.)							0.009	0.175	0.128
Private sector(-4)							-0.005	0.053	-0.102
(s.e.)							0.006	0.127	0.093
Public sector(-1)	0.014 ***	0.008	0.907 ***	0.014 ***	0.008	0.907 ***	0.019 **	-0.161	0.932 ***
(s.e.)	0.003	0.072	0.058	0.003	0.072	0.058	0.009	0.172	0.125
Public sector(-2)							-0.001	0.000	0.248
(s.e.)							0.012	0.227	0.165
Public sector(-3)							0.003	0.122	0.029
(s.e.)							0.010	0.200	0.146
Public sector(-4)							-0.007	-0.021	-0.237 **
(s.e.)							0.008	0.154	0.112
Adjusted R-square	0.958	0.887	0.903	0.958	0.887	0.903	0.955	0.905	0.940
Log-likelihood		28.362			28.362			68.771	
SBIC		6.647			6.647			44.488	

(Differences of variables)

Dependent	Exchange rate	Private sector	Public sector	Exchange rate	Private sector	Public sector	Exchange rate	Private sector	Public sector
# of lags		Optimal(1)			1			4	
Sample		1975:3-2003:3			1975:3-2003:3			1976:2-2003:3	
Regressors # of obs.		113			113			110	
Constant	0.001	-0.061	0.015	0.001	-0.061	0.015	0.001	-0.029	-0.018
(s.e.)	0.003	0.070	0.056	0.003	0.070	0.056	0.004	0.068	0.050
Exchange rate(-1)	0.130	-1.551	-1.454	0.130	-1.551	-1.454	0.052	-1.219	-2.490 *
(s.e.)	0.094	1.924	1.543	0.094	1.924	1.543	0.101	1.935	1.413
Exchange rate(-2)							0.002	1.666	-1.107
(s.e.)							0.103	1.974	1.442
Exchange rate(-3)							0.126	0.005	-1.351
(s.e.)							0.102	1.956	1.428
Exchange rate(-4)							0.139	-0.483	0.571
(s.e.)							0.102	1.947	1.422
Private sector(-1)	0.010	0.053	-0.037	0.010	0.053	-0.037	0.009	0.045	-0.029
(s.e.)	0.006	0.128	0.103	0.006	0.128	0.103	0.007	0.132	0.096
Private sector(-2)							0.011	0.098	-0.157 *
(s.e.)							0.007	0.128	0.093
Private sector(-3)							0.012 *	-0.092	0.129
(s.e.)							0.007	0.132	0.096
Private sector(-4)							-0.001	0.070	0.063
(s.e.)							0.007	0.129	0.094
Public sector(-1)	0.013 *	0.043	-0.142	0.013 *	0.043	-0.142	0.018 *	-0.233	-0.033
(s.e.)	0.008	0.155	0.125	0.008	0.155	0.125	0.010	0.183	0.134
Public sector(-2)							0.013	-0.157	0.226 *
(s.e.)							0.009	0.176	0.129
Public sector(-3)							0.014	0.037	0.277 **
(s.e.)							0.009	0.166	0.121
Public sector(-4)							0.001	0.231	0.044
(s.e.)							0.008	0.162	0.118
Adjusted R-square	0.019	-0.020	-0.003	0.019	-0.020	-0.003	0.016	-0.007	0.123
Log-likelihood		28.000			28.000			59.513	
SBIC		6.956			6.956			53.570	

1) Optimal number of lags are determined by Schwartz Bayesian Information Criterion (SBIC).
2) *, **, *** mean that the null hypotheses are rejected by 10%,5%,1%.

Impacts of the US dollar depreciation on the current account deficits

- We show results of the simulation analysis based on the three estimated VAR models for some scenarios of the US dollar depreciation.

(1) The US dollar (the real effective exchange rates) will sharply depreciate by 10%, 30%, and 50% in 2004:Q2.

(2) Similar movements as the actual movements after the Plaza Accord during the three years after the Plaza Accord.

(3) Similar movements as the actual movements during the Indonesian currency crisis period from 1997:Q3 to 1998:Q2.

Figure 2: Simulated Current Account Based on Model 1
(Case 1: 10% exchange rate depreciation in 2004:2)

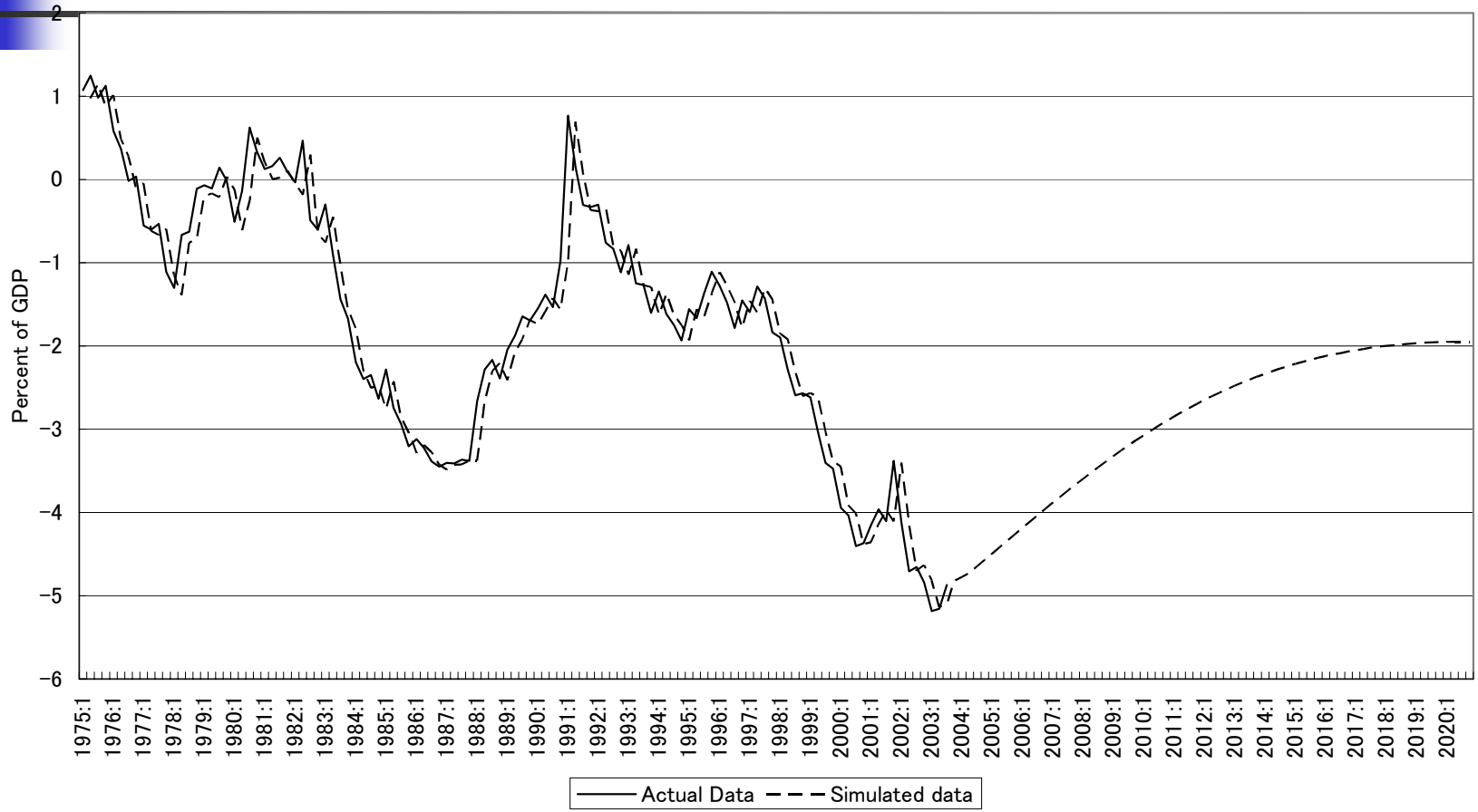


Figure 3: Simulated Current Account Based on Model 2
(Case 1: 10% exchange rate depreciation in 2004:2)

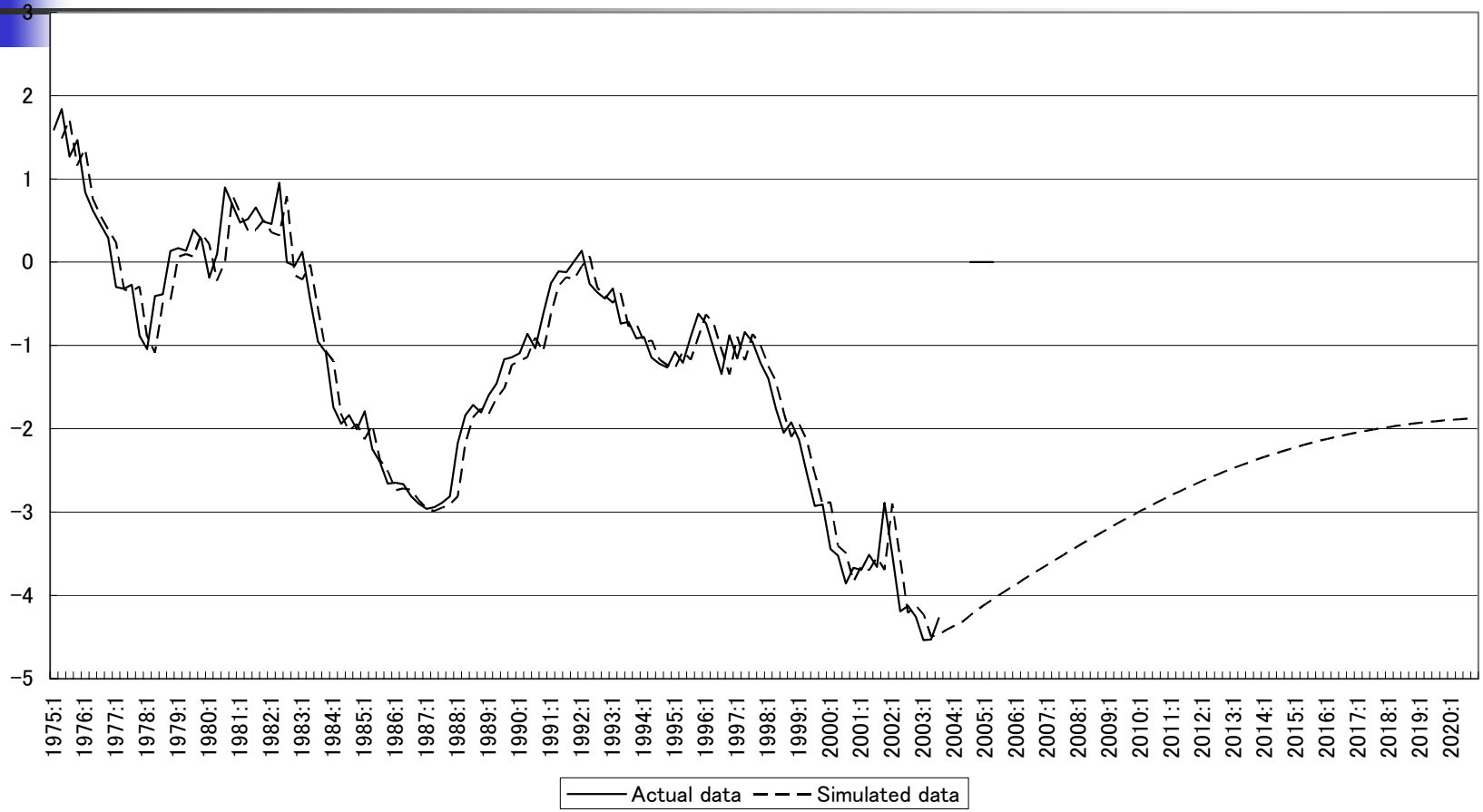


Figure 4: Simulated Current Account Based on Model 3
(Case 1: 10% exchange rate depreciation in 2004:2)

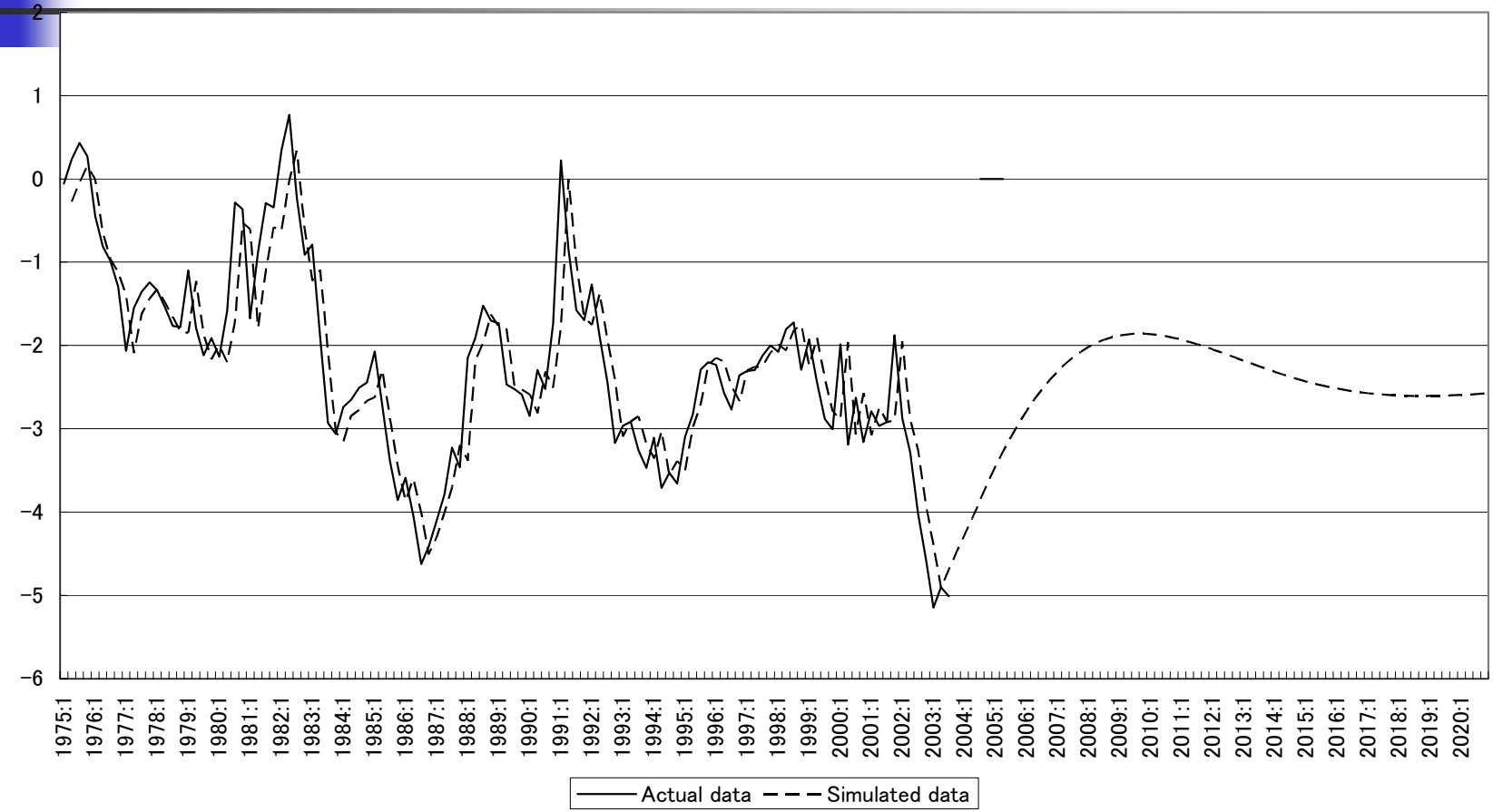


Figure 5: Simulated Current Account Based on Model 1
(Case 2: 30% exchange rate depreciation in 2004:2)

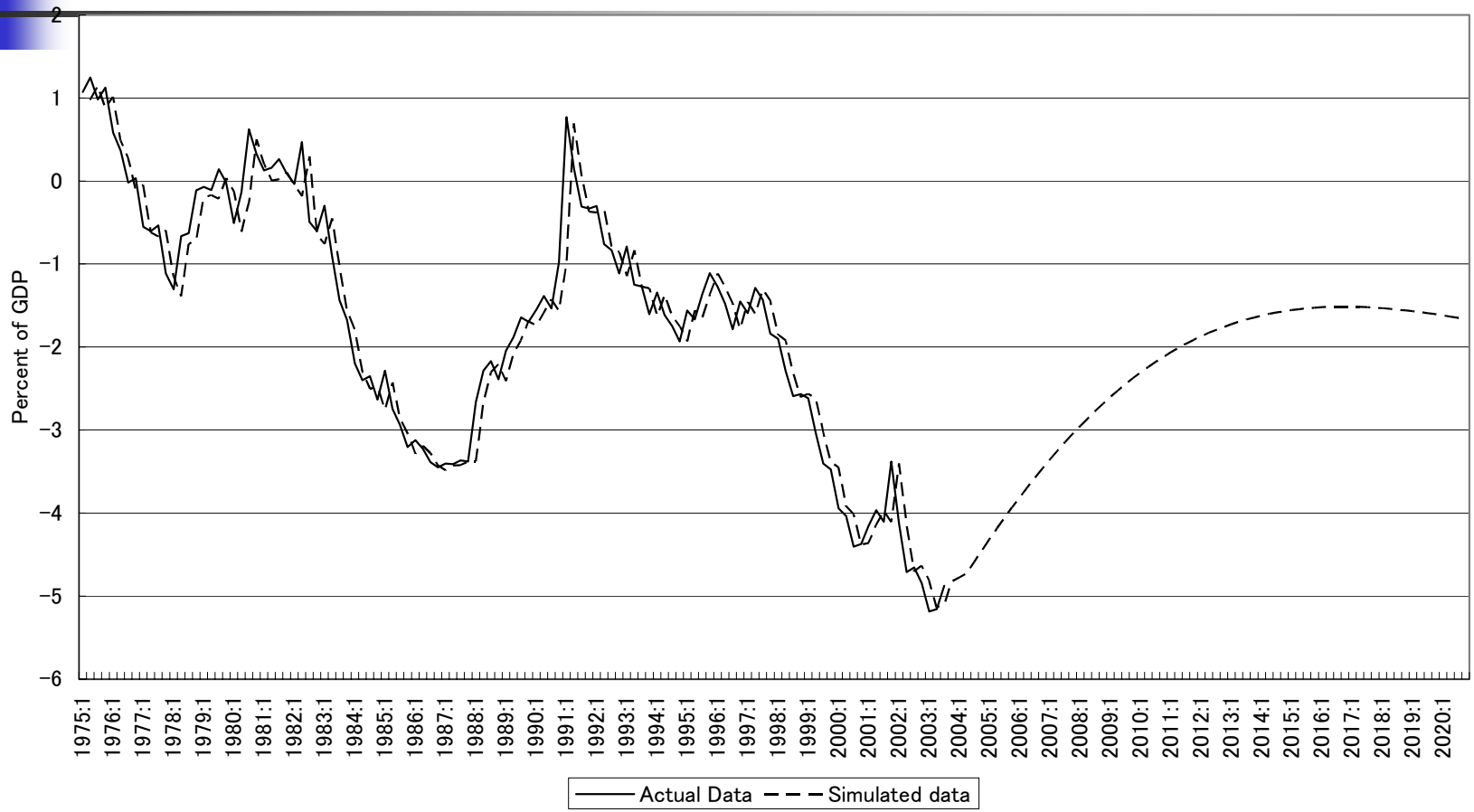


Figure 6: Simulated Current Account Based on Model 2
(Case 2: 30% exchange rate depreciation in 2004:2)

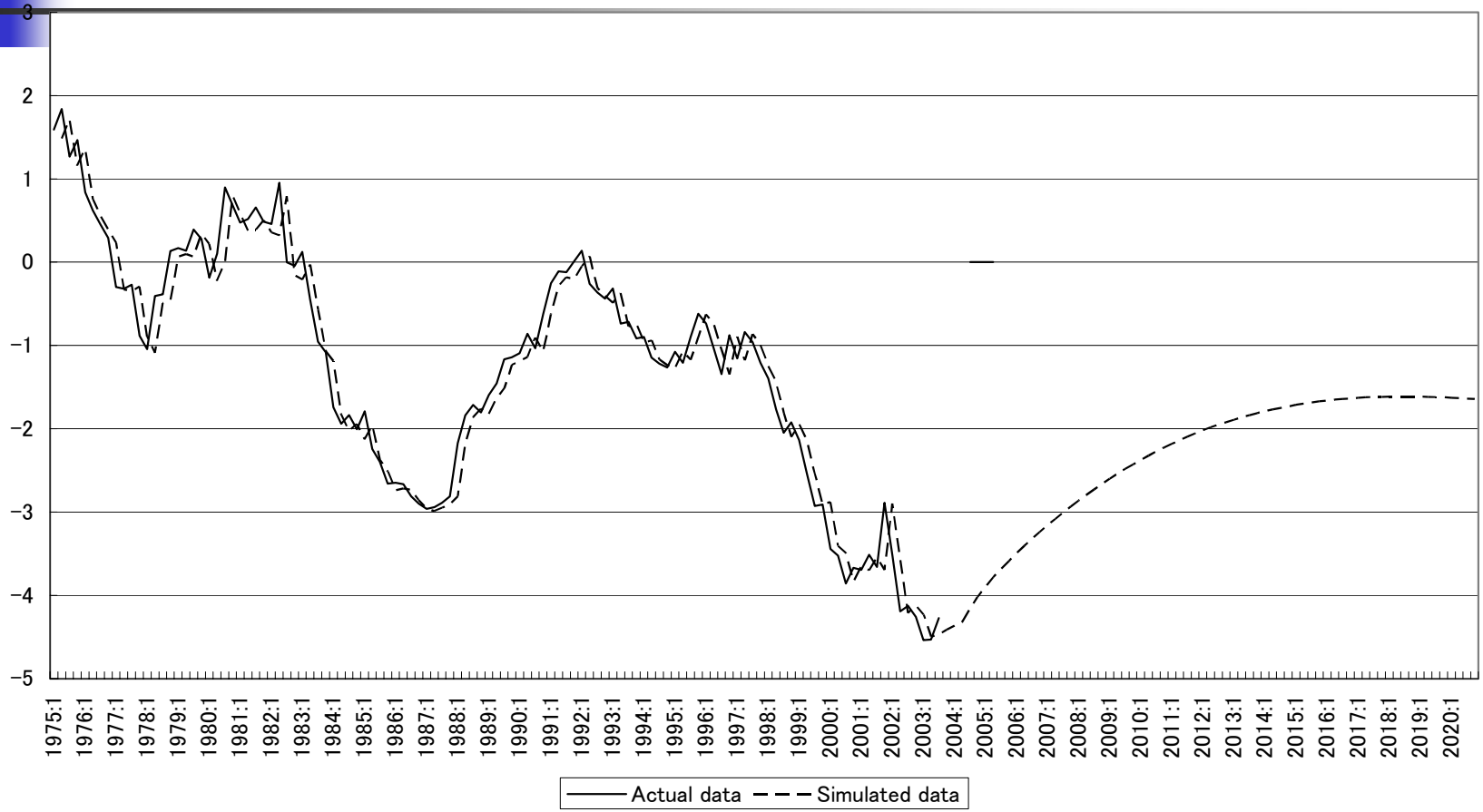


Figure 7: Simulated Current Account Based on Model 3
(Case 2: 30% exchange rate depreciation in 2004:2)

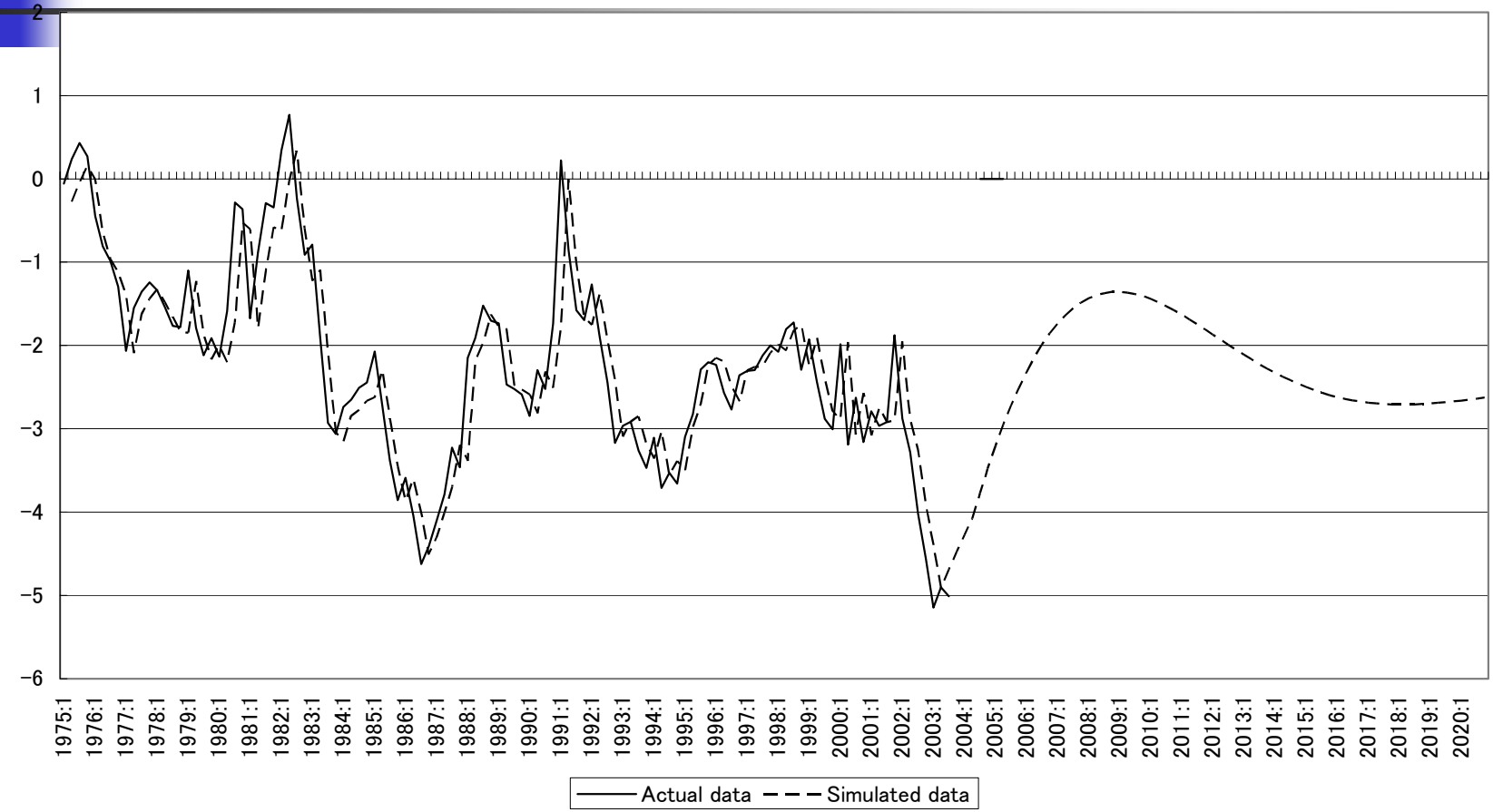


Figure 8: Simulated Current Account Based on Model 1
(Case 3: 50% exchange rate depreciation in 2004:2)

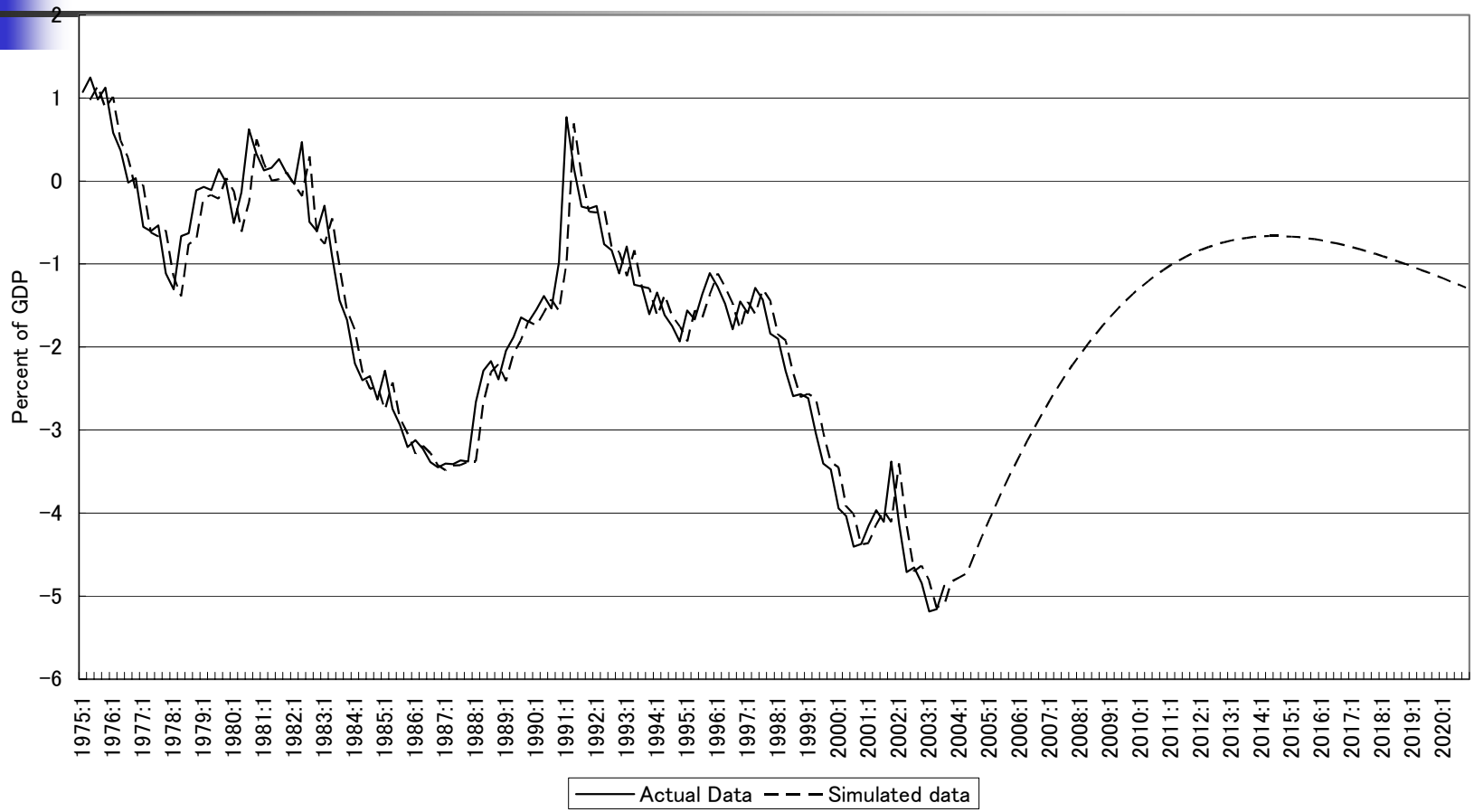


Figure 9: Simulated Current Account Based on Model 2
(Case 3: 50% exchange rate depreciation in 2004:2)

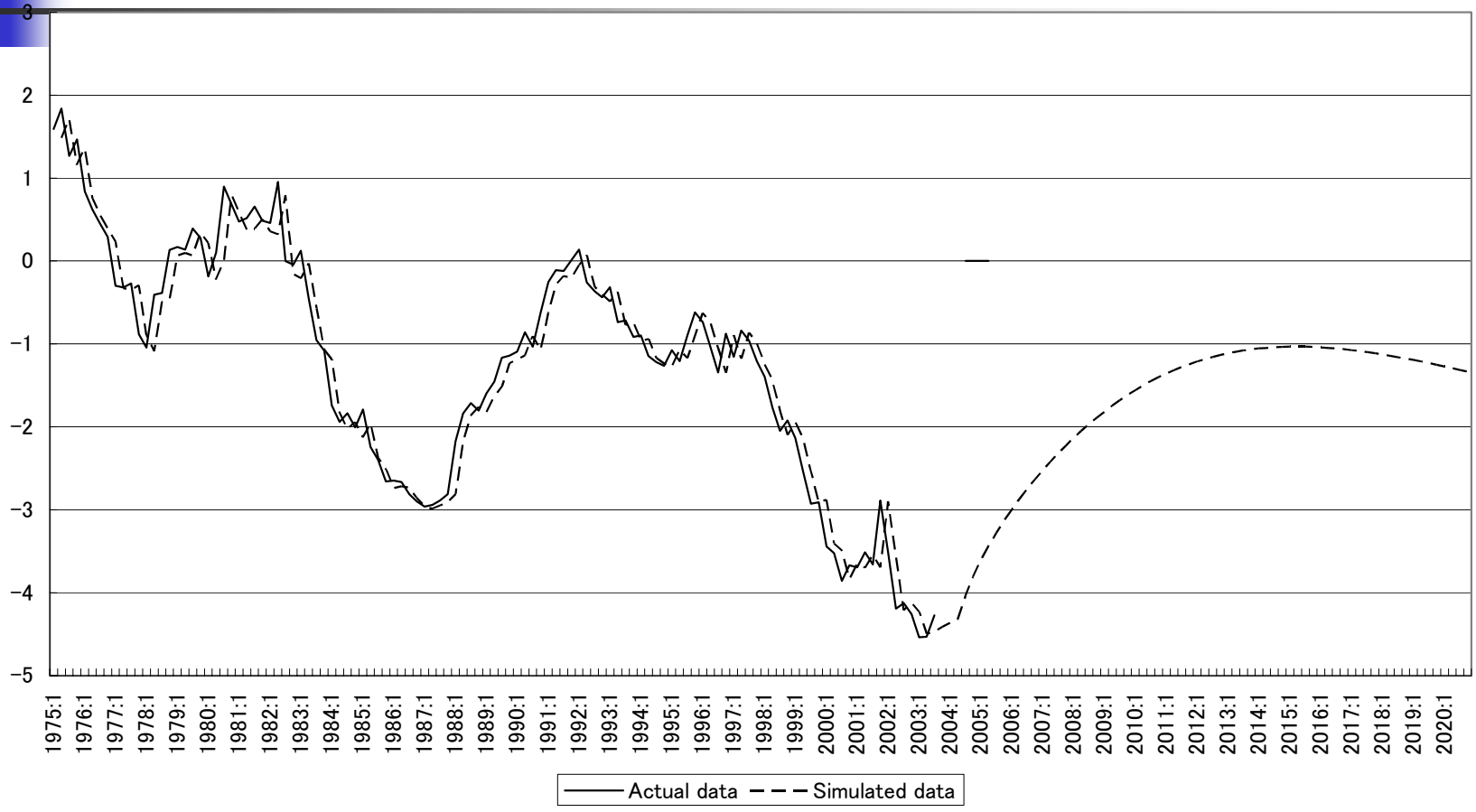


Figure 10: Simulated Current Account Based on Model 3
(Case 3: 50% exchange rate depreciation in 2004:2)

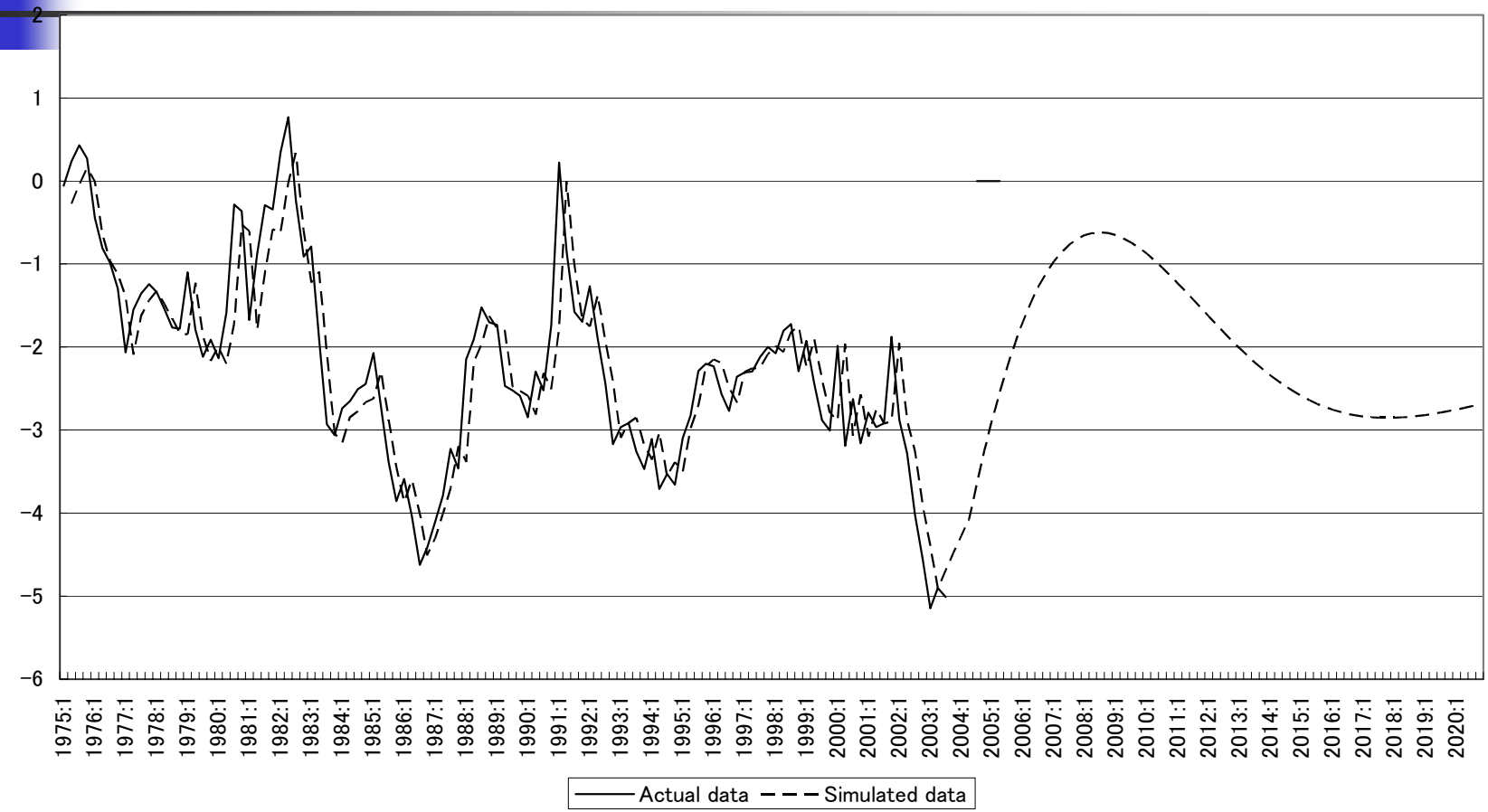
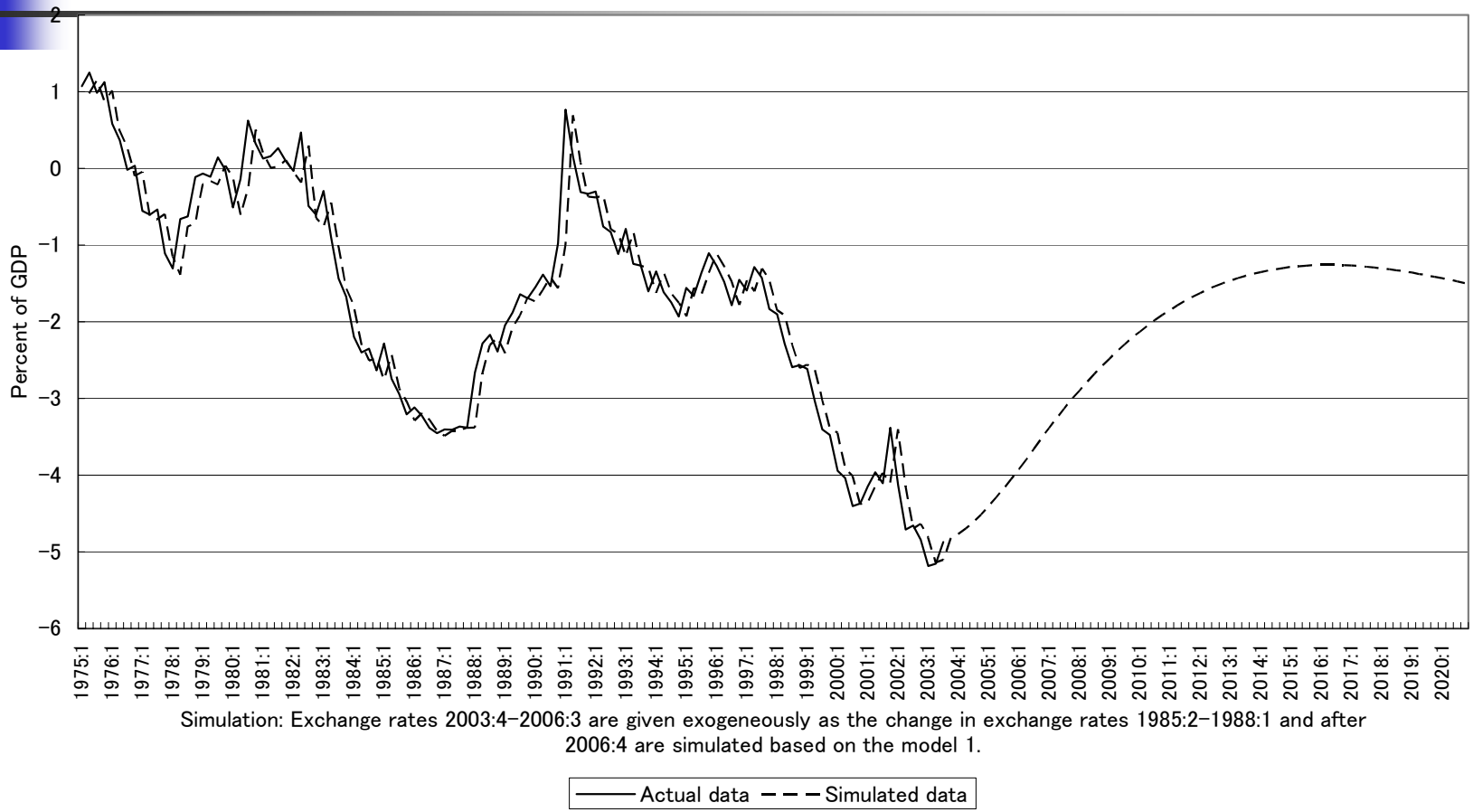
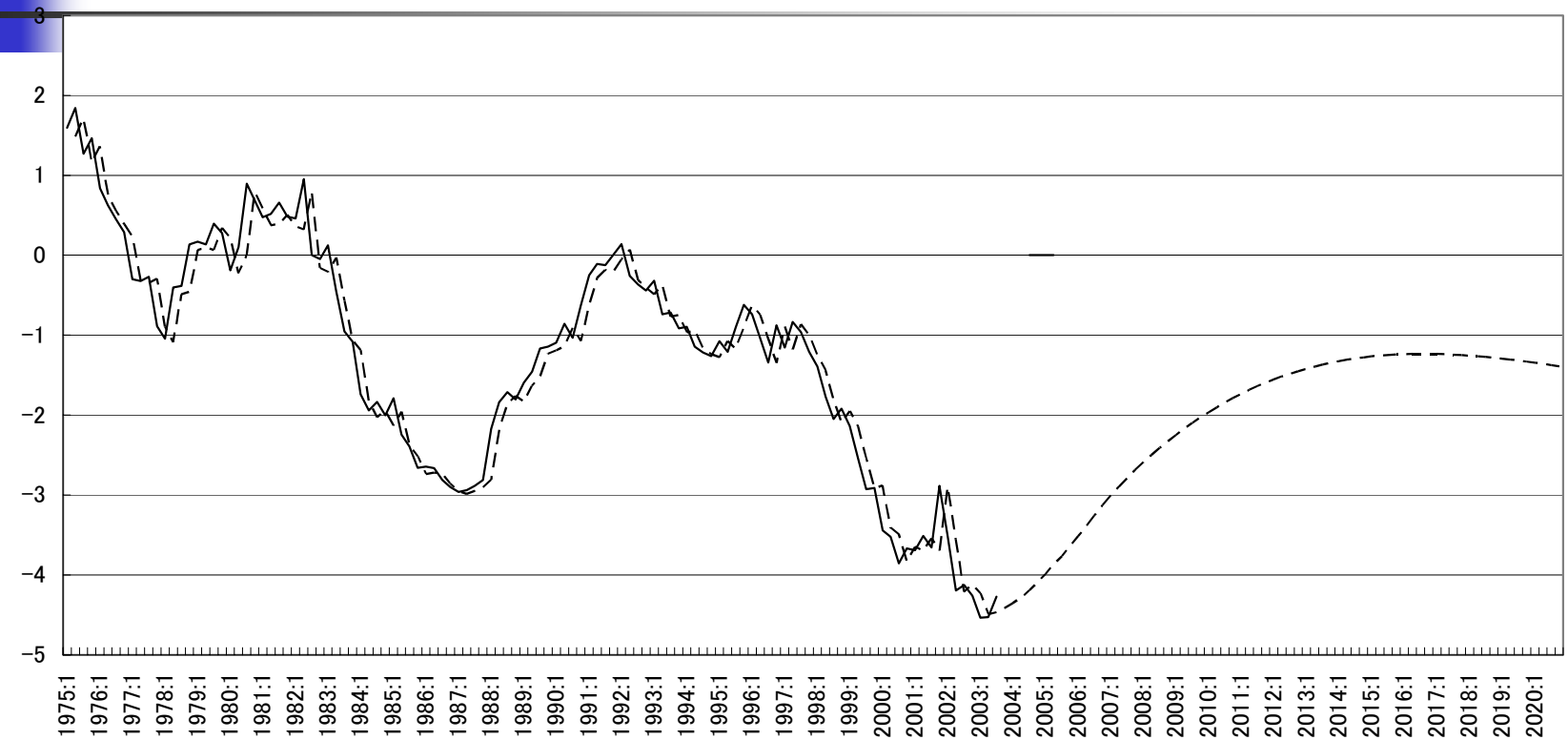


Figure 11: Simulated Current Account Based on Model 1
(Case 4: Exchange rate depreciation as after the Plaza Accord)



Simulation: Exchange rates 2003:4–2006:3 are given exogeneously as the change in exchange rates 1985:2–1988:1 and after 2006:4 are simulated based on the model 1.

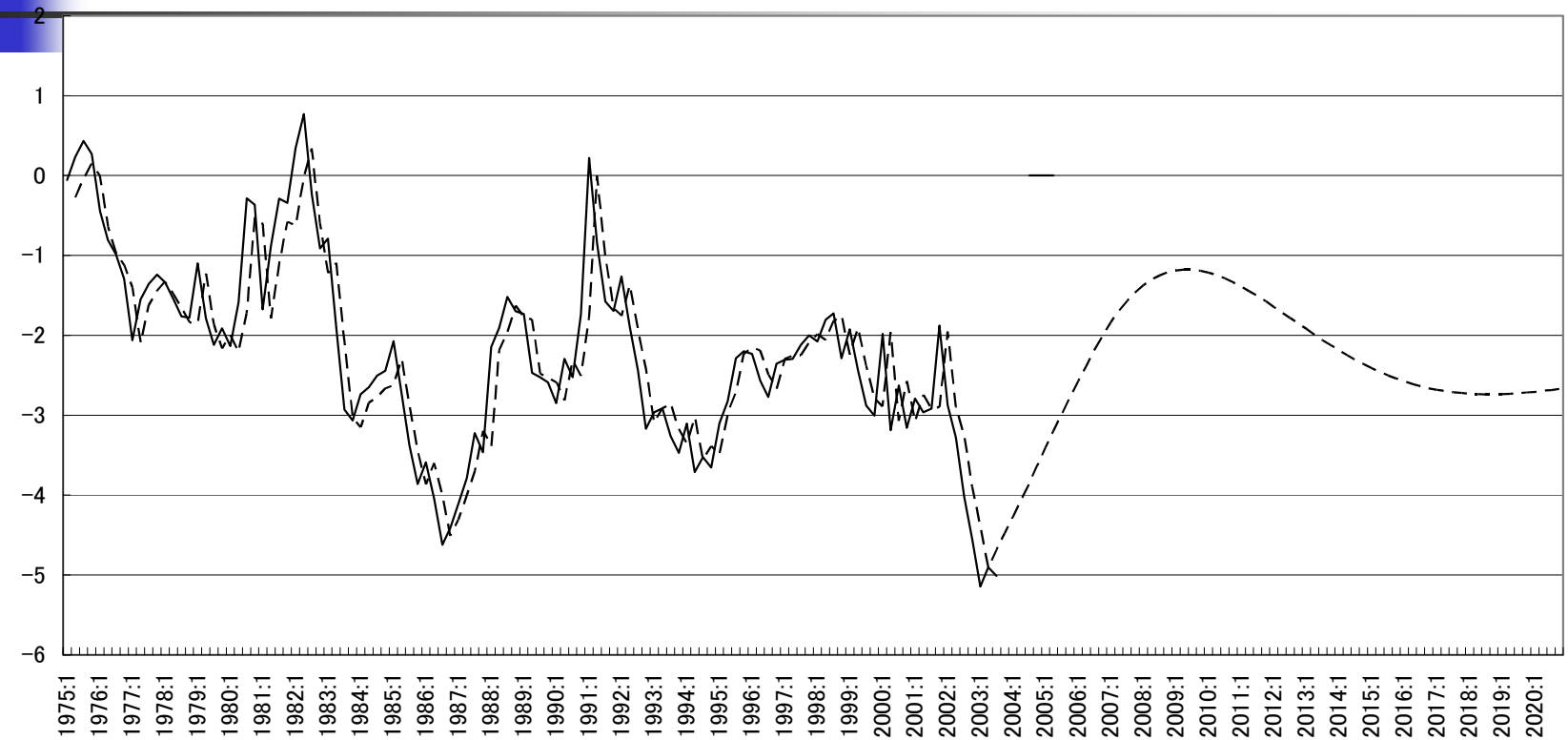
Figure 12: Simulated Current Account Based on Model 2
(Case 4: Exchange rate depreciation as after the Plaza Accord)



Simulation: Exchange rates 2003:4–2006:3 are given exogeneously as the change in exchange rates 1985:2–1988:1 and after 2006:4 are simulated based on the model 1.

Actual data Simulated data

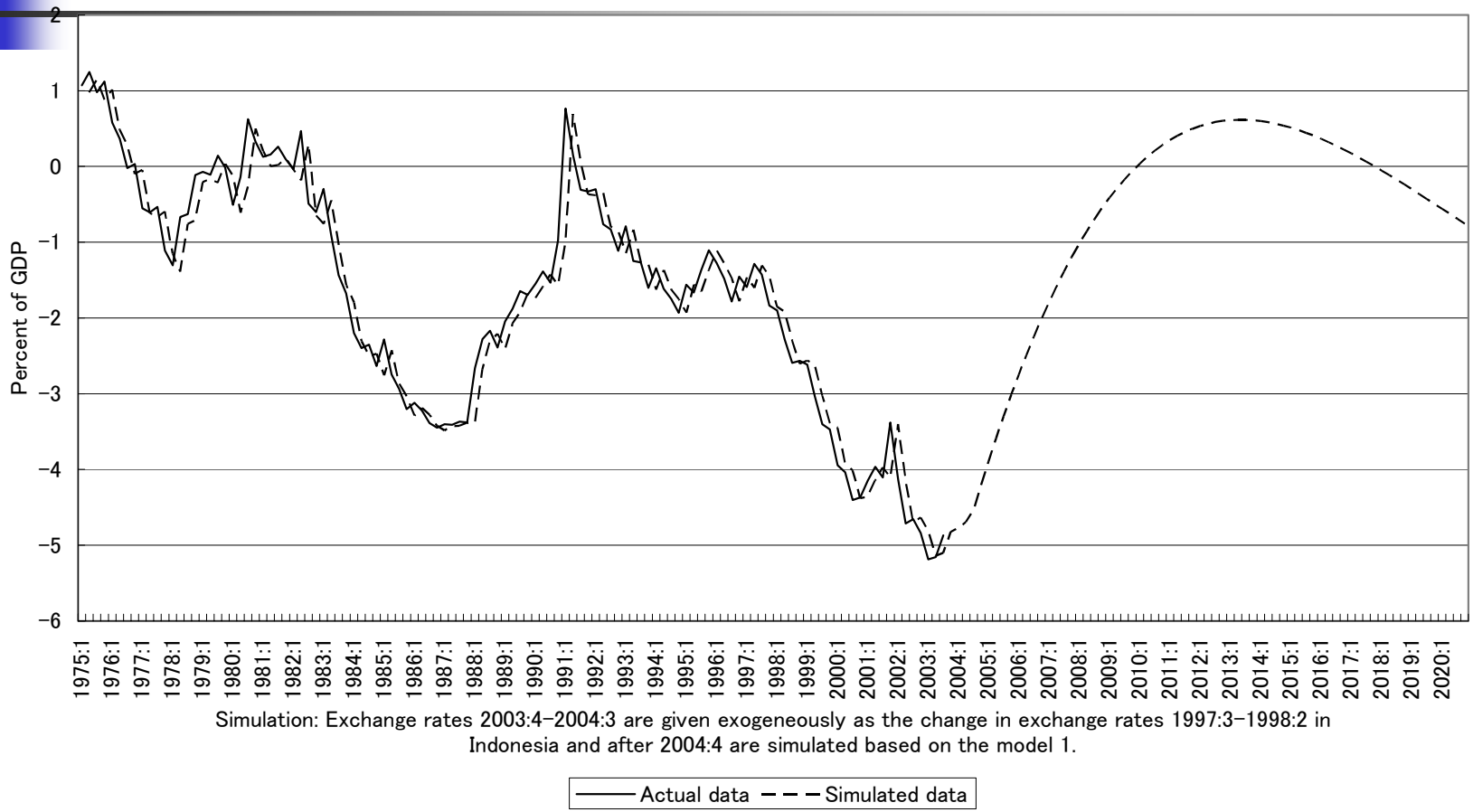
Figure 13: Simulated Current Account Based on Model 3
(Case 4: Exchange rate depreciation as after the Plaza Accord)



Simulation: Exchange rates 2003:4–2006:3 are given exogeneously as the change in exchange rates 1985:2–1988:1 and after 2006:4 are simulated based on the model 1.

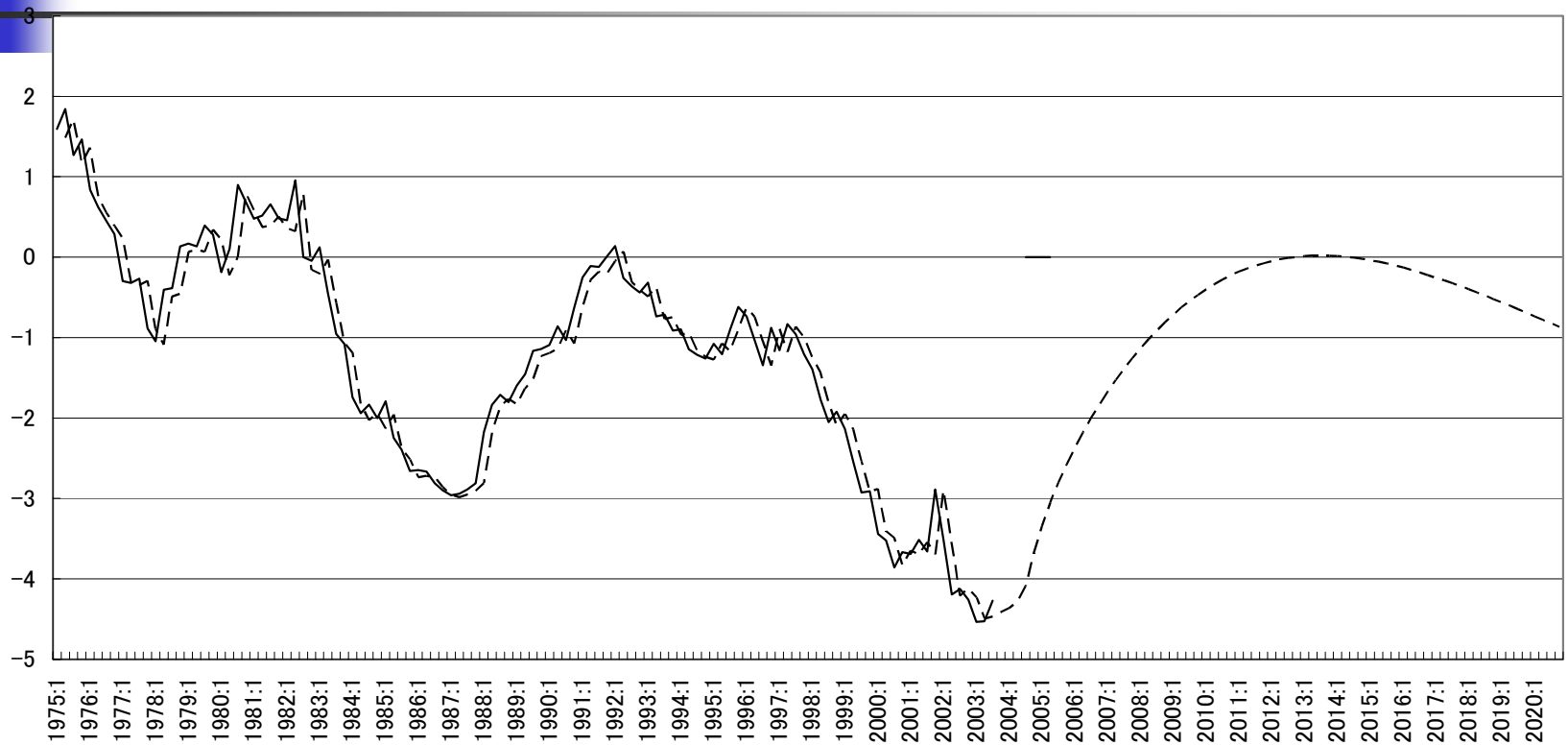
Actual data Simulated data

Figure 14: Simulated Current Account Based on Model 1
(Case 5: Exchange rate depreciation as in the Indonesian Currency Crisis)



Simulation: Exchange rates 2003:4–2004:3 are given exogeneously as the change in exchange rates 1997:3–1998:2 in Indonesia and after 2004:4 are simulated based on the model 1.

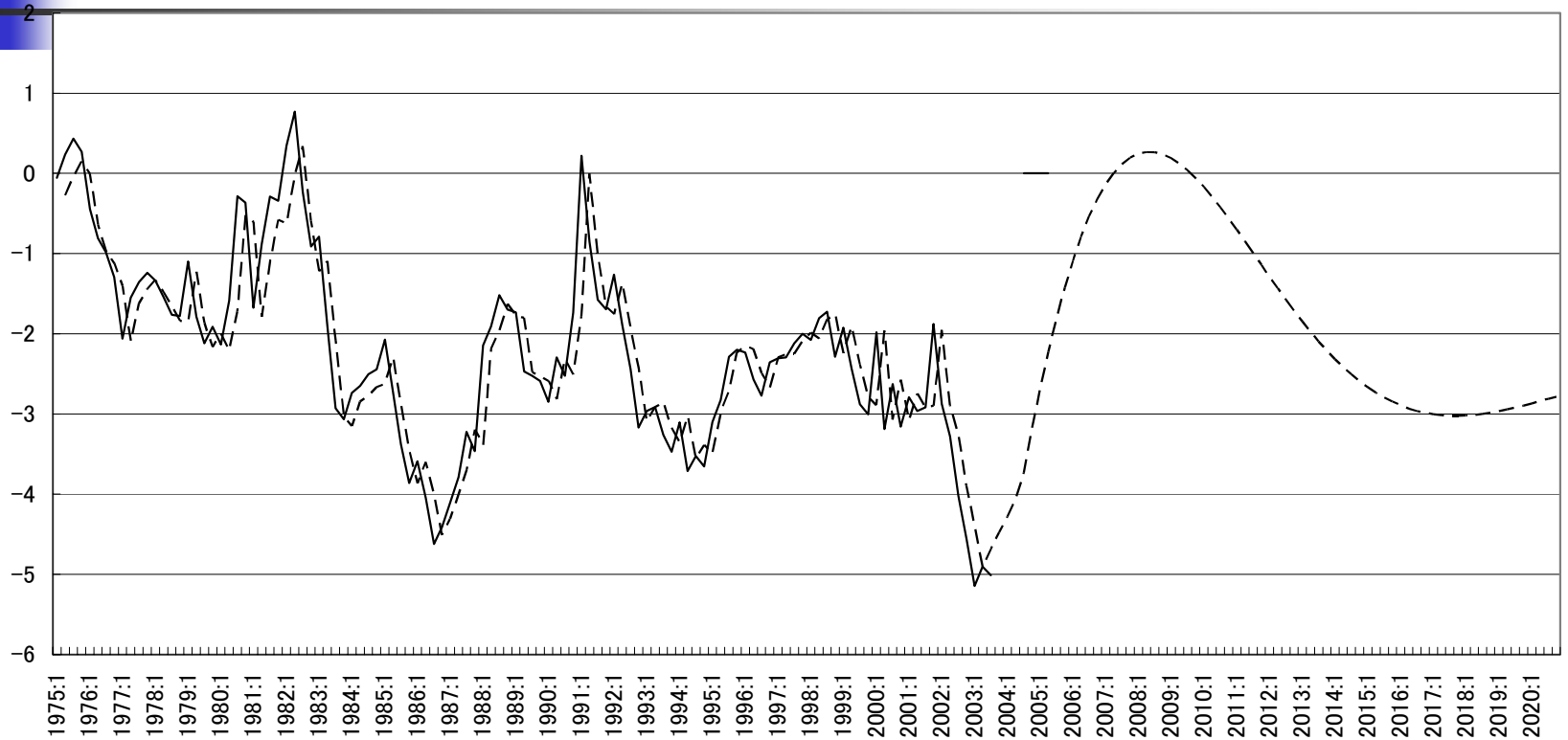
Figure 15: Simulated Current Account Based on Model 2
(Case 5: Exchange rate depreciation as in the Indonesian Currency Crisis)



Simulation: Exchange rates 2003:4–2004:3 are given exogeneously as the change in exchange rates 1997:3–1998:2 in Indonesia and after 2004:4 are simulated based on the model 1.

Actual data – – – Simulated data

Figure 16: Simulated Current Account Based on Model 3
(Case 5: Exchange rate depreciation as in the Indonesian Currency Crisis)



Simulation: Exchange rates 2003:4–2004:3 are given exogeneously as the change in exchange rates 1997:3–1998:2 in Indonesia and after 2004:4 are simulated based on the model 1.

Actual data Simulated data

Depreciation of the US dollar and sustainability of the current account

- We investigate whether each series of the simulated current account deficits is sustainable.
- The ADF test is used to investigate the sustainability of the current account deficits.
- The simulated current account deficits would be sustainable if the null hypothesis of unit-root is rejected by the ADF test.
- We conduct the unit-root test not only for during the full sample period (from 1976:Q1 to 2020:Q4) but for the forecasted for the sub-sample period (from 2003:Q4 to 2020:Q4).

Table 10: The Sustainability of the Simulated Current Account Based on Each Models

	Actual data	Model 1	Model 1 (differenced)	Model 2
Level	−0.643	−0.620	−0.889	−0.518
p-value	0.928	0.931	0.874	0.946
Number of lags	2	2	3	2
Difference	−3.357 **	−5.355 ***	−4.905 ***	−3.875 ***
p-value	0.013	0.000	0.000	0.003
Number of lags	5	2	2	4

	Model 2 (differenced)	Model 2 (error-correction)	Model 3	Model 3 (differenced)
Level	−0.681	−0.677	−2.271	−2.386
p-value	0.919	0.920	0.188	0.148
Number of lags	5	5	2	2
Difference	−3.905 ***	−3.855 ***	−5.909 ***	−6.077 ***
p-value	0.003	0.003	0.000	0.000
Number of lags	4	4	2	2

1) Sample period: 1976:1-2003:3
2) Testing models are with constant terms but without trend terms.
3) Number of lags are determined by Akaike's Information Criteria (AIC).
4) *, **, *** mean that the null hypotheses are rejected by 10%,5%,1%.

Table 11: The Sustainability of the Forecast of the Simulated Current Account

(Model 1)

	Case 1	Case 2	Case 3	Case 4	Case 5
Sample	1976:1–2020:4	1976:1–2020:4	1976:1–2020:4	1976:1–2020:4	1976:1–2020:4
Level	−2.144	−2.288	−2.377	−2.292	−2.318
p-value	0.231	0.172	0.143	0.171	0.162
Number of lags	10	10	10	10	10
Difference	−3.744	−3.701	−4.194	−3.629	−3.902
p-value	0.004 ***	0.005 ***	0.001 ***	0.006 ***	0.003 ***
Number of lags	9	9	5	9	5

	Case 1	Case 2	Case 3	Case 4	Case 5
Sample	2003:4–2020:4	2003:4–2020:4	2003:4–2020:4	2003:4–2020:4	2003:4–2020:4
Level	−5.944 ***	−6.449 ***	−9.001 ***	−0.616	−9.439 ***
p-value	0.000	0.000	0.000	0.905	0.000
Number of lags	10	10	10	10	10
Difference	−7.191 ***	−9.416 ***	−13.326 ***	−15.858 ***	−6.227 ***
p-value	0.000	0.000	0.000	0.000	0.000
Number of lags	10	9	8	10	10

(Model 2)

	Case 1	Case 2	Case 3	Case 4	Case 5
Sample	1976:1–2020:4	1976:1–2020:4	1976:1–2020:4	1976:1–2020:4	1976:1–2020:4
Level	−1.899	−2.051	−2.224	−2.108	−2.323
p-value	0.365	0.282	0.202	0.254	0.165
Number of lags	6	6	6	6	6
Difference	−4.248 ***	−4.210 ***	−4.122 ***	−4.125 ***	−3.917 ***
p-value	0.001	0.001	0.001	0.001	0.003
Number of lags	5	5	5	5	5

	Case 1	Case 2	Case 3	Case 4	Case 5
Sample	2003:4–2020:4	2003:4–2020:4	2003:4–2020:4	2003:4–2020:4	2003:4–2020:4
Level	−10.952 ***	−7.300 ***	−7.814 ***	−0.905	−9.033 ***
p-value	0.000	0.000	0.000	0.828	0.000
Number of lags	9	9	10	10	10
Difference	−12.628 ***	−10.027 ***	−13.360 ***	−2.138	−8.346 ***
p-value	0.000	0.000	0.000	0.207	0.000
Number of lags	10	9	10	10	10

(Model 3)

	Case 1	Case 2	Case 3	Case 4	Case 5
Sample	1976:2–2020:4	1976:2–2020:4	1976:2–2020:4	1976:2–2020:4	1976:2–2020:4
Level	−3.367 **	−3.268 **	−3.006 **	−3.153 **	−2.863 **
p-value	0.013	0.017	0.034	0.023	0.048
Number of lags	2	2	2	2	6
Difference	−7.446 ***	−7.313 ***	−7.085 ***	−7.317 ***	−6.786 ***
p-value	0.000	0.000	0.000	0.000	0.000
Number of lags	2	2	2	2	2

	Case 1	Case 2	Case 3	Case 4	Case 5
Sample	2003:4–2020:4	2003:4–2020:4	2003:4–2020:4	2003:4–2020:4	2003:4–2020:4
Level	−7.787 ***	−6.503 ***	−9.036 ***	−1.914	−8.611 ***
p-value	0.000	0.000	0.000	0.307	0.000
Number of lags	10	10	10	10	9
Difference	−9.256 ***	−8.783 ***	−9.933 ***	−3.525 ***	−16.525 ***
p-value	0.000	0.000	0.000	0.008	0.000
Number of lags	10	10	9	10	8

1) Testing models are with constant terms but without trend terms.
2) Number of lags are determined by Akaike's Information Criteria (AIC).
3) *, **, *** mean that the null hypotheses are rejected by 10%,5%,1%.
4) Each case is used by the simulated data from the exogeneous change in exchange rate after 2003:3 as follows.
Case 1: 10% exchange rate depreciation in 2004:2
Case 2: 30% exchange rate depreciation in 2004:2
Case 3: 50% exchange rate depreciation in 2004:2
Case 4: The exchange rate follows for 4 years after the data as one.
Case 5: The exchange rate follows as Indonesian currency crisis in 1997:3–1998:2.

Conclusion (1)

- Some scenarios of the US dollar depreciation would reduce the current account deficits to a level under 2% of GDP in the next several years.
- Smaller depreciation of the US dollar should reduce the current account deficits if the US government reduced the fiscal deficits at the same time.

Conclusion (2)

- The simulated current account deficits based on Model 3 (the exchange rate and the saving-investment balances for the private and the public sectors) are sustainable for all of the cases of supposed exchange rate movements.
- It is possible to obtain sustainable current account series by taking into account relationships among the exchange rate, the private sector's saving-investment balance, and fiscal deficits according to Model 3.
- The fiscal deficits are the most important factors that would make the US current account deficits sustainable in the near future.