Two Patterns of Current Account Reversal: Shift-type and V-shaped

Shingo IOKIBE

In current account reversal, the current account balance shrinks its deficit rapidly or jumps to a surplus from being in a large deficit. The purpose of this paper is to examine empirically the movements of macroeconomic variables before and after current account reversals and to extract some stable relationships between those variables, using the annual data of 23 developed countries from 1975 to 2007. We found that current account reversal episodes in developed economies can be classified into either a "shift-type" or a "V-shaped" reversal, depending on the movements of the current account balances. We also found marked differences in the adjustment of macroeconomic variables. Our classification of two types of current account reversal has many points in common with the classification by Croke et al. (2005), expansion and contraction. We believe, however, that our classification is superior in terms of generality.

1 Introduction

Current account reversal[1)] is a phenomenon in which the current account balance deficit shrinks rapidly or jumps to a surplus from being in a large deficit. The purpose of this paper is to examine empirically the movements of macroeconomic variables before and after current account reversals in order to extract some stable relationships among those variables.

The situation in which we see a current account reversal from surplus to deficit is, of course, quite common. Here, however, we consider a current account reversal in which the current account balance reverses from a large deficit, since current account reversals from a large deficit, accompanied by a rapid capital outflow, tend to invoke more difficult economic conditions in a world of nearly perfect international capital

mobility.

Previous literature on this subject has shown that when current account reversal[2] occurs, real output growth rate has a tendency to decline, and the nominal and real exchange rates tend to depreciate (Freund 2005, Debelle and Galati 2005, Edwards 2005, for example.). However, controversies surround the scale of economic costs paid by the economy involved through macroeconomic adjustments in concurrence with current account reversal. For example, Milesi-Ferretti and Razin (2000) insist that the economic costs have been benign in the current account reversal episodes of mid- and low-income countries. They showed that the median real output growth rate of the affected countries did not decline after reversal. Croke et al. (2005) also stress, from an analysis of developed countries, that economic costs do not always ensue from a current account reversal. The basis for their argument is that although some of the reversal episodes in developed countries are accompanied by output contraction, some are accompanied by output expansion.

These results from previous research suggest that there may be several methods of macroeconomic adjustment around current account reversal. In fact, by scrutinizing the dynamics of the current account as a fraction of the GDP from past reversal episodes, we found that there are two patterns of reversal, depending on the path of the current account. In this paper, we will empirically clarify two patterns, shift-type reversal and V-shaped reversal, and will discuss the difference between these two reversal patterns in terms of macroeconomic adjustment. For example, the following features will be revealed; the real exchange rate depreciates substantially during shift-type reversal, but changes hardly at all in V-shaped reversal; the real GDP growth rate declines less severely in shift-type reversal, but drops rapidly and extensively in V-shaped reversal.

The outline of this paper is as follows. Section 2 explains our definition of current account reversal and examines current account reversal episodes that developed countries have experienced since 1975. Section 3 first defines two patterns of current account reversal, shift-type and V-shaped reversal, and sorts the reversal episodes detected in section 2 into these two patterns. Then, we examine whether macroeconomic variables, such as the exchange rates and real GDP growth rate, move differently before

and after current account reversal, depending on the pattern of reversal.

2 Current Account Reversal

2.1 Definition

We can define current account reversal episodes according to the following four conditions.

1. The current account deficit per nominal GDP was no less than two percent in at least in one year during the three years just before the reversal.
2. The three-year average of deficits per nominal GDP before the reversal was larger than the three-year average after the reversal by at least two percentage points.
3. The lowest deficit per nominal GDP during the three years preceding reversal was larger than the largest deficit during the five years after the reversal.
4. The three-year average of deficits per nominal GDP after the reversal was less than two-thirds of the three-year average of deficits before reversal.

We set conditions 2, 3, and 4, following Freund (2005), although condition 1 is a little different from Freund's. Our condition is looser, the deficit having exceeded 2% in at least in one year during the three years before reversal whereas Freund's condition is that the deficit as a fraction of GDP must exceed 2% in the year immediately before the reversal. If we follow Freund's condition, the year when the current account deficit per the GDP is at maximum must be defined as the year preceding the reversal. However, this method contradicts the definition of reversal that defines a current account reversal as a phenomenon in which a current account deficit shrinks *sharply*. For example, in a case in which the current account recorded a large deficit for a few consecutive years following the year when it had reached a record-high level of deficit, and then the deficit began to shrink rapidly, we should regard the year in which the deficit began to decrease as the first year of the current account reversal.

Let us explain the reason why we define the four conditions above. First, condition 1 excludes reversals from a small deficit. The current account deficit has a tendency

to grow under circumstances in which financial crises are imminent (Kaminsky and Reinhart, 1999). By setting conditions 2 and 3, we exclude temporary improvements of the current account balance from consumption smoothing in response to small economic shocks. Condition 4 is needed to exclude a case in which the current account deficit per GDP shrinks by around 2 percent from a high level. If, for example, the current account deficit per GDP decreases by 2 percent from 15 percent, it is hardly appropriate to define such a case as a reversal of the current account.

By examining 23 developed countries[3] from 1975 to 2007, we found 19 episodes of current account reversal that satisfies all four of the conditions (see Table 1). The number of episodes is less than has been identified in the preceding literature[4]. The data may be one reason for the disparity because we used updated data. The other reason is that we count reversals that happen in consecutive years as one episode. For example, in Ireland, current account reversals occurred consecutively from 1982 to

Table 1 Current account reversal episodes in developed countries

Country	(1) Preceding year of reversal (year 0)	(2) Current account deficit in year 0 (percent of GDP,)	(3) Maximum deficit (year) (percent of GDP)
Austria	1981	4.3	4.8 (1980)
Ireland	1981	13.0	
Belgium	1982	2.9	4.0 (1981)
Spain	1982	2.4	2.7 (1981)
Sweden	1982	3.1	3.3 (1980)
Portugal	1983	6.3	15.3 (1981)
Greece	1985	7.1	
Denmark	1986	5.2	
New Zealand	1986	9.5	14.4 (1984)
Norway	1988	3.9	5.9 (1986)
US	1988	2.4	3.4 (1987)
UK	1990	3.9	5.1 (1989)
Finland	1991	5.4	
Iceland	1992	2.3	4.0 (1991)
Italy	1992	2.3	
Spain	1992	3.52	3.53 (1991)
Canada	1993	3.9	
Sweden	1993	2.1	3.3 (1992)
Austria	1999	1.6	2.5 (1997)

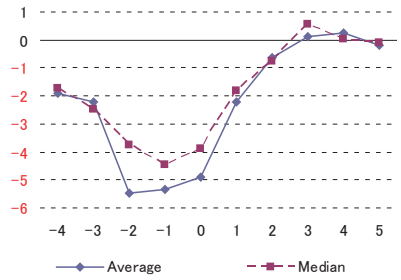
(Note) An empty cell in column (3) means that the year with the maximum deficit of the current account is the same as column (1).
(Data source) World bank, *World Development Indicator*.

1987, precisely according to conditions 1 to 4. We define these consecutive reversals as one reversal episode, however, with 1982 as the starting year[5].

Table 1 shows that developed countries did not experience current account reversal from the beginning of 1995 through 2002, except for Austria in 1999. This is a surprising development because current account reversal had happened in every year in one of the developed countries through 1994. Though the combination of our definition and data set can find episodes only before 2002, the decade after 1994 appears to be an extraordinarily calm period during which current account reversal did not occur.

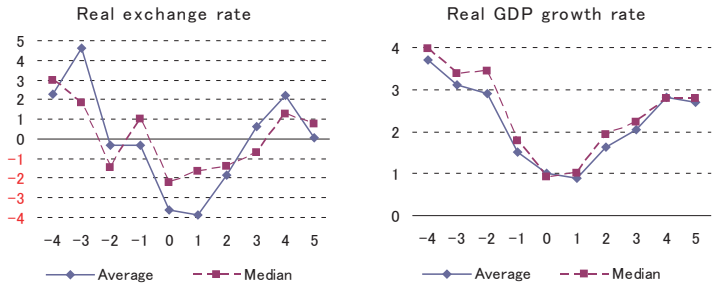
No current account reversals have occurred in any developed countries after 2003. Since 2004, we have seen rapid increases in the current account deficits not only in the U.S. but also in several industrial economies, such as Spain and the U.K., which

Chart 1 Current account dynamics during reversal (whole sample)



(Note) The fraction of the nominal GDP. Unit is percentage.
(Data source) World bank, *World Development Indicator*.

Chart 2 Exchange rates and growth rates during reversal



(Note) Annual rates of change. Unit is percentage. The series of the real exchange rate are calculated as an average annual appreciation rate of the real effective exchange rate.
(Data source) World bank, *World Development Indicator*, and International Monetary Fund, *International Financial Statistics*.

have been followed by the global financial crises in 2007 and 2008. No one can deny the possibility that a current account reversal may happen after a long interval in several developed countries.

Chart 1 shows the dynamics of the average current account deficits per GDP of the 19 current account reversal episodes during the 10 years around the reversals. The horizontal axis represents the time period, in which we define the year preceding the current account reversal as "year 0" and the year in which the current account reversal occurred (or the year in which the current account deficit per GDP began to shrink sharply) as "year 1." In a typical current account reversal episode, the current account deficit stays at 5 percent of the GDP for three years preceding the reversal and then shrinks rapidly to around zero percent of the GDP in the following three years. In particular, the scale of decline in deficit in the first reversal year is enormous, around three percent of the GDP.

2.2 Macroeconomic adjustment in a current account reversal

Let us first examine the average dynamics of the real exchange rates and the real GDP growth rates during the decade in whose middle a current reversal started. As the existing literature has shown, a current account reversal accompanies both a real depreciation of the exchange rate and a decline in the real GDP growth rate (Chart 2). The real exchange rate depreciates by around 10 percentage points from the preceding year ("year 0") to the second year after reversal ("year 2"). The real GDP growth declines by an average annual rate of 2 percent from the two years before reversal ("year -1") to the first year after reversal ("year 1"), and it takes 4 years for it to return to its former trend.

These dynamics of current account, real exchange rate, and output may indicate the functioning of a textbook mechanism during a current account reversal. That is, both the demand-switching effect of a real exchange rate depreciation and the demand-reduction effect of an output decline may contribute to an improvement in the trade balance with some lags.

3 Two Patterns of Current Account Reversal: Shift-type vs. V-shaped

3.1 Expansion vs. Contraction à la Croke et al. (2005)

Are adjustment mechanisms the same for any reversal of the current account?

Croke et al. (2005) indicated that such may not be true. By comparing the average GDP growth rates for the three years before reversal and the three years after reversal, they extracted both the top 7 episodes in which the growth rate improved the most and the bottom 7 episodes in which the growth rate improved the least or else deteriorated most. They called the former "expansion episodes" and the latter "contraction episodes." They showed that macroeconomic variables adjust in different ways between the expansion and contraction episodes.

Croke et al. (2005) showed that the real exchange rate depreciates in expansion episodes, whereas it does not change much in contraction episodes. Because of this finding, they concluded that in expansion episodes, the main driver of the current account improvement is not the demand-reducing effect of output shrinkage but the demand-switching effect of real exchange rate depreciation, while in contraction episodes the main contributor is the import-reducing effect of output decline.

This result of Croke et al. (2005) is very interesting because it indicates that current account reversals may happen in several ways. Regrettably, their classification lacks generality. First, in over half of the expansion episodes, the three-year average growth rate declined after reversal, so it may be an overstatement to say that the whole 7 episodes are defined as reversals with an "economic expansion." Second, the residual 40 percent of episodes are not classified in either pattern, because they selected either the seven episodes with the highest growth rate or those with the lowest growth rate. In the residual 40 percent of episodes, the three-year average growth rate declined 1.9% on average after reversal. Why are those episodes not classified as "contraction episodes"? Third, they did not explain why they selected those seven episodes.

We will show below that a classification based on the dynamics of the current account balance before and after reversal is superior in terms of generality to a classification based on growth rate dynamics before and after reversal. If we classify

current account reversal episodes into "shift-type" and "V-shaped" patterns, depending on how the current account balance moves before and after reversal, we can find differences in the macroeconomic adjustment mechanism between the two types, similar to the "expansion" and "contraction" episodes of Croke et al. (2005).

3.2 Shift-shaped vs. V-shaped

Definition

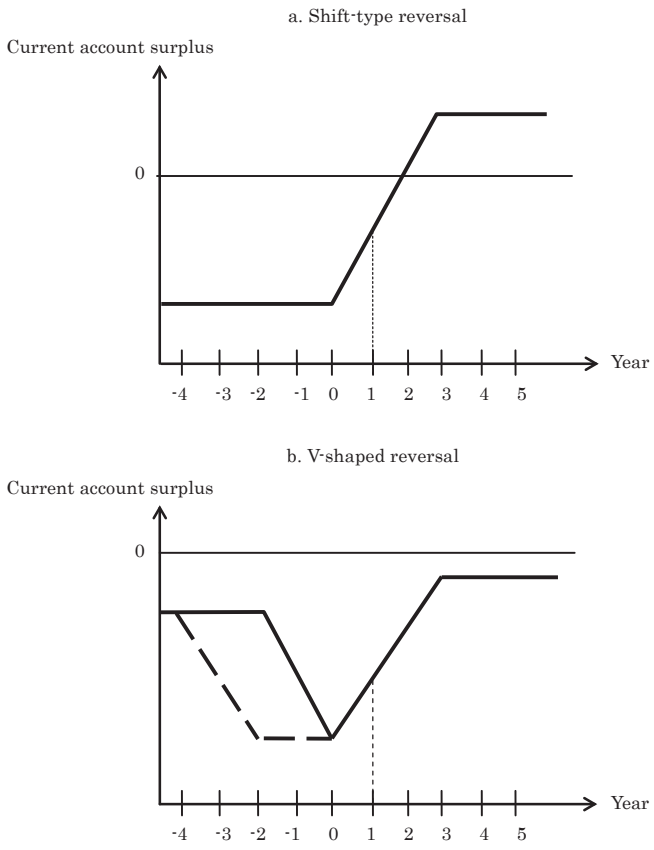
We can classify the 19 reversal episodes in Table 1 into two patterns, based on the way the current account balance moves: “shift-type” and “V-shaped”. Chart 3 shows images of both patterns.

Let us define a “shift-type” current account reversal episode as one in which the current account balance has stayed in a large deficit over 5 years before reducing its deficit rapidly, and has sustained either a small deficit or a surplus for more than 5 years thereafter (Chart 3a).

On the other hand, we define a “V-shaped" current account reversal episode as one in which the current account deficit has increased rapidly for a few years just before reversal, or one in which the current account balance recorded a large-scale deficit in only a few of the years preceding reversal (Chart 3b). For example, V-shaped reversal episodes may include one in which the current account deficit increased rapidly in "year -1" (2 years before the reversal year) and, thereafter, reversed sharply in "year 1" (the first year of reversal), and returned to at least the former level of deficit or turned into a surplus in "year 3" (the third year after reversal). This case is literally V-shaped. We depict it as a solid line in Chart 3b. Our V-shaped reversal episodes also include, by definition, a U-shaped episode like the dotted line in Chart 3b. That is, V-shaped episodes can include a case in which the current account deficit began to increase 4 years before the reversal ("year -3"), stayed at a large scale for three years, and then decreased rapidly to the smaller size.

Concretely, we define an episode matching all of the three conditions below as a shift-type current account reversal, while we define an episode which does not match any one of the three conditions as a V-shaped reversal.

Chart 3 Conceptual diagram: Shift-type vs. V-shaped reversal



a) The current account deficit as a fraction of GDP in the four and five years preceding reversal is no less than that in the fourth and fifth year after reversal, respectively.

b) In any of the pre-reversal five years, the current account deficit as a fraction of GDP is no less than the average of the deficits in the post-reversal five years.

c) Both of the sixth-year and seventh-year current account deficits as a fraction of GDP are no larger than the average deficit in the pre-reversal five years.

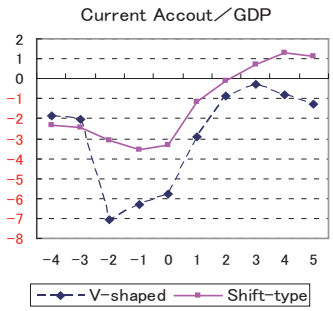
Conditions a) and b) exclude from shift-type reversals such episodes as those in which the current account deficit increased sharply in the three years just before

Table 2 Two patterns of current account reversal: Shift-type vs. V-shaped

Type	Episode	No
Shift	Austria (1981, 1999), Belgium (1982), Sweden (1982, 1993), Denmark (1986), the United States (1988), Finland (1991), Italy (1992), Canada (1993)	10
V-shaped	Ireland (1981), Spain (1982, 1992), Portugal (1983), Greece (1985), New Zealand (1986), Norway (1988), the United Kingdom (1990), Ireland (1992)	9

(Note) The number in parentheses shows the year preceding reversal—i.e., column (1) of Table 1.

Chart 4 Current account dynamics: Shift-type vs. V-shaped reversal



(Data source) World bank, *World Development Indicator*.

reversal, and condition c) excludes episodes in which improvement of the current account balance after reversal was temporary. Following these criteria, we can classify the above 19 reversal episodes into 10 shift-type episodes and 9 V-shaped episodes (see Table 2).

As a natural consequence of the definition, the current account dynamics are distinctly different between shift-type and V-shaped reversal episodes (Chart 4).

In shift-type episodes, on average, the current account gradually enlarges its deficit to 3 to 4 percentage of the GDP over the 5 years before the reversal, and reduces its deficit massively thereafter. The current account balance shrinks its deficit by 2 percent of the GDP in the first year of reversal, turns into surplus in the third year, and keeps a surplus as large as 1% of the GDP thereafter.

On the other hand, in V-shaped episodes, the current account deficit begins to increase rapidly 3 years before reversal. The deficit as a fraction of the GDP, on average, grows by 5% from 2% to 7% over the 3 years preceding the reversal, and retains its size for the following 3 years. Though the median deficit is smaller than average, it increased sharply during the 3 years preceding reversal as the average deficit does. During the 3 years after the reversal, both the average and median

Table 3 T-test on difference between the averages for reversal patterns: Macroeconomic variables

	-4	-3	-2	-1	0	1	2	3	4	5
CA	0.37	0.39	-2.24**	-2.31**	-1.93**	-1.43	-0.70	-0.92	-2.10**	-2.84***
REER	-0.95	-0.20	1.21	2.07**	2.81***	0.76	0.92	-0.59	-1.17	0.36
NEER	-2.98***	-1.14	-0.92	-1.35	-0.40	-0.97	-0.53	-2.44**	-2.52**	-1.32
Growth	0.11	0.59	0.20	0.32	-0.08	-1.27	-1.12	1.88*	1.49	0.10
I	1.08	1.27	1.92*	1.94*	2.02**	1.81*	1.31	1.30	1.36	1.21
S	-0.81	0.22	-1.12	0.34	0.56	0.49	-0.98	-0.60	-1.46	-1.46
Stock	0.21	-0.02	-0.66	-0.24	0.00	-1.73*	-2.32**	-2.29**	-1.65*	-1.00
Export	1.82*	1.49	0.89	0.66	0.00	-0.84	-0.45	-0.81	-0.86	-0.70
Import	0.52	0.08	1.46	1.04	0.00	-1.92*	-2.44**	-2.01**	-1.19	-0.95
CPI	3.37***	2.97***	2.45**	3.96***	1.64*	2.51**	2.57***	0.90	1.32	2.07**
ODR	2.21**	2.06*	4.99***	3.81***	5.17***	4.20***	3.74***	4.45***	4.19***	3.14***
RODR	-2.18**	-1.46	0.67	-1.98*	1.00	-1.24	-0.79	2.14**	1.74*	-0.52
M2	0.23	0.03	1.34	-0.58	0.49	1.77*	0.32	0.06	2.48**	0.82
TOT	1.34	1.26	0.91	0.75	0.00	0.29	1.10	1.18	0.91	0.51

(Note1) The numbers in the table are t-statistics of two-sided test on null hypothesis that the cross-country average of V-shaped reversal episodes equals to that of shift-type reversal episodes. The alternative hypothesis is that the averages of the two reversal patterns are not the same. We calculated the t-statistic as

$$t = \frac{\overline{X_V} - \overline{X_S}}{\sqrt{S_V^2/m + S_S^2/n}}.$$

Here, we denote $\overline{X_V}$ and $\overline{X_S}$ as the average of V-shaped and shift-type episodes, respectively, while S_V^2 and S_S^2 as the variance of V-shaped and shift-type episodes, respectively. m and n indicate the total number of samples of V-shaped and shift-type episode. The right upper-case letters *, **, and *** in table 5 indicate that the null-hypothesis can be rejected with 10%, 5%, and 1% statistical significance, respectively.
(Note2) The meanings of the abbreviations in the first column are as follows: CA abbreviates current account per GDP; REER, real effective exchange rate; NEER, nominal effective exchange rate; Growth, real GDP growth rate; I, gross fixed investment per GDP; S, gross national savings per GDP; Stock, real stock price index; Export, export per GDP; Import, import per GDP; CPI, consumer price index growth rate; ODR, nominal official discount rate; RODR, real official discount rate; M2, growth rate of M2 per GDP ratio; TOT, terms of trade.
(Source) The author's calculations.

deficit decline quickly to around zero as in the shift-type episodes, but increase again after the fourth year.

For the periods from year -2 to year 0 and from year 4 to year 5, t-test denied the null hypothesis that the average current account per GDP ratio of shift-type reversal episodes is identical to that of V-shaped episodes. (See Table 3)

3.3 Comparison about macroeconomic adjustment

Let us compare the two patterns of current account reversal regarding the dynamics of other macroeconomic variables before and after reversal. In Charts 5 through 7, we show the average dynamics of main macroeconomic and financial variables during shift-type and V-shaped reversal episodes, respectively. We will

inquire into the differences between the episodes in terms of how the macro economy adjusts during current account reversal by comparing the average dynamics of the selected variables for each pattern. Because the median dynamics of the same variables are not much different, the comparison should not change our main conclusions[6].

Economic variables

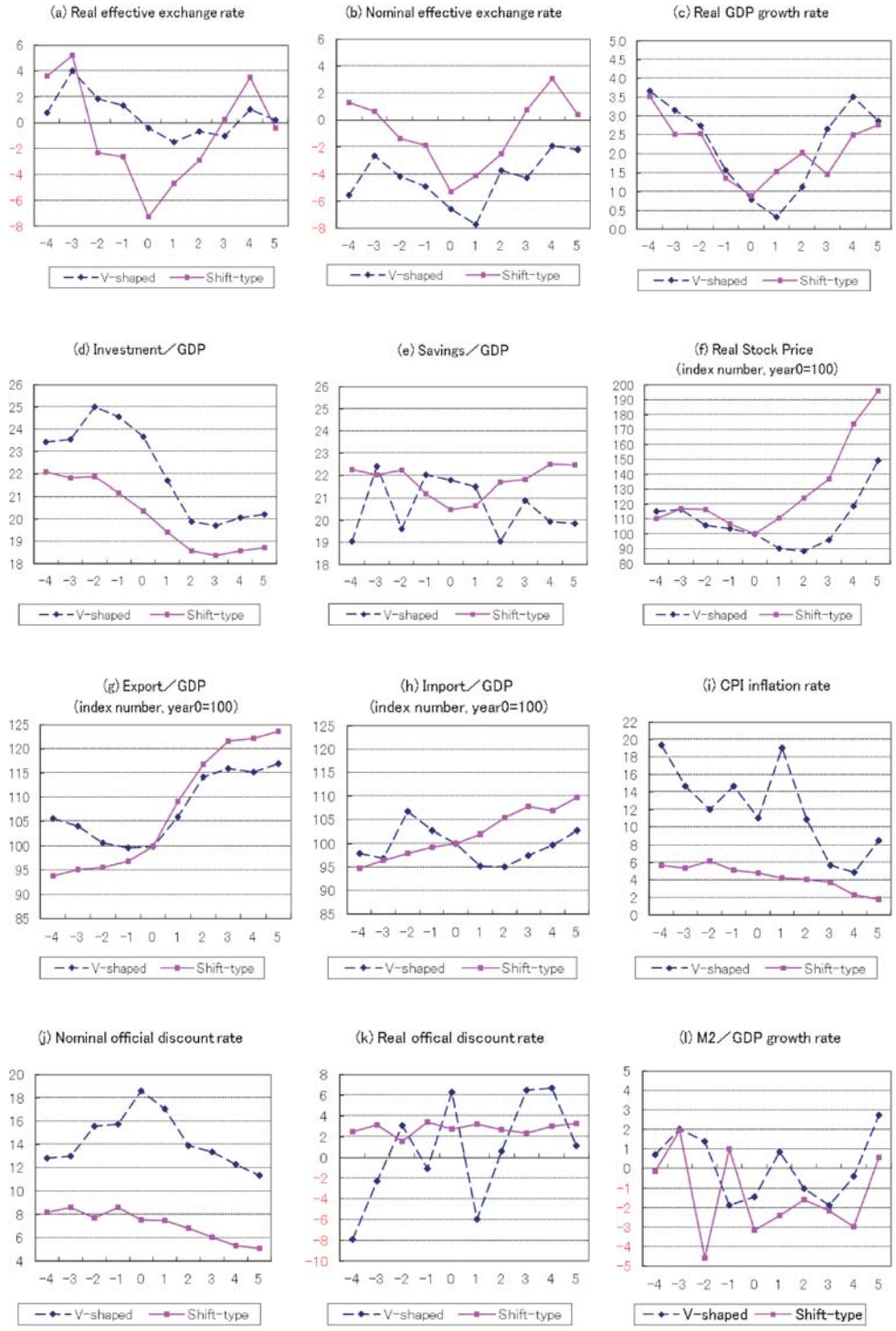
Real exchange rate: The average movement of the real exchange rate differs sharply between the shift-type and V-shaped episodes (Chart 5a). In a shift-type reversal, the real exchange rate appreciates until 4 years before reversal and then depreciates during 5 consecutive years, starting with 3 years before the reversal. The cumulative depreciation rate amounts to 20%. This may be a result of the adjustment of real exchange rate overvaluation. On the contrary, in a V-shaped reversal, the real exchange rate moves more steadily.

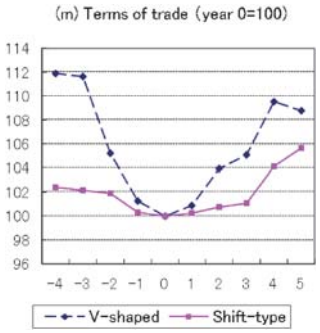
Nominal exchange rate: The dynamics of the nominal exchange rate also differ between the two patterns of reversal. In a V-shaped reversal, unlike the real exchange rate movement, the nominal exchange rate continues to depreciate from 5 years before reversal to 5 years after reversal (Chart 5b). In a shift-type reversal, the nominal exchange rate declines continuously from 3 years before the reversal to the second year after it, as the real exchange rate does. As we explain below, the inflation rate is higher in the V-shaped episode. The smaller movement of the real exchange rate during a V-shaped reversal may result from the fact that the nominal exchange rate depreciation rate was the same as the inflation rate.

Real GDP growth rate: As for real GDP growth rate, there is some difference between the two reversal patterns (Chart 5c). During a V-shaped reversal, the path of real growth rate is V-shaped with the bottom at the first year of the reversal, whereas it is U-shaped during a shift-type reversal. In other words, the growth rate declined sharply in a shorter period in a V-shaped reversal, while it stagnated to a lesser extent but for a longer period.

Investment: In both types of reversal, real investment dropped extensively during the reversal (Chart 5d). One difference is that real investment rises in the V-shaped

Chart 5 Macroeconomic variables: Shift-type vs. V-shaped reversal





(Note) The dotted and solid lines are cross-country averages for V-shaped and shift-type episodes, respectively. Real and nominal effective rates are appreciation rates per annum. Real GDP growth rate, consumer price inflation rate, and M2 per GDP are annual growth rates. Official discount rate is an annual rate. Units of these variables are percent. Real stock price, exports per GDP, imports per GDP, and terms of trade are index values calculated as the value at year 0 equals 100. Official discount rate data are missing the following episodes: U.K. (1990) and Iceland (1992). M2/GDP data are missing the following: Austria (1999), Belgium (1982), Finland (1982), Denmark (1986), New Zealand (1986), and Norway (1988). Terms of trade data are missing an episode in Portugal (1983).
(Data source) See appendix.

reversal from year -3 to year -1 before reversal and declines sharply in the first year of reversal, while there is no increase in real investment for the shift-type reversal before its decrease after year -1. Another difference is in the scale of investment before reversal. Real investment as a fraction of the GDP is larger in V-shaped episodes than in shift-type episodes. On the other hand, we cannot find any marked difference between the shift-type and V-shaped reversals in terms of national savings (Chart 5e).

Stock price: Real stock price first declines and then reverses during current account reversal periods, irrespective of the pattern of reversal. However, we can find differences between the two types of reversal on three points: the duration of the stock price decline, the timing of lowest price, and the magnitude of the revaluation rate after reversal (Chart 5f). In a shift-type reversal, real stock price reaches a low in year 0 and revalues quickly after reversal. On the contrary, in a V-shaped reversal, real stock price continuously declines for 5 years, starting with year -2. Though the pace of stock price revaluation after year 2 is rapid, the price in 5 years after reversal is, at most, 60% higher than the bottom price.

Export and Import: Exports and imports as a fraction of the GDP move differently, depending on patterns of current account reversal (Chart 5g and h). In a shift-type reversal, exports as a fraction of the GDP grow extensively at a maximum of almost

10% per annum in the post-reversal period, and imports per GDP also increase after reversal. In a V-shaped reversal, the movement of imports is distinctive in that it moves in an inverse of a V-shaped line or else it jumps in year -2 and decreases thereafter. Overall, from year -4 to year 5, imports do not increase at all and exports increase only slightly. Before reversal, exports decrease for 3 years.

CPI inflation rate: There is a large difference between the two types of episodes in the dynamics of the inflation rate around the time of current account reversal (Chart 5i). In fact, in both episodes, the consumer price index inflation rate tends to decline from the pre-reversal to the post-reversal period. However, the average level of inflation rate differs largely. While for shift-type episodes the average inflation rate is 5.5% for 5 years pre-reversal, and 3.2% for 5 years post-reversal, for V-shaped episodes the average inflation rate is much higher: 14.5% for the preceding 5 years and 9.8% for the following 5 years. These facts suggest that shift-type current account reversal happens in a relatively stable macroeconomic environment, while V-shaped current account reversal occurs in an unstable macroeconomic environment resulting from inappropriate macroeconomic policies.

Central bank discount rate: Nominal official discount rates[7] are higher in V-shaped current account reversal episodes than in shift-type episodes (Chart 5j), perhaps reflecting a high inflation rate for these episodes. In V-shaped episodes, central banks raise the official discount rates rapidly and extensively from year -2 to year 0 before lowering them rapidly in the post-reversal period. On the contrary, in shift-type episodes, central banks do not raise the discount rate before reversal, lowering it only to a limited extent after reversal. Turning to the real official discount rate (Chart 5k), in a V-shaped reversal, it is lower than zero through year -3 and then was raised to the plus range. This suggests that in a V-shaped reversal, a loose monetary policy prevails during 4 years before reversal and is strictly tightened thereafter.

Monetary aggregates: We cannot find any difference in the dynamics of M2 per GDP ratio between the two patterns of current account reversal (Chart 5l). The only difference detected is that in V-shaped episodes, M2 per GDP continuously increases from year -4 to year -2, whereas in shift-type episodes it continuously decreases at a moderate pace throughout the decade. We should keep in mind, however, that the

Table 4 Comparison of the dynamics of macroeconomic variables during current account reversal

	Shift-type	V-shaped
Real exchange rate	Large depreciation	Small changes
Nominal exchange rate	Depreciation from year -2 to year 2	Persistent large depreciation
Real GDP growth rate	U-shaped	V-shaped
Investment	Decline from year -1	Rapid increase through year -2 before dropping after year -1
Stock price	Rapid rise just after reversal starting	Decline through year -1; rise after year 3
Exports	Rapid increase after reversal	Slight increase
Imports	Continuous increase	Increase first, then decrease. No marked shift of the scale between before and after reversal.
CPI Inflation rate	Low Gradual decline	High Large decline
Official discount rate	Small changes	Low through year -3 (especially for the real rate) Rise after year -2
M2 ／ GDP	Tendency to decrease	Increase from year -4 to year-2
Terms of Trade	Slight deterioration after year -1 Large improvement after year 4	Large deterioration after year -2

result of V-shaped episodes largely depended on the movement of M2 per GDP in the U.K. episode in 1990.

Terms of trade (export price/import price): The degree of terms of trade deterioration before reversal differs depending on the pattern of reversal (Chart 5m)[8]. In V-shaped episodes, the terms of trade deteriorated by 10%, whereas the depreciation was only 2% in shift-type episodes. In the post-reversal period of V-shaped episodes, the terms of the trade index are still less than the pre-reversal level at 5 years after reversal, whereas they exceed the pre-reversal level by the fourth year after reversal in shift-type episodes.

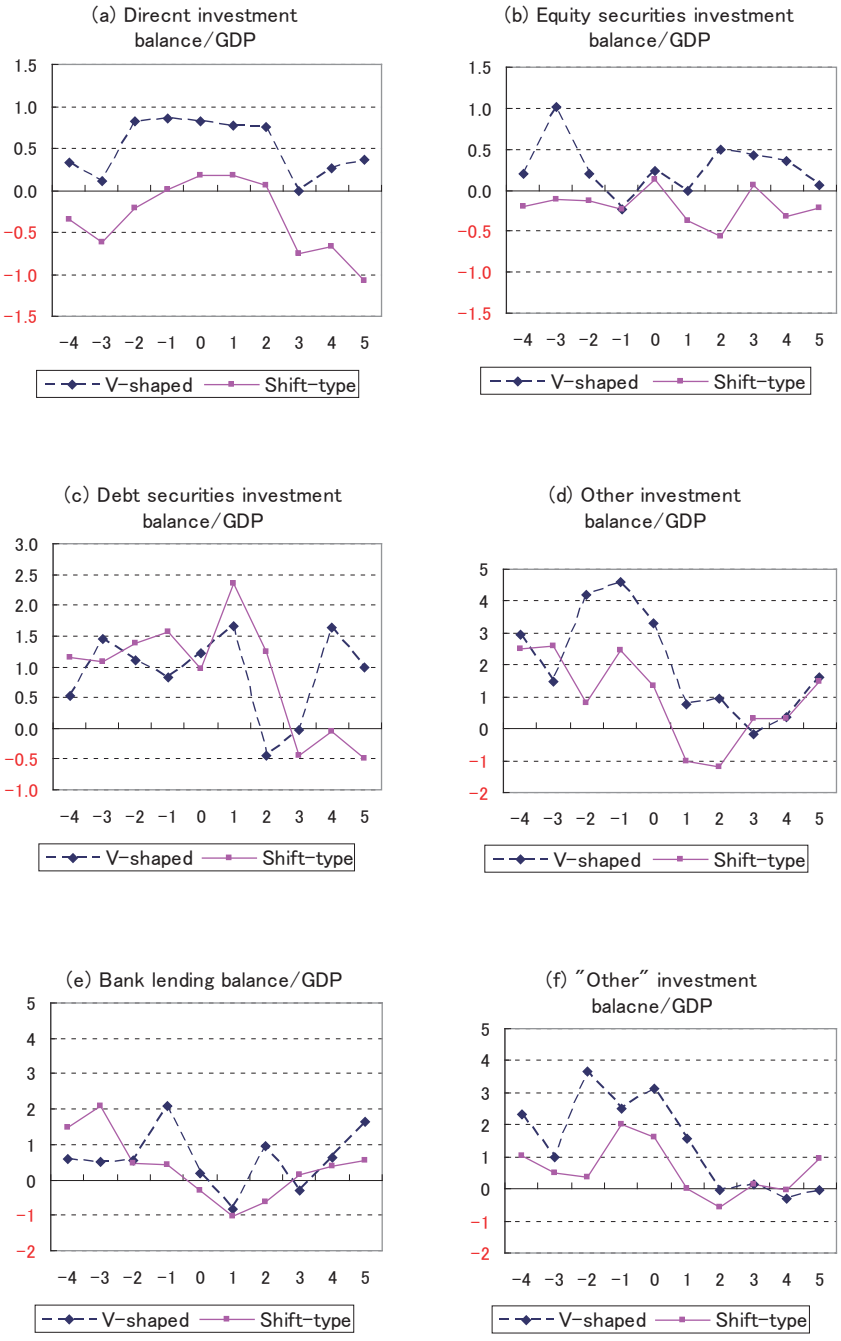
The results of t-test in Table 3 largely supports our analysis. Table 4 summarizes the results explained above.

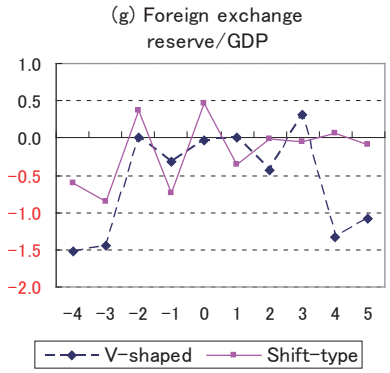
Capital Flow

Let us turn to a comparison of the adjustment of variables on the balance of the financial account (Charts 6, 7, and 8, and Table 5).

Other investment: The most remarkable difference between the two patterns can be

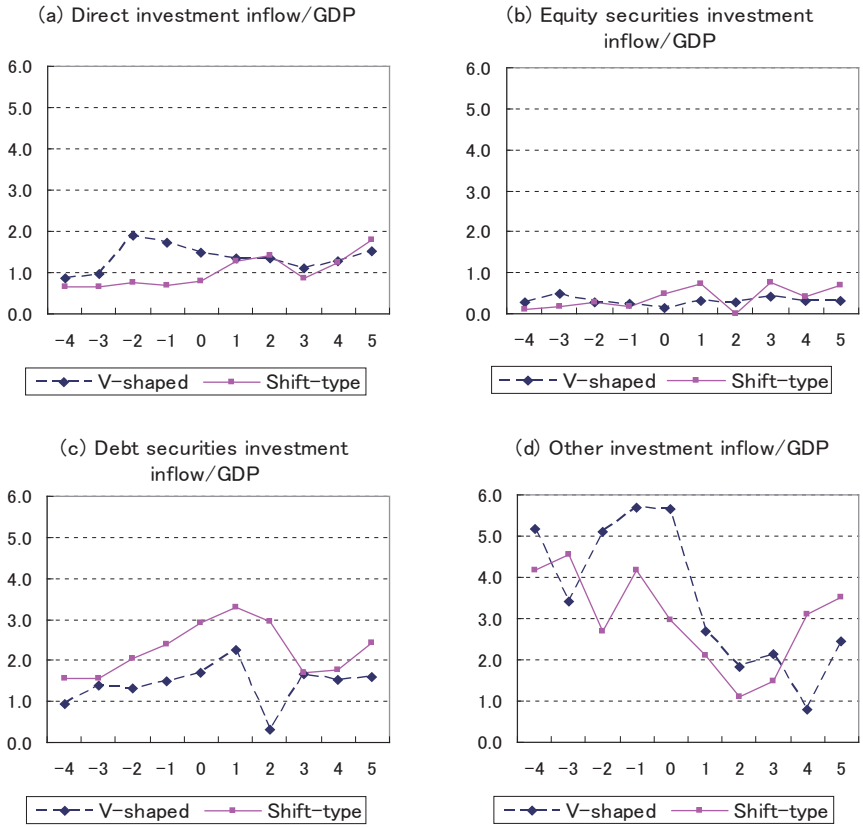
Chart 6 Balance on Financial account: Shift-type vs. V-shaped reversal

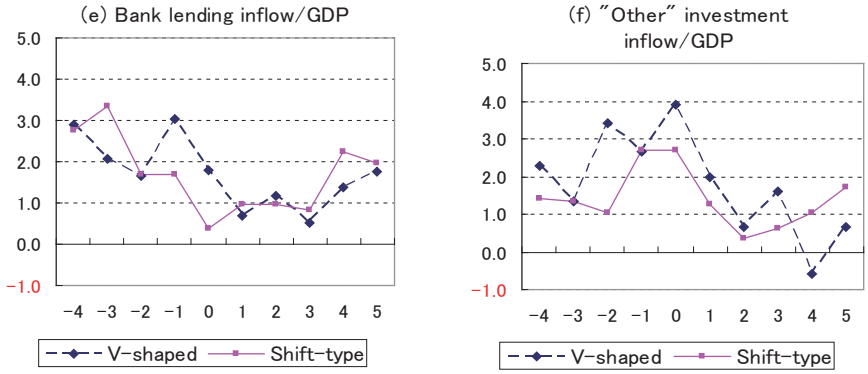




(Data source) Each items of balance on financial account are from *International Financial Statistics* (IMF). Data of Nominal GDP in terms of U.S. dollar are from *World Development Indicator* (World Bank).
(Note) All data are as a fraction of GDP and their unit is percentage. Data of balance on bank lending are calculated by subtracting gross investment outflow by "Banks" (category number BQDZF) in the category of "Other Investment Assets" (BWDZF) in the balance of payments statistics in IFS from gross investment inflow by "Banks" (BUDZF) in the category of "Other Investment Liab., n.i.e." (BIDZF), while data of balance on "other" investment are calculated as "Other Investment Assets" net of "Other Investment Liab., n.i.e." minus the balance on bank lending above. As for foreign exchange reserve, a minus sign means an increase in reserves.

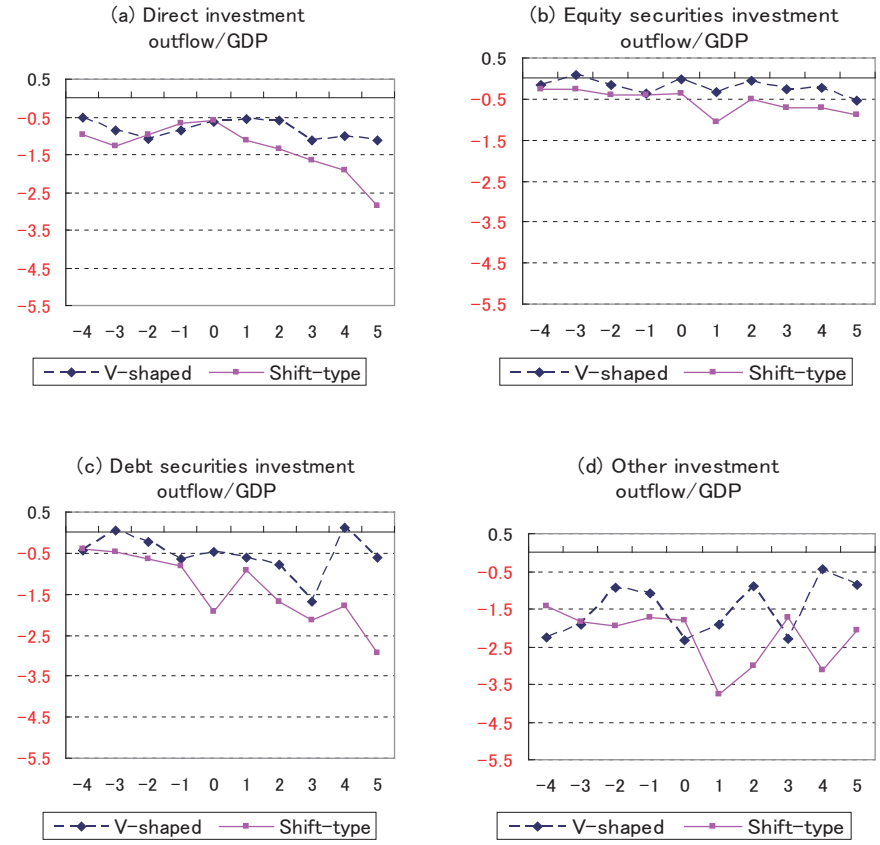
Chart 7 Gross capital inflow: Shift-type vs. V-shaped reversal

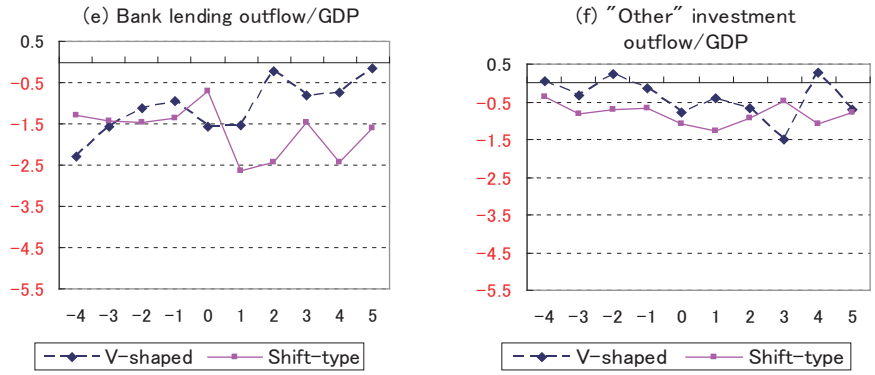




(Data source) Data of gross capital inflows are from *International Financial Statistics* (IMF). Data of Nominal GDP in terms of U.S. dollar are from *World Development Indicator* (World Bank).
(Note) All data are as a fraction of GDP and their unit is percentage. The graphs of other investment inflow and of bank lending inflow for Shift-type reversal are averages for 9 episodes excluding Belgium (1982). Data of bank lending inflows correspond to "Banks" (BUDZF) in the category of "Other Investment Liab., n.i.e." (BIDZF) in the balance of payments statistics in IFS, while data of "other" investment inflows are the residual of "Other Investment Liab., n.i.e."

Chart 8 Gross capital outflow: Shift-type vs. V-shaped reversal





(Data source) Data of gross capital outflows are from *International Financial Statistics* (IMF). Data of Nominal GDP in terms of U.S. dollar are from *World Development Indicator* (World Bank).
(Note) All data are as a fraction of GDP and their unit is percentage. The graphs of other investment outflow and of bank lending outflow for Shift-type reversal are averages for 9 episodes excluding Belgium (1982). Data of bank lending outflows correspond to "Banks" (BQDZF) in the category of "Other Investment Assets" (BHDZF) in the balance of payments statistics in IFS, while data of "other" investment outflows are the residual of "Other Investment Assets."

seen in other-investment flow. Regardless of the pattern of reversal, surpluses in other-investment balance as a fraction of the GDP decrease massively over four years in the post-reversal period (Chart 6d). However, the pre-reversal variability of net other-investment inflows differs between the two reversal patterns. The scale of net other-investment inflows before reversal in V-shaped episodes is larger, amounting to over 4% in year -2 and year -1. On the contrary, in shift-type episodes, net other-investment inflows do not increase remarkably before reversal.

Chart 6e and f depict the results when we decompose the net other-investment flow into the net bank-lending flow and the others (referred to as "other" investment flow below). From these charts, we can see that the pre-reversal rapid increase in net other-investment flow in V-shaped episodes results from a rapid increase in net "other" investment flow. Net inflow of "other" investment exceeds that of bank lending, even in year -1 when net bank-lending inflow temporarily surged.

We next decomposed the net other-investment inflow into the gross outflow (Chart 7d) and the gross inflow (Chart 8d). In V-shaped episodes, the variability of net other-investment inflow is driven largely by that of gross other-investment inflow, whereas in shift-type episodes, it is driven not only by a decrease in gross inflow but by an increase in gross outflow. In other words, in V-shaped episodes, a large amount of foreign capital flows into the concerned country in the form of other-investment flow

Table 5 T-test on difference between the averages for reversal patterns: Financial variables

a. Balance on financial account

	-4	-3	-2	-1	0	1	2	3	4	5
Direct	1.16	0.91	1.67*	1.57	1.66*	1.66*	1.58	1.47	2.18**	2.78***
Equity	1.29	1.59	1.41	-0.01	0.32	0.40	1.51	0.76	1.14	0.50
Debt	-1.11	0.40	-0.34	-0.88	0.23	-0.42	-1.30	0.22	1.39	1.50
Other	0.24	-0.83	2.41**	1.49	1.03	0.78	1.29	-0.23	0.00	0.07
Lending	-0.72	-1.72*	0.10	1.19	0.75	0.13	1.27	-0.31	0.29	0.90
"Other"	1.18	0.63	2.63***	0.30	0.81	1.19	0.49	-0.02	-0.25	-1.01
Reserve	-1.14	-0.84	-0.40	0.55	0.00	0.74	-0.65	0.46	-2.02**	-0.91

b. Gross capital inflow

	-4	-3	-2	-1	0	1	2	3	4	5
Direct	0.71	0.68	1.79*	1.64*	1.28	0.12	-0.09	0.52	0.01	-0.37
Equity	0.99	0.89	-0.05	0.30	-1.29	-1.13	0.67	-0.87	-0.45	-1.28
Debt	-0.80	-0.20	-0.76	-1.03	-0.88	-0.57	-2.06**	-0.04	-0.20	-0.63
Other	0.49	-0.60	1.82*	0.73	1.37	0.28	0.34	0.27	-2.33**	-0.55
Lending	0.09	-0.86	-0.01	0.64	0.96	-0.21	0.13	-0.20	-0.81	-0.18
"Other"	0.77	-0.01	2.31**	-0.03	0.71	0.56	0.26	0.58	-1.30	-0.92

c. Gross capital outflow

	-4	-3	-2	-1	0	1	2	3	4	5
Direct	0.82	0.57	-0.17	-0.39	-0.10	1.27	1.69*	0.79	1.36	1.81*
Equity	0.39	2.18**	1.12	0.05	1.16	0.88	1.19	1.25	1.25	0.91
Debt	-0.04	1.71*	1.09	0.30	1.29	0.41	1.02	0.26	2.36**	2.18**
Other	-0.50	-0.05	1.06	0.56	-0.39	1.03	1.88*	-0.39	3.25***	0.94
Lending	-0.61	-0.11	0.37	0.37	-0.77	0.62	1.97*	0.52	1.67*	1.54
"Other"	1.06	1.44	2.07**	1.20	0.59	2.15**	0.71	-1.09	2.93***	0.11

(Note) The numbers in the tables are t-statistics of two-sided test on the null hypothesis that the cross-country average of V-shaped reversal episodes equals to that of shift-type reversal episodes. The alternative hypothesis is that the averages of the two reversal patterns are not the same. We calculated the t-statistic as

$$t = \frac{\overline{X_V} - \overline{X_S}}{\sqrt{S_V^2/m + S_S^2/n}}.$$

Here, we denote $\overline{X_V}$ and $\overline{X_S}$ as the average of V-shaped and shift-type episodes, respectively, while S_V^2 and S_S^2 as the variance of V-shaped and shift-type episodes, respectively. m and n indicate the total number of samples of V-shaped and shift-type episode. The right upper-case letters *, **, and *** in table 6 indicate that the null-hypothesis can be rejected with 10%, 5%, and 1% statistical significance, respectively.
(Source) The author's calculations.

before current account reversal, and it flows out in a concerted fashion concurrently with the current account reversal. On the other hand, in shift-type episodes, other-investment outflows of foreign capital consist of at most two-thirds of the whole other-investment outflows because domestic capital outflows comprise the residual one-third.

Let us decompose gross other-investment flows into bank lending flow and "other" investment flow (Charts 7, e and f; 8, e and f). Movements of gross "other" investment inflow are dominant in V-shaped episodes, while a decrease in bank-lending inflow and an increase in bank-lending outflow are the main drivers of other-investment flow dynamics in shift-type episodes.

Debt securities investment: Debt securities investment flows also vary largely before and after current account reversal. In both patterns, net debt securities inflow dropped from year -1 by more than 2% of GDP (Chart 6c)[9]. A difference between the two patterns lies in the amount of gross debt investment flows. In a shift-type reversal, debt securities investment inflow surges from several years before reversal to the first year of reversal; after reversal, both a decrease in inflow and an increase in outflow of debt securities investment take place by over 1% of the GDP, resulting in a sharp decline in net debt securities investment inflow. However, we cannot see anything peculiar to gross debt securities investment flows in V-shaped episodes (Charts 7c and 8c)[10].

Direct investment: The net inflows of direct investment rise and fall largely according to current account reversal. In both patterns of reversal, the net inflows of direct investment grow by 0.5% as a fraction of the GDP in year -2 and continue to keep a comparative amount through year 2 (Chart 6a)[11]. In addition, turnarounds of direct investment after current account reversal take place later than those of other-investment and of debt securities investment.

The differences between the two reversal patterns may be shown by two points. First, the scale of the surplus in the direct investment balance is bigger in V-shaped reversal than in shift-type reversal. Overall, the direct investment balance tends to be in surplus in a V-shaped reversal episode and in a small deficit in a shift-type reversal episode. Second, after year 4, the surplus of the direct investment balance increases again in a V-shaped episode, while the deficit increases in a shift-type episode. In the post-reversal period of the latter, an increase in gross foreign direct investment outflow, which overwhelms an increase in gross direct investment inflow from abroad, produces a deficit in the net direct investment balance (Charts 7a and 8a).

Table 6 Changes in capital flow during current account reversal

Balance on...	Shift-type	V-shaped
Other investment	No remarkable movement in the pre-reversal period. Outflows of domestic capital in the post-reversal period (in particular, an increase in bank lending outflow)	Rapid increase in surplus in year -2 and year -1, and thereafter a large decline in surplus through year 3. Foreign capital inflow followed by its outflow (in particular, large inflows and outflows of other investment than bank lending)
Debt securities Investment	Sharp decline in surplus after year 2. Inflows of foreign capital in the pre-reversal period. Outflows of foreign and domestic capital in the post-reversal period.	Temporary drop in surplus between year 2 and year 3
Direct investment	Deficit expansion after year4 Deficit base	Surplus base
Equity investment	Deficit base	Surplus base
Reserve assets	No remarkable change	Decrease in reserve asset accumulation from year -2 to year 3

Equity securities investment: Both the net and gross flows of equity securities investment are less important as those of other investments (Chart 6b). Like direct investments, around the time of current account reversal, the net equity securities investment balance remained in deficit in shift-type episodes, whereas it was in surplus in V-shaped episodes.

Reserve assets: No particular features are detected regarding foreign exchange reserves during a shift-type current account reversal, but one feature occurs in V-shaped episodes: consecutive declines in foreign exchange reserve accumulation for 6 years (Chart 6g). Such an indication suggests that the monetary authorities may have intervened in the foreign exchange market in order to lean against the nominal exchange rate depreciation during V-shaped current account reversals.

The results of t-test summarized in Table 5 largely supports our analysis here. Table 6 summarizes the results explained above.

Comparison with "Expansion vs. Contracting" episodes à la Croke et al. (2005)

Our classification of current account reversal into shift-type and V-shaped has many features in common with the classification by Croke et al. (2005) if we consider that a shift-type current account reversal corresponds to an “expansion” current account reversal and a V-shaped reversal corresponds to a “contraction” reversal.

Let us summarize the main differences between the expansion reversal and the

contraction reversal of Croke et al. (2005). In expansion episodes, the current account reversal starts from consecutive 2% deficits as a fraction of the GDP, while in contraction episodes it begins just after an abrupt hike in the deficit. The real exchange rate depreciates by over 20% during an expansion reversal, but it does not depreciate at all over a contraction reversal. Investment as a fraction of the GDP does not increase before beginning to drop in an expansion reversal, but it first increases before current account reversal, starting and then decreasing concurrently with current account reversal in a contraction episode. The average growth rate of export during the reversal period is higher in expansionary episodes than in contraction episodes. Imports increase continuously before and after current account reversal in expansion episodes, but rise in the pre-reversal period and fall in the post-reversal period of contraction episodes. The real stock price index rises after current account reversal in expansion episodes, but it stagnates at low prices for a few years after reversal in contraction episodes.

If we replace "expansion" and "contraction" with "shift-type" and "V-shaped" respectively, all of these results turn out to be same as those summarized in Charts 4 and 5, and in Table 4.

4 Mechanism of Current Account Adjustment: Hypotheses

How does the macro economy adjust when a shift-type or a V-shaped current account reversal occurs? We will propose here one hypothesis inferred from the facts summarized in Tables 4 and 6.

4.1 Mechanism of Shift-type Reversal

A shift-type current account reversal is supposed to be concurrent with certain structural changes in the macro economy. Such changes might consist of changes in monetary policy stance, or exchange rate policy and an abrupt productivity jump, or a new product development in the export goods sector.

First, with regard to monetary policy stance, let us imagine a situation in which the central bank, misunderstanding the economic conditions or the effects of its policy,

introduces an excessively tight monetary policy. Or, let us imagine a situation of an overvalued official exchange rate under a fixed exchange rate regime. In either case, an overvalued nominal exchange rate results in an overvaluation of the real exchange rate. As a result, the trade balance and the current account balance turn into continuous deficits. Due to a contractionary monetary or exchange rate policy, the inflation rate should be suppressed, and investment and export should not increase much.

Suppose that the central bank revises its understanding of economic conditions and alters its monetary policy stance in an appropriate direction. Alternatively, suppose the monetary authorities devalue the exchange rate parity from an overvalued rate, or the economy is hit by a currency crisis. In either case, the nominal exchange rate should lose its value sharply, falling from a high to a low level. However, the inflation rate tends not to rise quickly in a low-inflation environment. Therefore, the real exchange rate depreciates extensively, like drawing downward-shifted horizontal lines. This real exchange rate depreciation improves the trade balance, which should reverse the current account balance from sustained deficits to sustained surpluses.

Next, let us consider a scenario of shift-type current account reversal with a structural change in the tradable goods sector. Let us suppose that a positive productivity shock in the tradable goods sector lowers the international relative price of home tradable goods and increases foreign demand for domestic export goods. Or, suppose that an improvement in the attractiveness of home tradable goods, brought about by developments of innovative products or technical breakthroughs, increases the export demand for home tradable goods. Though these new technologies and better products' performances will certainly be imitated by foreign firms in the future, home export goods firms can enjoy the benefits from leading in the global market for at least 5 or 10 years. As a result, in the medium-run, home households can enjoy a relative increase in real income to foreigners, which may raise the domestic savings rate. The current account balance, in turn, becomes a sustained surplus. Output growth expansion because of export growth increases imports through an increase in material and industrial parts imports. Improvement in the international competitiveness of the export goods sector should also raise stock

prices, mainly in the export goods sector.

What is most remarkable during shift-type reversal episodes is the post-reversal growth of export and stock prices. It may be wrong to assign the cause of the higher growth rate of exports over imports only to the large real exchange rate depreciation from monetary easing policy. The same is true concerning the cause of a rise in stock prices. We should suspect that a shift-type current account reversal may happen as the result of a combination of monetary or exchange rate policy shifts and structural changes in the tradable goods sector.

We should also examine the macroeconomic adjustment mechanism from the perspective of capital flows. After current account reversal, the rapid growth of exports brings about an increase in both domestic firms' export credit supply and the accumulation of foreign currency cash and deposit. Export firms may found new affiliated firms in destination markets in order to expand their marketing channels. Some export firms may instead begin to invest their foreign currency revenue in financial assets, perhaps mainly in domestic currency-denominated bonds, in order to avoid exchange rate risk. Because of these changes, in the post-reversal period, external other investment grows first, foreign direct investment increases second, and then foreign debt securities investment rises. Other-investment outflow begins to increase first because it is directly affected by an increase in exports, while direct investment outflow begins to grow later because it takes time to implement a new foreign direct investment.

4.2 Mechanism of V-shaped Reversal

On the other hand, a V-shaped current account reversal can take place as the byproduct of a large-swung business cycle.

Let us assume an overheated economy, which can result from overconfidence of firms and households backed by a long-lasting economic boom, or by an excessive supply of bank credit backed by an excessive monetary easing policy, or by stock or land price bubbles. In most cases, these three coincide with and amplify each other, resulting in economic overheating.

Domestic economic agents do not doubt the prosperous economic growth of the

home country in near future. This overvaluation concerning future growth rates leads to excessive lending, investment, and consumption. Such actions may raise the domestic growth rate. However, home agents consume future output growth in advance; thus, the current account balance turns into a deficit. Furthermore, the current account deficit grows at an accelerated pace because in an overheated economy, bank lending, investment, and consumption tend to augment each other in an accelerated fashion. The inflation rate may rise, but the nominal exchange rate may depreciate owing to monetary easing policy; thus, the real exchange rate may not appreciate very much.

After a while, the central bank begins to tighten its monetary policy; or the stock price or land price bubble bursts; or banks, which begin to acknowledge slower than expected growth from their debtors' profits, hesitate to make additional loans. Firms and households, which realize that they themselves have incurred excessive liabilities, also hesitate to invest and consume as formerly. Firms cut employment and the unemployment rate rises. Households consume less for fear of a drop in future income. These all bring about a rise in the national savings rate and a drop in the investment rate, a rapid improvement of the current account balance, and a large decline in real output growth rate.

The inflation rate declines during a current account reversal. Nonetheless, both a high level of inflation rate before the current account reversal and nominal price downward rigidities prevent the inflation rate from falling into minus territory. That is, the inflation rate after current account reversal is still greater than zero. Therefore, though the nominal exchange rate depreciates because of net capital outflow, the real exchange rate may not depreciate much, or movements of the real exchange rate over the current account reversal period may fall into a limited range.

When the economy is overheating before current account reversal, domestic banks increase external financing in order to expand lending to home firms and households; hence, bank lending inflow from foreign countries rises sharply. Import growth brings about increases in trade credit, like import usance, and in foreign firms' accumulation of deposit in domestic banks. This situation accounts for why other-investment inflow grows sharply before current account reversal. However, once the economy boom

bursts, the directions of these cross-border capital flows reverse. In other words, the surplus of the other-investment balance drops after current account reversal. A drop in bank lending to domestic sectors brings about a drop in foreign bank lending to domestic firms, and an import decline brings about decreases in trade credit from abroad to home importers and in foreign accumulation of deposit in domestic banks.

5 Implications

We can draw several implications from the empirical results on shift-type and V-shaped reversal in section 3. Firstly, current account reversal does not always occur with a large real depreciation of the concerned country's currency. The average cumulated real depreciation rate of the reversal country's currency in the post-reversal period reaches more than 20 percent in shift-type current account reversal, but it was less than 5 percent in V-shaped reversal. This smallness of real currency depreciation in V-shaped episode is surprising because the current account deficits shrink more than 5 percent of GDP in V-shaped episodes. This fact suggests that the standard hypothesis, which says that larger the real exchange rate depreciation rate, larger the current account deficit, does not always hold.

Secondly, the nominal exchange rate depreciates sharply during a current account reversal, irrespective of its pattern.

Thirdly, the real GDP growth rate always decline when any type of current account reversal occurs. This result suggests that the classification of current account reversal into “expansion” and “contraction” episode by Croke et al. (2005) might be misleading.

6 Conclusion

This paper analyzes when and in which countries current account reversal has occurred, and in what mechanisms macroeconomic variables adjust before and after current account reversals, using the annual data of 23 developed countries from 1975 to 2007. We obtained three main results.

First, our results are in line with those from the preceding literature. Second, we found that current account reversal episodes in developed economies can be classified into either a "shift-type" or a "V-shaped" reversal, depending on the movements of the current account balances. Third, we found marked differences in the adjustment of macroeconomic variables. Our classification of current account reversal info shift-type and V-shaped has many points in common with the classification by Croke et al. (2005), expansion and contraction. We believe, however, that our classification is superior in terms of generality and of appropriateness of naming.

The fact that the macroeconomic variables move in different ways before and after a current account reversal and that they differ between shift-type and V-shaped current account reversal suggest that there is a difference between the two patterns of reversal in the mechanism by which the macro economy adjusts to current account reversal. We proposed hypotheses explaining the two types of reversal. A shift-type current account reversal may reflect the combination of a correction of inadequate monetary and exchange rate policies and a rise in productivity in the export sector. On the other hand, a V-shaped current account reversal may happen because of an over-swung business cycle, or because of overheated economic expansion and its contraction. However, it is needless to say that building a theoretical model and testing our hypothesis in empirical models must be explored in future works.

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Notes

1) This expression, current account reversal, was first introduced by Milesi-Ferretti and Razin (2000).
2) "Current account reversal" is sometimes abbreviated as "reversal" hereafter.
3) Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxemburg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, U.K., U.S. The sample periods of some countries are shorter because of missing data. Data from Greece and Ireland start after 1976 and those of Japan and Switzerland after 1977. As for Greece, data from 1998 are missing.

4) As far as research scrutinizing developed economies as this paper does, Freund (2005) depicts 21 episodes; Debelle and Galati (2005) cover 28 episodes; Croke et al. (2005), 23 episodes; and Freund and Warnock (2007), 26 episodes. The fact that none of this literature can find a reversal in Austria (1999) due to shorter sample periods highlights the smallness of the number of episodes we depict here.
5) Though Edwards (2005) counts each of the consecutive reversal episodes as an independent episode, we do not use his method.
6) One caveat is that as for bond investment balances, a non-trivial difference exists between the average movement and the median movement. That is why we should discount the analytical result on the average movement of bond investment balances.
7) In 1980's, during which most of the current account reversal episodes happened, central banks used official discount rates as main monetary policy tool.
8) However, as for median value, terms of trade in V-shaped episodes did not deteriorate as much as is average.
9) We should keep it mind that when we look at the median of debt securities investments, net inflow of debt securities investment increased in year -1 during V-shaped current account reversal episodes.
10) As for V-shaped episodes, many concerned countries met near zero gross internal and/or external investment to debt securities, and thus in most of the years medians of net or gross debt securities investment balances are zero.
11) However, with regard to the median, we cannot find an increase in net direct investment inflow in the pre-reversal period during shift-type current account reversal.

Data sources

World Development Indicator: the current account, nominal and real GDP, gross fixed investment, gross national savings, export, and import. These are all valued in U.S. dollars at current exchange rate, except for real GDP.

*International Financial Statistics (*IMF) : nominal and real effective exchange rate, stock price, consumer price index, official discount rate, M2, terms of trade, and financial account balance variables.

Homepages of Federal Reserve Board, European Central Bank, and Bank of England: the policy interest rate of the U.S., the Euro Area, and the U.K., respectively.

Data calculation

The growth rates of real GDP and consumer price index are calculated as annual rates. Real stock price index is calculated as a division of stock price by CPI inflation rate which is converted into an index value. Real official discount rate is calculated as a

division of the nominal official discount rate by CPI inflation rate.

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