Current Account Surplus Reversals: An Empirical Analysis of Dynamics and Characteristics

by

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Abstract

Current account deficit reversals have caused significant concern among economists and policy-makers alike, but should current account *surplus* reversals spur a similar apprehension? Literature on deficit reversals has found a systematic characterization of the dynamics of reversal that include a slowdown in income growth and a substantial depreciation of real exchange rate. However, very little research has been done on the dynamics of current account surplus reversals. This paper aims to establish whether a distinct and representative case, similar to that of deficit reversals, exists for current account surplus reversals. This paper finds variation in income growth and real exchange rate adjustment following a surplus reversal in developed versus developing countries and in petroleum-based versus non-petroleum-based economics. Additionally, this analysis finds some evidence that conditions of surplus buildup are associated with more severe outcomes regarding gross domestic product growth and real effective exchange rate depreciation. Overall, the results presented in this paper provide substantial support for the suggestion that a distinct and archetypal case does not exist for current account surplus reversals.

I. Introduction

Current account deficit reversals[1] have cause significant concern among economists and policy-makers alike, but should current account *surplus* reversals spur a similar apprehension? Over the past several years, the United States has run a substantial current account deficit, which measured over $473 billion in 2011 (3.1 percent of GDP) and has persistently exceeded 2 percent of GDP since 1998 (The Economist 2012; World Bank World Development Index 2012). The possibility of a sharp decline in this deficit has caused alarm regarding the impact it would have on the US economy. As a result of this concern, a large amount of empirical work has been done on the characterization of current account deficit reversals in an effort to determine what an American reversal might look like. This research has found that there exists for deficit reversals a typical and well-defined case that includes a slowdown income growth and a depreciation of real exchange rate.

However, the current account deficit is only one side of the story. The deficit of one country, by definition, must be financed by the surplus of another (or several others). Therefore, the decline of any current account deficit necessitates a reciprocal decline of one or more current account surpluses. In then Governor Ben Bernanke's March 2005 speech, the current chairman of the Federal Reserve argued that the current US deficit is driven, in part, by

[1] A deficit reversal is defined as a substantial decline in a nation's current account deficit.

developing nations' use of strategies that included switching from their positions as net importers of capital to net exporters on international capital markets. He terms the result of this change a global "savings glut," which he believes to be responsible for the rising current account deficit in the US (Bernanke 2005). Based on Bernanke's argument, any reversal of the US deficit would require a symmetrical reversal of the foreign current account surplus(es) that have financed that deficit.

Although the ballooning US deficit has a spurred significant amount of empirical work regarding the nature of current account deficit reversals; to date, little work has been done on current account *surplus* reversals. In fact, only two articles on the subject have been published: Edwards (2007) and IMF (2010). However, the work that has been done has found support for the relationship between deficit and surplus reversals discussed above. In his paper on current account surpluses and global imbalances, Sebastian Edwards (2007) argues that any resolution of global imbalance (including the US deficit) will require a reduction in China's current account surplus (Edwards 2007, 25).

In 2007, China's current account surplus exceeded 10 percent of its GDP, measuring almost $250 billion, which certainly gave Edwards good reason to specifically cite the surplus (World Bank World Development Index 2012). However, today, China's surplus has decreased substantially, measuring just over 2 percent of GDP in 2011 (The Economist 2012). In 2011, Germany's current account surplus narrowly beat out China's as the largest in the world, measuring nearly $203 billion (4.9 percent of GDP) (The Economist 2012; World

Bank World Development Index 2012). For any substantial decrease in the US current account deficit to occur, both of these sizeable surpluses will likely need to decline. For this reason, a study addressing whether a typical case exists for surplus reversals is necessary.

The purpose of this paper is to address the void in the literature regarding current account surplus reversals and to gain an understanding of the implications of such events. In order to do so, a basic characterization of surplus reversal episodes is necessary. First, this paper evaluates the dynamics of the outcomes associated with current account surplus reversals, specifically income growth and real effective exchange rate adjustment. Second, it addresses conditions of surplus buildup as a possible explanation for the variation in outcomes.

In brief, this paper finds that for developed countries,[2] the second year before a surplus reversal is associated with an increase in GDP growth, implying a deceleration of growth following the reversal. For petroleum-based economies,[3] this paper finds that the first year of reversal from surplus is associated with a substantial increase in GDP growth that is likely driven by growth in the non-oil sector. For developing and non-petroleum-based economies, on the other hand, surpluses appear to be associated with slower income growth in the third year before a reversal and a considerable

[2] Defined as OECD-member states.
[3] Defined as OPEC-member states.

acceleration of real exchange rate appreciation that occurs in the second year before a reversal.

Regarding the question of whether certain conditions of surplus buildup can serve as an explanation for variation in outcomes, this paper finds that the growth of consumption and of government expenditure relative to GDP growth in the pre-reversal period are both associated with a small decrease in GDP growth in the three years beginning with the reversal relative to long-term average growth. This result implies that for larger surpluses, higher growth of consumption and government expenditure as shares of GDP are both associated with slightly lower GDP growth in the reversal period. Concerning real effective exchange rate adjustment, this paper finds that the size of the surplus preceding a reversal is associated with a slightly faster rate of REER depreciation. However, all three of these relationships are limited to episodes associated with a current account surplus that exceeds 6 percent of GDP.

The most important implication of these results is that they support the suggestion that, in contrast to the case of current account deficit reversals, there is no distinct and archetypal case associated with current account surplus reversals.

The rest of this paper is organized as follows: Section II relates relevant empirical literature on the adjustment of both current account deficits and surpluses. Section III presents basic overview of methodology. In Section IV, the GDP growth and REER adjustment dynamics of current account surplus reversals are analyzed. In particular, this section addresses the question of

whether surplus reversals are associated with any speed up or slow down of GDP growth or REER adjustment. Section V presents analysis on the relationship between conditions of surplus buildup and outcomes of surplus reversal. Specifically, it asks whether certain preconditions are associated with more or less severe outcomes of GDP growth and REER adjustment. Finally, Section VI contains some concluding remarks and discusses directions for future research.

II. Literature Review

Beginning with Sachs's (1981) Brookings paper on oil prices and investment demand as determinants of the dissimilarity in current account balances that existed between countries in the 1970s, there has been a substantial interest in current account adjustment and its determinants. Empirical work by Debelle and Faruqee (1996) and Chinn and Prasad (2000) looks at determinants of current account variation within developing nations and discovers some support for stage-of-development as a determination. However, it was not until the late 1990s and early 2000s that current account deficit reversals, in particular, became a topic of interest. Although this paper discusses current account *surplus* reversals, there are several pieces of empirical work on deficit reversals that are particularly relevant, as they have informed the analysis done here.

Milesi-Ferretti and Razin (1998) evaluate indicators and consequences of both current account deficit reversals and currency crises in 105 low- and middle-income countries for the period 1970-1996. They ask four primary questions: *what triggers large and persistent reductions in current account deficits?; what triggers sharp exchange rate depreciations (currency crises)?; what are the consequences of these events for output?; and is there a link between current account reversals and currency crises?* (Milesi-Ferretti and Razin 1998, 4).

Milesi- Ferretti and Razin (1998) find that current account deficit reversals are more likely to occur in countries with larger deficits, in countries that have lower reserves, in countries with a higher GDP per capita, and in countries that have more unfavorable terms of trade. They find that reversals are less likely to occur in countries that are recipients of high official transfers and in those whose debt is mostly on concessional terms (Milesi-Ferretti and Razin 1998, 15 and 16).

Regarding the consequences of current account deficit reversals, they find that countries with more open economies as well as those with a less appreciated real exchange rate prior to the reversal tend to have better growth performance. Furthermore, Milesi-Ferretti and Razin's (1998) results suggest that for developing countries, current account deficit reversals are not "systematically associated" with a slowdown in income growth (Milesi-Ferretti and Razin 1998, 19 and 30).

As for currency crises, Milesi-Ferretti and Razin (1998) find that lower reserves, a more appreciated real exchange rate, and hostile external conditions—high US interest rates and low growth in industrial countries—make such crises more likely to occur and that in the year of a crisis, growth tends to decline (Milesi-Ferretti and Razin 1998, 24 and 30). Additionally, their results suggest that deficit reversals and currency crises are two entirely "distinct events" (Milesi-Ferretti and Razin 1998, 27 and 30).

Although these results establish a useful set of facts regarding current account deficit reversals in developing countries, Milesi-Ferretti and Razin

(1998) do not address current account adjustment in high-income countries. For this, Freund (2005) provides an analysis of the dynamics of current account adjustment among industrial countries.

Freund (2005) finds that the average trough, or point at which the reversals process typically begins, is about 5 percent of GDP and that deficits typically resolve in three to four years (Freund 2005, 1284). She also finds that reversals usually involve a deceleration of income growth and a significant depreciation of real exchange rate (Freund 2005, 1293). Freund does not discover any decent predictors—or triggers—of current account deficit reversals, although she does find some evidence to suggest that weak GDP growth tends to "precede a reversal" (Freund 2005, 1297). Finally, with regard to the relationship between current account deficits and the business cycle, Freund finds that deficits tend to increase during periods of above-average growth and to decrease when recession occurs. These results suggest that current account deficit reversals are "largely a symptom of the business cycle" (Freund 2005, 1297).

Milesi-Ferretti and Razin (1998) provide an analysis of how certain conditions of the pre-reversal period are associated with the outcomes of reversal. However, again, this only applies for developing countries. Freund and Warnock (2005) provide a comparable analysis on reversals in developed nations.

Freund and Warnock (2005) evaluate the degree to which particular aspects of the increase of the current account deficit are related to more or less

severe outcomes following reversal. In particular, these aspects include "the size and persistence of the current account deficit, its nature (whether it is funding consumption or something more productive such as investment), the size and composition of financing, and the openness of the economy" (Freund and Warnock 2005, 2). Freund and Warnock characterize outcomes as the level of exchange rate depreciation, the deceleration in GDP growth, and the improvement in the current account balance (Freund and Warnock 2005, 3).

Of the preconditions studied by Freund and Warnock, they find that larger current account deficits are associated with a comparatively lower rate of income growth during recovery and a longer recovery period (Freund and Warnock 2005, 12 and 21). They also find that deficits driven by consumption and government deficit growth require greater real exchange rate depreciation than those that are driven by investment (Freund and Warnock 2005, 12). Finally, Freund and Warnock find that for deficits associated with greater bond inflows there appears to be larger increases in interest rates following the reversal (Freund and Warnock 2005, 15).

Croke, Kamin, and Leduc (2005) evaluate whether past episodes of current account adjustment in industrialized countries exhibit "features similar to those described by the disorderly correction scenario" (Croke Kamin and Leduc 2005, 5). They define the disorderly correction scenario as a chain of events in which depreciation in real exchange rate causes a simultaneous rise in interest rates and fall in stock prices, both of which work to trigger a recession (Croke Kamin and Leduc 2005, 2).

Croke, Kamin, and Leduc (2005) do not find any substantial evidence of past reversal episodes that exhibit characteristics that fit the disorderly correction hypothesis. For episodes that experienced a slowdown of GDP growth, they find no association with real exchange rate depreciation, interest rate increase, or real stock prices decrease. For episodes during which an increase in GDP growth occurred following the beginning of adjustment, their results suggest that a significant depreciation in real exchange rate occurs (Croke, Kamin, and Leduc 2005 6). Overall, these findings weaken the argument for disorderly correction scenario, and, therefore, for painful adjustment.

Edwards (2005) paper analyzes "the relationship between the U.S. dollar and the US current account" and evaluates possible consequences of a reversal event in which the US current account deficit decreased sharply and suddenly by 3 to 6 percent of GDP (Edwards 2005, 3). He finds that such a reversal would involve an accumulated real exchange rate depreciation of 21 to 28 percent in the first three years following an adjustment. Edwards (2005) also finds that current account deficit reversals tend to correlate with substantial declines in GDP growth (Edwards 2005, 41).

Despite the extensive literature on current account deficit reversals, there has been surprisingly little empirical work done on current account surplus reversals. In fact, only two major publications on the topic currently exist.

Edwards (2007) analyzes the nature of adjustments in current account surplus countries and asks "whether a realignment of world growth rates—with Japan and Europe growing faster and the US growing more

slowly—is likely to solve current global imbalances" (Edwards 2007, 2). Edwards's (2007) results suggest that for large and high-income economies, an appreciation in real exchange rate occurs during the period of surplus adjustment (Edwards 2007, 27). Edwards finds no significant trend for either investment or GDP growth in the years following a surplus reversal, but he does find a small increase in interest rates for the same period (Edwards 2007, 28). Edwards also finds a deterioration of the terms of trade, relative to the previous year, for the year of the reversal (Edwards 2007, 28).

Most importantly, Edwards's results suggest that "a well-defined and sharp 'typical' behavior," similar to the one that exists for the case of large and abrupt current account deficit reversals, does not exist for reversals of the current account surplus (Edwards 2007, 29). Additionally, Edwards argues, based on his results, that any correction of global imbalances will require a significant adjustment of the current account surpluses in China and many oil-exporting countries (Edwards 2007, 25).

IMF (2010) evaluates the growth outcomes of current account surplus reversals that are driven by policy and works to identify the components that drive changes in growth. IMF (2010) finds no association between policy-induced reversals and slower growth. In fact, results suggest that during policy-induced surplus reversals, total employment increased to some extent (IMF 2010, 2). Additionally, the study finds considerable deviation among growth outcomes (IMF 2010, 7 and 8).

Regarding the components that drive the change in income growth, IMF (2010) finds that better terms of trade, higher real world output, and trade liberalization are all associated with faster income growth in reversal period. Larger initial current account surpluses and greater real exchange rate appreciation in the pre-reversal period, on the other hand, are both found to be negatively associated with growth following the reversal (IMF 2010, 10 and 12).

Both Edwards (2007) and IMF (2010) find no evidence of a systematic relationship between current account surplus reversals and income growth or real exchange rate adjustment, a result that is replicated here. However, neither article discusses whether conditions of the economy or of the surplus buildup might explain the variation in outcome. Edwards (2007) does not address the issue at all, and IMF (2010) is concerned only with what it considers "policy-induced" episodes of reversal. The paper looks to fill that void by evaluating the dynamics of reversal and addressing how certain aspects of the buildup of the current account surplus are associated with more or less severe outcomes for all episodes of surplus reversal.

III. Methodology

This paper includes a two-part analysis for which two separate methods of regression analysis are used. The first is a set of OLS regression equations that regress GDP growth and REER on a lagged dependent variable; dummy variables for each of the six years around a reversal (years -2 through 3); and a fixed effect for country and year. This regression equation is based on that used in Freund (2005) to characterize deficit reversals. The lagged dependent variable is included to capture trends in GDP and REER change and the six dummy variables are used to test for an association between surplus reversals and higher or lower GDP and REER change. Finally, the fixed effects for country and year are included to control for GDP and REER trends in a particular country and on a global scale.

The second analysis consists of a set of OLS regression equations that regress GDP growth and exchange rate adjustment in the reversal period on several preconditions of current account surplus. This model of regression equation is based on that used in Freund and Warnock (2005). The inclusion of several preconditions is done to establish whether one of such preconditions is associated with higher or lower GDP growth or REER adjustment. Both sets of equations will be explained in greater detail in sections IV and V.

Episode Identification

The identification of surplus reversal episodes for this study is based on that used in deficit reversal literature, including Milesi-Ferretti and Razin

(1998), Freund (2005), and Freund and Warnock (2005), and recent surplus reversal literature, IMF (2010). For the purposes of this study, a current account surplus reversal is defined as satisfying three distinct criteria:

1) During the period preceding the reversal, there is a large and persistent current account surplus: In the three years before the reversal (noted as years -2, -1, and 0), the current account surplus must average at least 2 percent of GDP. To mitigate the influence of outliers, the surplus must exceed 2 percent of GDP in at least two of the three years preceding the reversal year.
2) Following the reversal, a significant narrowing of the surplus must occur: The average current account surplus in the three years starting with the reversal year (noted as years 1, 2, and 3) must be at least 2 percentage points of GDP less than the average in the three years before the reversal.
3) The narrowing of the surplus must be sustained, not a sharp and temporary change: the maximum surplus in the three years following the reversal must be smaller than the minimum surplus in the three years preceding the reversal.

Sixty-three episodes were identified in fifty-two countries out of a dataset containing 172 countries and 39 years (6708 observations total). Nine of the episodes identified occurred in OECD member countries and five occurred in OPEC member countries. Ten of these countries had two or more surplus reversals. A full list of reversal episodes can be found in the appendix.

Year Specification and Identification of Reversal Periods

For the purpose of this study, episodes of current account surplus reversal are six years in length. These years are identified as -2, -1, 0, 1, 2, and 3. Year 0 signifies the year *before* the current account (as a percent of GDP) begins its decline from surplus. In other words, year 1 represents the first year of "reversal." This method of labeling is consistent with the literature on deficit reversals.

Throughout this paper, the terms "pre-reversal period" and "reversal period" will be used. The pre-reversal period consists of years -2 through 0 and the reversal period consists of years 1 through 3.

IV. The Dynamics of Current Account Surplus Adjustment

This section evaluates how current account surplus reversals can be characterized in terms of income growth and real effective exchange rate adjustment. Specifically, this analysis addresses whether such a characterization can be made along line of industrialization (developed versus developing nations) and oil-export dependency (petroleum-based and non-petroleum-based economies). The aim of this analysis is to determine how current account surplus reversals can be characterized and find whether there is a distinct and archetypal case of surplus reversal regarding GDP growth and REER adjustment.

A Descriptive Analysis

This section of analysis evaluates the average income growth and REER adjustment during a current account surplus reversal based on descriptive statistics. Average annual change in GDP and average annual rate of REER appreciation (depreciation)[4] were calculated for the pre-reversal and reversal periods and the differences between the two were taken. This data was then aggregated in terms of average, median, and standard deviation. This calculation was done six times with six different subsamples: all countries; OECD countries only; non-OECD countries; OPEC countries only; non-OPEC countries; and non-OECD, non-OPEC countries.

The results reported in Table 1 show a clear pattern with regard to the sign and magnitude of the average difference in average annual GDP (REER)

[4] An increase in REER represents appreciation, a decrease depreciation.

change between the pre-reversal and reversal periods. The subsample that includes only non-OECD/non-OPEC countries has the highest magnitude with negative signs for both GDP and REER change. The subsample that includes OPEC countries has the highest magnitude with positive signs for both GDP and REER change.

Table 2 shows the descriptive statistics for the subsample that includes all countries. Average GDP average annual change decreases from 2.23 percent in the pre-reversal period to 1.62 percent in the reversal period. The average difference in average annual GDP change amounts to -0.66 percentage points. Average REER average annual change decreases from 0.18 percent in the pre-reversal period to -0.52 percent in the reversal period, representing a -0.95 percentage point change from appreciation to depreciation.

Developing versus Developed Countries

For OECD-member countries (Table 3), average GDP average annual change decreases from 2.50 percent in the pre-reversal period to 1.99 percent in the reversal period, with an average difference of -0.51 percentage points. Average REER average annual change increases from -0.03 percent to 0.05 percent, representing a 0.08 percentage point change from depreciation to appreciation.

For non-OECD member countries (Table 4), average GDP average annual growth decreases from 2.19 percent to 1.56 percent, with an average difference of -0.69 percentage points. Average REER rate of change also decreases, from

0.25 percent to -0.82 percent, a -1.28 percentage point change from appreciation to depreciation.

Petroleum-Based versus Non-Petroleum Based Economies

For OPEC-member countries (Table 5), average GDP average annual change increases (the only subsample to do so) from -0.13 percent in the pre-reversal to 2.57 percent in the reversal period. This amounts to a 2.70 percentage point increase. Average REER rate of change also increases, from -3.62 percent to 1.53 percent and has an average difference of 5.15 percentage points. It should be noted that this subsample is the only one of the six to experience an increase in both average GDP and REER average annual change.

Non-OPEC member countries (Table 6), on the other hand, experience a decrease in both characteristics. Average GDP average annual change decreases from 2.50 percent to 1.52 percent. The average difference in GDP average annual change between the two periods is -1.04 percentage points. Average REER average annual change decreases from 0.79 percent to -0.86 percent, a -1.93 change from appreciation to depreciation.

Based on these results, one might expect to see a negative relationship between current account surplus reversal and both GDP growth and REER adjustment for subsamples including all countries, non-OECD countries, non-OPEC countries, and non-OECD/non-OPECD countries. For OECD countries, one might expect a negative relationship with GDP growth and a positive one with REER. Finally, for OPEC countries, one might expect a positive relationship with both GDP growth and REER adjustment.

Multivariate Analysis

In this section, GDP growth and exchange rate adjustment are regressed on a lagged dependent variable; six dummy variables for years -2 through 3; and a fixed effect for country and year using OLS regression equations. These equations resemble those used in Freund (2005).

Equation i: GDP Change (Growth)

$$\Delta y_{j\,t} = \alpha \Delta y_{j\,t-1} + \beta_{-2} s_{-2} + \beta_{-1} s_{-1} + \beta_0 s_0 + \beta_1 s_1 + \beta_2 s_2 + \beta_3 s_3 + \gamma_j + \mu_t$$

Equation ii: Real (effective) exchange rate change

$$\Delta reer_{j\,t} = \alpha \Delta reer_{j\,t-1} + \beta_{-2} s_{-2} + \beta_{-1} s_{-1} + \beta_0 s_0 + \beta_1 s_1 + \beta_2 s_2 + \beta_3 s_3 + \gamma_j + \mu_t$$

Variable Description

For Equation i, found above, the dependent variable is GDP growth, measured as percent change,[5] in country j, year t. For Equation ii, the dependent variable is REER change, also measured as percent change,[6] in country j, year t. REER is defined such that an increase in REER represents appreciation.

The lagged dependent variable takes on the value of GDP or REER percent change in the previous year. This variable is included so as to address potential trends in GDP and REER change.

The six dummy variables (s_s) each take on the value of 1 if the observation in question represents a year during which that particular country was at the point in the reversal period specified by the variable itself. For

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[5] Data for GDP growth was measured as percent change in decimal form, i.e. 0.3 in lieu of 30%.

[6] Data is also measured in decimal form, as mentioned in footnote 4.

example, s_0 equals one for South Africa 1980 as that year represents the year immediately preceding reversal (year 0) for that country and s_1 equals one for South Africa 1981 as that year represents the first year of reversal (year 1) for that country. This pattern continues with s_{-2} taking on a value of one for South Africa 1978, s_{-1} equaling one for South Africa 1979, s_2 equaling one for South Africa 1982, and finally, s_3 equaling one for South Africa 1983. This method of using six dummy variables to identify correlations between a particular year in a reversal and changes to GDP and REER change is consistent with that used in Freund (2005).

The coefficients on s_{-2} through s_3 will be interpreted as representing an associated between the year of reversal defined by the variable (i.e. year -1 for s_{-1}) and GDP change or REER rate of change. For example, a positive, statistically significant, coefficient on variable s_{-1} in Equation i would be interpreted as an association between year -1 of the reversal and increased GDP growth.

The variable for country fixed effects is included to control for country-specific GDP growth and REER adjustment trends. This variable (γ_j) takes the form of 172 dummy variables, each representing a different country in the dataset, which take on a value of one when the observation represents the country determined by the variable. For example, for dummy variable "Barbados," only the 39 observations that occur in the country of Barbados take on the value of one.

Finally, the fixed year effect, (μ_t) is made up of 39 dummy variables, one for each of the years in the data set. The dummy variable takes on the value of one if the reversal occurred in the year noted by the variable. For example, the variable for 1980 takes on a value of one for the 172 observations that occur in that year. This variable is included to control for global macroeconomic GDP growth and REER trends. Information regarding the data used in these equations can be found in the data appendix.

Dataset Description

The data set contains 6708 observations. Each one represents a particular country during a particular year. 172 countries are represented over a period of 39 years (1970-2009). The data set is restricted to countries with a 2009 GDP per capita of more than $1000 in 2005 PPP terms and a 2009 population over half a million. These criteria eliminated five countries from the data set and are similar to that used in Edwards (2007). Another eighteen countries were eliminated due to a lack of available data.

Methodology

Each regression equation was run six times with six subsamples of data: the first includes all countries, the second excludes non-OECD member countries, the third excludes OECD member countries, the fourth excludes non-OPEC member countries, the fifth excludes OPEC member countries, and the sixth excludes both OPEC and OECD member countries. This division of the dataset into subsamples was done to determine if a pattern would emerge along

the lines of developed versus developing countries and petroleum-based versus non-petroleum based economies.

The results of Freund (2005) and Milesi-Ferretti and Razin (1998) suggest that there are differences regarding GDP change and REER rate of change between industrialized and developing countries following current account deficit reversals. The analysis done here endeavors to establish whether a similar difference exists for surplus reversals.

Results and Interpretation

GDP Growth

In comparing results from the six different subsamples, it becomes clear that current account surplus reversals correlate with different patterns of GDP growth for developing versus developed countries and petroleum versus non-petroleum based economies.

When the subsample includes all countries, excludes OECD members, OPEC members, and excludes both OECD and OPEC member countries (Tables 8, 10, 12, and 13 respectively), the coefficient on s_{-2} is consistent in sign (negative), magnitude (approximately 0.026), and statistical significance (1 percent and 5 percent levels). When the subsample includes OECD member countries only (Table 9), the coefficient on s_{-2} decreases in magnitude and loses its statistical significance. When the subsample includes OPEC member countries only (Table 11), the coefficient increases in magnitude, but still loses its statistical significance.

Additionally, when the subsample includes OECD member countries only (Table 9), the coefficient on s_{-1} becomes statistically significant at the 1 percent level and has a magnitude of 0.022. For the subsample that includes OPEC member countries only (Table 11), the coefficient on s_1 is 0.12 and is statistically significant at the 5 percent level.

These results show that for developing (non-OECD member) countries, the third year before a country's current account surplus begins to decline (year -2) is correlated with a 3 percent decrease in GDP growth (Table 10). For developed (OECD-member) countries (Table 9), such a statistically significant correlation does not exist. This result suggests that current account surpluses are associated with slower GDP growth in the pre-reversal for developing economies.

In the case of developed countries, the second year before their current account begins to reverse from its surplus (year -1) is correlated with a 2.2 percent increase in GDP growth (Table 9). This result suggests that current account surpluses in high-income countries are associated with higher than average growth. Because this high growth is not found during and following the surplus reversal, these results imply a deceleration of GDP growth during the reversal period for developing countries.

However, these results fail to establish as strong and significant pattern of GDP growth slowdown such as that found by Freund (2005), who conducted a similar study using dummy variables for reversal years of current account deficit reversals. For industrial countries, Freund finds a positive and significant

relationship between income growth and the first year preceding a reversal, and a negative and significant relationship between income growth and the first and second years after a reversal (Freund 2005, 1294). Freund's results imply a pattern of substantial GDP growth slowdown following a current account deficit reversal for industrial countries that is not found in the case of current account surplus reversals.

Comparing the results from the OPEC-member-countries-only subsample and the subsample that excludes such countries yields a similarly clear pattern. These results show that for non-petroleum-based economies, the third year before a country's current account begins to reverse from its surplus (year -2) is correlated with a 2.7 percent decrease in GDP growth. This result suggests that current account surpluses are associated with slower growth in the pre-reversal period for non-OPEC member countries.

For petroleum-based economies, the first year of reversal from a surplus (year 1) is correlated with a 12.1 percent increase in GDP growth. These results are consistent with the descriptive analysis done earlier in this paper, which found a 2.7 percentage point increase in average annual GDP change between the reversal and pre-reversal periods. These results suggest that in petroleum-based economies, current account surplus reversals are associated with increased GDP growth in the reversal period. However, this result is counterintuitive given the nature of the current account.

Current Account Surplus Reversals in Petroleum-Based Economies

Because the current account of most nations is primarily made up of the balance of trade and for petroleum-based economies, oil is the primary export, one might expect a current account surplus reversal in oil-exporting countries to correlate with a decrease in GDP growth. However, it is certainly possible that while the current account of an oil-exporting nation is decreasing, oil production, and therefore GDP growth, can be increasing if oil prices are also falling.

An evaluation of the seven episodes of current account surplus reversal occurring in OPEC-member countries yields little support for this hypothesis. Oil rents (as a percent of GDP) decrease between years 0 and 1 for six out of the seven episodes (Figure 1) and oil prices (dollars per barrel) decrease between years 0 and 1 for five out of the seven episodes (Figure 2). This information would suggest that an increase in production could easily explain the result of increased income growth associated with a current account surplus reversal found above. However, oil production actually *decreased* between the years 0 and 1 for six of the seven episodes (Figure 3). This information points to growth in the non-oil sector of these economies as the source of the increased GDP growth associated with year 1 of a current account surplus reversal.

Real Effective Exchange Rate Change

The regression results for real effective exchange rate as the dependent variable yielded no statistically significant correlations for years -2 through 2. These results show that for current account surplus reversals, unlike current account deficit reversals, there appears to be no significant relationship between

a particular year of reversal and real effective exchange rate adjustment. This result contrasts with the relationship between REER adjustment and current account deficit reversals. Freund (2005) finds a negative and significant relationship between the first year after a reversal and real effective exchange rate appreciation (Freund 2005, 1294).

Because a fair amount of real effective exchange rate data was unavailable, decreasing the number of observations from 6708 to 2674, a robustness check was done using real exchange rate (in relation to the US dollar) instead. Regression results for real exchange rate as the dependent variable yields results different from those of real effective exchange rate regarding sign, magnitude, and statistical significance. When all countries are included (Table 14, column 1), the coefficient on s_{-1} is 0.30 and is statistically significant at the 5 percent level, implying that a 30 percent acceleration in RER appreciation coincides with the second year before a current account begins to reverse from surplus. When the subsample excludes OPEC member countries and OECD member countries (Table 14, columns 3 and 5), the coefficient increases slightly in magnitude (to 0.333 and 0.354 respectively) and maintains its statistical significance at the 5 percent level.

For all other subsamples, the coefficient on s_{-1} fails to retain its statistical significance. When the subsample includes OECD member countries only, the coefficient becomes negative. For OPEC countries only, the magnitude decreases significantly, to 0.086 (Table 14, Column 4). These results suggest that the relationship between RER appreciation and the second year before a reversal of

the current account surplus is driven by developing, non-net-oil-exporting countries.

These results show a significant increase in appreciation of real exchange rate for both developing and non-petroleum based economies in the second year before the surplus reversal occurs. This interpretation suggests that current account surplus reversals in developing and non-petroleum based economies are preceded by RER appreciations.

Overall, this section of analysis supports the suggestion that there is no distinct and archetypal case for current account surplus reversals. This section finds that for developed countries, the second year before a surplus reversal begins (year -1) is associated with a 2.2 percent increase in GDP growth. This result suggests that a deceleration in growth occurs following a surplus reversal in a developed economy. Also regarding income growth, this section found that for petroleum-based economies, the first year of reversal (year 1) is associated with a 12.1 percent increase in GDP growth that is driven by growth in the non-oil sector. On the other hand, for developing and non-petroleum-based economies, results from this section suggest that surpluses in such economies are associated with slower growth.

Regarding real effective exchange rate, no relationship with surplus reversal was found. But for real exchange rate (relative to the US Dollar), a 30 percent acceleration in appreciation occurs in the second year before the reversal (year -1) in developing and non-petroleum-based economies.

V. Characterization of the Relationship Between Conditions of Surplus and Severity of Reversal Outcome

The descriptive analysis above has shown diverse outcomes of real GDP growth and REER adjustment across episodes of current account surplus reversal and identified patterns along the lines of industrialized versus non-industrialized countries and oil-exporting versus non oil-exporting countries. Initial regression analysis confirmed the pattern among developed versus developing nations and petroleum-based versus non-petroleum-based economies. In this section, regression analysis endeavors to determine if certain characteristics of the surpluses themselves are associated with more or less severe outcomes of GDP change and REER adjustment.

Below, a set of OLS regression equations estimate the correlation between particular characteristics of current account surpluses and real GDP growth/ real effective exchange rate appreciation (or depreciation) following a current account surplus reversal. Such characteristics include the value of the current account surplus at its peak, whether or not the surplus was "persistent", the growth of consumption and government expenditure, both relative to GDP growth, in the pre-reversal period, trade relative to GDP in the pre-reversal period, and the net foreign asset position in the year immediately preceding the reversal. More information on these variables can be found in the Data Appendix. This model of estimation mirrors the work of Freund and Warnock (2005) on current account deficit reversals.

A Simple Correlation Analysis

This section evaluates the relationship between various outcomes (income growth and real effective exchange rate adjustment) and various preconditions (the size of the current account at its peak; whether the reversal was preceded by a persistent surplus; the extent to which it was associated with surges in consumption, government expenditure, or investment; and the extent of openness and indebtedness to the rest of the world) using a simple correlation analysis. Two measures of growth are used: average growth in the three years of surplus decline (the reversal period) less average growth in the three years before the decline (the pre-reversal period), and the difference between average growth in the three years of surplus decline (the reversal period) and long-term average growth over the whole period (1970-2009). Two measures of real effective exchange rate adjustment are used: average annual adjustment during the three years of surplus decline, and average annual adjustment during the six years encompassing the pre-reversal and reversal periods. For both of these measures, a negative sign represents depreciation. Simple correlations and significance levels are presented in Table 15.

Large and Persistent Surpluses

For this study, the variable *CA/GDP at peak* is measured as the current account balance relative to GDP in the year immediately preceding the decline (Year 0). The variable *Persistence* is a dummy variable that takes on a value of one if the surplus lasted for more than five years and no reversal occurred during those five years. In their study on current account deficit reversals,

Freund and Warnock (2005) include these variables because the literature on deficit reversals "suggests that large and persistent deficits will involve more pain" (Freund and Warnock 2005, 11). They find that large and persistent deficits are associated with "a growth slowdown that is deeper than average" and with "less depreciation than average" during a reversal (Freund and Warnock 2005, 12). These variables are included in this study to determine if a similar relationship exists for surplus reversals.

The correlations presented in Table 15 imply that large surpluses are associated with a acceleration in REER depreciation. For each percentage point increase in the current account relative to GDP, there is a 53 percent acceleration of average annual REER depreciation (statistically significant at the 5 percent level) in the three years beginning with the initial surplus decline, the reversal period (years 1 through 3). This result suggests that for larger surpluses, REER depreciates during and after a reversal at a faster rate.

Additionally, for those episodes preceded by a persistent surplus, there is a 0.26 percent increase (statistically significant at the 5 percent level) in the difference between average growth in the reversal period and average growth in the pre-reversal period. This result implies that for episodes involving a persistent surplus, either growth in the reversal period is higher, or that growth is lower in the pre-reversal period. Because Table 15 also reports a -0.057 correlation for persistence and the difference between growth in the reversal period and the long-term average, it is likely that the above-mentioned result is driven by lower growth in the pre-reversal period, rather than higher growth in

the reversal period. Furthermore, Table 8 shows a negative and statistically significant relationship between the first year of the pre-reversal period (year -2) and income growth, which supports the above-mentioned theory. Based on this analysis, this result suggests that persistent surpluses are associated with lower GDP growth in the pre-reversal period (years -2 to 0).

Surpluses Associated with Consumption, Government Expenditure, and Investment Growth

Deficit reversal literature finds that for reversals in which the "deficits [are] associated with consumption booms or large fiscal deficits, rather than a surge in the more productive investment spending, the adjustment process might be more painful" (Freund and Warnock 2005, 12).

For this reason, Freund and Warnock (2005) chose to include variables for consumption, fiscal expenditure, and investment in their study. They find that those deficits associated with higher levels of consumption involve considerably more depreciation in the REER during the reversal period as well as lower growth during the pre-reversal period. Additionally, they find deficits associated with investment growth to experience slower income growth during the reversal period and much less REER depreciation during the reversal period than average. They find fiscal balance to have no statistically significant relationships (Freund and Warnock 2005, 12). By including these variables in this study, this paper intends to determine if surplus accumulation that is associated with higher growth of consumption, government, or investment as a share of GDP is related to higher or lower GDP growth and REER adjustment.

For this study, the variable for *CONS/GDP growth -2 to 0* is measured as the ratio of average annual growth of household consumption relative to GDP in the pre-reversal period (years -2 to 0). Table 15 shows a correlation of -0.2950 between growth of consumption relative to GDP and the difference between GDP growth in the reversal period and long-run average growth, implying a 29.50 percent decrease in that difference for every percentage point increase in growth of consumption as a percentage of GDP. This result suggests that growth of consumption share of GDP in the pre-reversal period is associated with lower-than-average income growth in the reversal period.

GOVTEXP/GDP growth -2 to 0 also shows a statistically significant association with income growth. This variable is measured as the average annual growth in government expenditure relative to GDP in the pre-reversal period (years -2 to 0). Table 15 shows a 0.28 percent increase in the difference in average annual GDP growth between the reversal and pre-reversal periods for each percentage point increase in growth of government expenditure relative to GDP (statistically significant at the 1 percent level). However, there is also a statistically significant (at the 1 percent level), but *negative* correlation representing a 43 percent decrease in the difference between GDP growth in the reversal period and long-run average growth. The concurrence of these two results suggests that the increase in the difference between growth in the pre-reversal and reversal periods is driven by lower growth in the pre-reversal period, as opposed to increased growth in the reversal period. Also, the negative

and statistically significant correlation between the first year of the pre-reversal period (year -2) and growth found in Table 8 supports this proposition.

As shown in Table 15, in the case of current account surplus reversals, investment, which is measured as average annual growth in gross fixed capital formation relative to GDP in the pre-reversal period (years -2 to 0), does not appear to have any statistically significant relationship with either income growth or REER adjustment.

Openness and Indebtedness to the Rest of the World

Freund and Warnock (2005) argue for the inclusion of openness as a variable for consideration because in open or "well integrated" economies, "only a small relative price change will be needed to induce consumers to switch to domestic goods" (Freund and Warnock 2005, 13). Such a switch would reduce the trade, and therefore current account, deficit. By this logic, a similarly small relative price change could result in a switch to imported goods, thereby reducing the trade, and therefore current account, surplus. For both situations, one would expect there to be less REER adjustment associated with more open economies.

The variable for *Openness (TRAD/GDP average -2 to 0)* is measured as average trade (imports plus exports) as a percentage of GDP in the pre-reversal period (years -2 to 0). Table 15 shows no statistically significant result regarding the relationship between openness and income growth or between openness and REER adjustment.

Indebtedness to the rest of the world *NFA/GDP at peak* is measured by net foreign assets as a percentage of GDP in the year immediately preceding the reversal (year 0). Inclusion of this variable in the deficit reversal literature is based on the argument that heavy reliance on foreign financing can easily result in a quick reversal in foreign investment, which "can induce considerable pain" (Freund and Warnock 2005, 13). However, no such association is found. With regard to surplus reversals, NFA as a percentage of GDP does not have any statistically significant relationship with either income growth or REER adjustment (Table 9).

Multivariate Analysis

The unconditional correlations shown in Table 15 indicate that larger current account surpluses are associated with a faster rate of REER depreciation and that persistent surpluses and growth of government expenditure as a share of GDP are both associated with a lesser growth difference between the reversal and pre-reversal periods. Additionally, the simple correlations suggest that growth of consumption and of government expenditure, both as a share of GDP, are associated with a lower difference of GDP growth in the reversal period relative to long-term average growth.

However, the analysis of correlations above neglects the possibility that outside factors are motivating the relationships discussed above. In this section, multivariate analysis is used to confirm or deny the above-mentioned correlative relationships. Specifically, GDP growth and exchange rate adjustment are regressed on preconditions: the size of the current account surplus at its peak

(CApeak), whether the reversal was preceded by a persistent surplus (Persistence), the average annual growth in consumption (CONS/GDPgrowth), government (GOVTEXP/GDPgrowth), and investment (INVT/GDPgrowth) relative to GDP growth in the pre-reversal period, openness (Openness), and the net foreign asset position (NFA/GDP) in the year immediately preceding the reversal. This model of regression equation is based on that done by Freund and Warnock (2005) in their evaluation of current account deficit reversals.

Growth Effects

Table 16 investigates the result found in Table 15 that surplus persistence is associated with in an increase in the differences in GDP growth between the pre-reversal and reversal periods.

$$\Delta y_{1\text{-}3} - \Delta y_{\text{-}2\text{-}0} = \beta_0 + \beta_1 (\text{CApeak}) + \beta_2 (\text{Persistence}) + \beta_3 (\text{CONS/GDPgrowth}) + \beta_4 (\text{GOVTEXP/GDPgrowth}) + \beta_5 (\text{INVT/GDPgrowth}) + \beta_6 (\text{Openness}) + \beta_7 (\text{NFA/GDP})$$

The coefficient on *Persistence* is 0.055 (significant at the 5 percent level), implying that those episodes of reversal that are preceded by a persistent surplus are associated with a 5.5 percent increase in the difference between GDP growth in the reversal and pre-reversal periods (column 1). This result suggests that surplus persistence is associated with either higher growth in the reversal period (year 1 to 3) or lower growth in the pre-reversal period (years -2 to 0), or an amount of both. However, including other factors—size of the surplus; consumption, expenditure, and investment growth; openness; and NFA position—resulted in a loss of statistical significance for the coefficient, although the magnitude remains similar (columns 2 and 3). Results in column 4, which

excludes episodes involving surpluses that exceed 10 percent of GDP[7], yield a coefficient of 0.095 (significant at the 5 percent level) for persistence of the surplus, which suggests that the result is not driven by large surpluses. However, when episodes involving surpluses that exceed 6 percent of GDP[8] are eliminated from the sample, the coefficient loses its significance and changes its sign (column 5). These results suggest that while large surplus outliers do not drive the significance, persistence is not a significant factor for reversals of smaller surpluses.

Table 17 investigates the suggestion found in Table 15 that growth in the share government expenditure relative to GDP in the pre-reversal period is associated with an increase in the difference in GDP growth in the pre-reversal and reversal periods by running the following regression:

$$\Delta y_{1\text{-}3} - \Delta y_{\text{-}2\text{-}0} = \beta_0 + \beta_1 (\text{CApeak}) + \beta_2 (\text{Persistence}) + \beta_3 (\text{Cons/GDPgrowth}) + \beta_4 (\text{GovtExp/GDPgrowth}) + \beta_5 (\text{Inv/GDPgrowth}) + \beta_6 (\text{Openness}) + \beta_7 (\text{NFAPosition})$$

The coefficient on growth of government expenditure relative to GDP is 0.006 (significant at the 5 percent level), implying that for every percentage point increase in government expenditure growth, a 0.6 percent increase in the difference between GDP growth in the reversal and pre-reversal periods occurs (column 1). This result could mean either an increase in growth in the reversal

[7] Twenty-six of the identified surplus reversals meet this criterion, and are therefore eliminated.
[8] Forty-three of the identified surplus reversals meet this criterion, and are therefore eliminated.

period, or a lower level of growth in the pre-reversal period. Looking ahead towards the regression analysis done on the ratio of GDP growth in the reversal period relative to long-run average growth (Table 19), which yields a statistically significant and negative coefficient for government expenditure, it is likely that the coefficient on government expenditure in Table 17 is a result of lower growth in the pre-reversal period. Additionally, results shown in Table 8 affirm a correlation between the pre-reversal period and lower income growth, which supports the above-mentioned suggestion.

When other factors are included, the coefficient on government expenditure loses is statistical significance and changes in magnitude (columns 2 and 3). Additionally, when large-surplus episodes are excluded, above 10 percent and 6 percent of GDP in columns 5 and 6 respectively, statistical significance is again lost and magnitude changes substantially. These results suggest that that although large surplus outliers do not drive the significance, growth of government expenditure as a share of GDP in the pre-reversal period is not a significant factor in determining the difference between GDP growth in the reversal period and GDP growth in the pre-reversal period.

Table 18 reports results regarding the correlative relationship between growth in the share of consumption relative to GDP in the pre-reversal period and the difference between GDP growth in the reversal period and long-term average growth.

$\Delta y_{1\text{-}3} - \Delta y_{longrun} = \beta_0 + \beta_1$ (CApeak) + β_2 (Persistence) + β_3 (CONS/GDPgrowth) + β_4 (GOVTEXP/GDPgrowth) + β_5 (INVT/GDPgrowth) + β_6 (Openness) + β_7 (NFA/GDP)

The coefficient on growth of consumption relative to GDP in the pre-reversal period is -0.0025 (statistically significant at the 5 percent level), implying that a percentage point increase in the growth of consumption as a share of GDP is associated with a 0.25 percent decrease in the difference between GDP growth in the reversal period and long-term average GDP growth (column 1). Including other factors—current account size, persistence, government expenditure and investment growth, openness, and NFA position—does not measurably change the size or significance of the coefficient on consumption growth. Of those factors included, only government expenditure is significant (at the 1 percent level) (columns 2 and 3). When episodes associated with large surpluses (exceeding 10 percent of GDP) are excluded, the coefficient changes in sign and magnitude and loses its significance (column 4), suggesting that the coefficient of -0.0025 found in column 1 is driven primarily by episodes associated with larger surpluses. In column 5, episodes associated with a surplus of less than 6 percent of GDP are eliminated, yielding a coefficient of -0.0030 (statistically significant at the 10 percent level). When other factors are included for this subsample, the magnitude increases slightly (-0.0038) and significance increases to the 1 percent level (column 6), implying that for episodes of reversal that are associated with a surplus greater than 6 percent of GDP, a percentage point increase in growth of consumption relative to GDP is associated with a 0.38 percent decrease in the difference between GDP growth in the reversal period and the long-run average of growth.

Table 19 investigates the validity of the correlation between average annual growth of government expenditure relative to GDP and the difference between GDP growth in the pre-reversal period and long-term average growth.

$\Delta y_{1\text{-}3} - \Delta y_{longrun} = \beta_0 + \beta_1$ (CApeak) + β_2 (Persistence) + β_3 (CONS/GDPgrowth) + β_4 (GOVTEXP/GDPgrowth) + β_5 (INVT/GDPgrowth) + β_6 (Openness) + β_7 (NFA/GDP)

The coefficient on growth of government expenditure relative to GDP in the pre-reversal period is -0.0032 (statistically significant at the 1 percent level), implying that a percentage point increase in the rate of growth of government expenditure relative to GDP is associated with a 0.32 percent decrease in the difference between GDP growth in the pre-reversal period and long-term average growth (column 1). Including other factors does not appreciably change the size or significance of the coefficient, and of those factors, only consumption growth is significant (see Table 18) (columns 2 and 3). When episodes associated with large surpluses (exceeding 10 percent of GDP) are excluded, the coefficient decreases substantially in magnitude and loses its significance (column 4). This result suggests that the coefficient of -0.0032 found in column 1 is driven primarily by larger surpluses. In column 5, episodes associated with a surplus of less than 6 percent of GDP are eliminated, yielding a coefficient of -0.0038 (statistically significant at the 1 percent level). When other factors are included for this subsample, the magnitude decreases slightly (-0.0034) and significance decreases to the 5 percent level (column 6), implying that for episodes of reversal that are associated with a surplus greater than 6 percent of GDP, a percentage point increase in government expenditure growth is

associated with a 0.34 percent decrease the difference between in GDP growth in the reversal period and long-run average GDP growth.

Overall, the results shown in Tables 18 and 19 suggest that there is a growth slowdown story for countries experiencing reversals that are associated with high growth of consumption and government expenditure relative to GDP in the pre-reversal period. However, these relationships hold true only for those episodes in which the size of the current account exceeds 6 percent of GDP.

Exchange Rate Effects

Table 20 evaluates the validity of the simple correlations' finding that surplus size is negatively and significantly correlated with average annual real effective exchange rate adjustment in the reversal period (years 1 to 3).

$$\Delta \text{ reer}_{1\text{-}3} = \beta_0 + \beta_1 (\text{CApeak}) + \beta_2 (\text{Persistence}) + \beta_3 (\text{Consumption}) + \beta_4 (\text{GovtExpenditure}) + \beta_5 (\text{Investment}) + \beta_6 (\text{Openness}) + \beta_7 (\text{NFAPosition})$$

The coefficient on current account at its peak relative to GDP is -0.0027 (statistically significant at the 5 percent level), implies that a percentage point increase in the current account is associated with a 0.27 percent deceleration of REER appreciation. When other factors are controlled for, the size and significance of the coefficient both increase (from 0.0027 to 0.004 and from 5 percent level to 1 percent significance level) (columns 2 and 3). When episodes that are associated with surpluses greater than 10 percent of GDP are excluded, the coefficient changes in sign, magnitude and loses its significance (column 4), implying that the coefficient found in column 1 was driven by large surpluses. Columns 5 and 6 exclude episodes with a current account of less than 6 percent

of GDP and have coefficients of -0.005 and -0.006 respectively (both statistically significant at the 1 percent level). Column 6 includes other factors, none of which are statistically significant.

The results shown in Table 20 suggest that larger current account surpluses are associated with a 0.6 percent faster REER depreciation in the reversal period. However, this relationship holds true only for episodes in which the surplus in question is equal to more than 6 percent of GDP.

These results, which show no clear systematic relationship between the preconditions of current account surplus reversals and REER adjustment, are in contrast to current account deficit literature, which finds a statistically significant relationship between both persistence of the deficit and the extent of investment growth in the pre-reversal period and REER depreciation. Specifically, both variables are associated with a lower level of REER depreciation (Freund and Warnock 2005, 19).

Overall, this section of analysis supports the suggestion made by the previous section that there is no distinct and archetypal case for current account surplus reversals. Specifically, this section finds that pre-reversal growth in consumption and government expenditure are both associated with a slight decrease in the difference between reversal period GDP growth and long-term average growth. Regarding real effective exchange rate adjustment, the size of a current account surplus is associated with a slight acceleration in REER depreciation in the reversal period. However, all three relationships are limited to reversals associated with surpluses that exceed 6 percent of GDP.

VI. Conclusion

This paper provides substantial support for the suggestion that current account surplus reversals, unlike current account deficit reversals, are not associated with any kind of definite or representative behavior. This paper finds evidence that implies a slowdown in GDP growth following current account surplus reversals in developed countries and an acceleration of GDP growth following a reversal for petroleum-based economies. For developing and non-petroleum-based economies, results in this paper suggest that surpluses in such nations are associated with slower GDP growth and an acceleration of RER appreciation in the pre-reversal period.

Additionally, this paper finds that for episodes associated with surplus greater than 6 percent of GDP, growth of consumption and government expenditure relative to GDP in the pre-reversal period are both associated with a small decrease in the difference between GDP growth in the three years beginning with the reversal and long-term average GDP growth. Concerning REER adjustment, the size of the surplus preceding a reversal is associated with a slight acceleration of REER depreciation in the reversal period for episodes associated with surplus greater than 6 percent of GDP.

Most importantly, this paper finds no support for a systematic characterization of current account surplus reversal outcomes. Furthermore, the variation in outcomes found between developing versus developed and petroleum-based versus non-petroleum based economies provides further

support for the suggestion that such a systematic characterization does not exist for episodes of surplus reversal.

These results are consistent with the minimal literature that is available on the subject of surplus reversals. Both articles, Edwards (2007) and IMF (2010), provide support for this papers finding that a systematic characterization of surplus reversals does not exist. Additionally, this paper's finding of a wide variation of growth outcomes among reversals is supported by a similar finding in IMF (2010). However, this paper differs from the literature in that it evaluates the dynamics of GDP and REER outcomes for *all* current account surplus reversals, regardless of their cause, and analyzes the correlation between their preconditions and outcomes.

Due to the lack of published empirical work regarding current account surplus reversals, there is a great deal of room for further research. Since this paper has established that no systematic characterization of surplus reversals exists, the next logical step would be to study the differences between the dynamics of deficit reversals and surplus reversals to address the question of why such a typical case exists for the reversal of a current account deficit but not for the reversal of a surplus. In addressing this question, both a correlative and causational study would be beneficial.

Appendix

List of Episodes of Surplus Reversal

Number	Country	Reversal Year	Span of Reversal
1	Bahrain	1984	1980-1985
2	Barbados	1994	1992-1997
3	Belgium	2005	2003-2008
4	Chad	1983	1981-1986
5	China	1992	1990-1995
6	Djibouti	1995	1993-1998
7	Djibouti	2003	2001-2006
8	Dominican Republic	2005	2003-2008
9	Egypt, Arab Rep.	1993	1991-1996
10	Egypt, Arab Rep.	2006	2004-2009
11	El Salvador	1988	1986-1991
12	Eritrea	1994	1992-1997
13	Fiji	1988	1986-1991
14	Finland	2002	2000-2005
15	Gabon	1984	1982-1987
16	Gambia, The	1992	1990-1995
17	Germany	1990	1988-1993
18	Indonesia	2002	2000-2005
19	Italy	1997	1995-2000
20	Ireland	1998	1996-2001
21	Jordan	2004	2002-2007
22	Korea, Rep.	2000	1998-2003
23	Kuwait	1981	1979-1984
24	Kuwait	1990	1988-1993
25	Latvia	1994	1992-1997
26	Lesotho	1994	1992-1997
27	Macao SAR, China	2004	2002-2007
28	Malaysia	1979	1977-1982
29	Malaysia	1989	1987-1992
30	Maldives	1990	1988-1993
31	Mauritius	2003	2001-2006
32	Morocco	2003	2001-2006
33	Netherlands	1997	1995-2000
34	Nigeria	1992	1990-1005
35	Nigeria	2006	2004-2009
36	Norway	1985	1983-1988
37	Oman	1981	1979-1984
38	Oman	1991	1989-1994
39	Pakistan	2003	2001-2006
40	Panama	1990	1988-1993
41	Paraguay	1991	1989-1994

42	Romania	1989	1987-1992
43	Russian Federation	2006	2004-2009
44	Rwanda	1996	1994-1999
45	Samoa	1990	1988-1993
46	Saudi Arabia	1982	1980-1985
47	Slovenia	1994	1992-1997
48	Solomon Islands	1979	1977-1982
49	South Africa	1980	1978-1983
50	Suriname	1980	1978-1983
51	Suriname	1995	1993-1998
52	Swaziland	1977	1975-1980
53	Swaziland	1991	1989-1994
54	Swaziland	2004	2002-2007
55	Syrian Republic	1991	1989-1994
56	Syrian Republic	2002	2000-2005
57	Thailand	2000	1998-2003
58	Trinidad and Tobago	1995	1993-1998
59	Ukraine	2005	2003-2008
60	Venezuela	1975	1973-1978
61	Venezuela	1985	1983-1988
62	Vietnam	2001	1999-2004
63	Yemen	2001	1999-2004

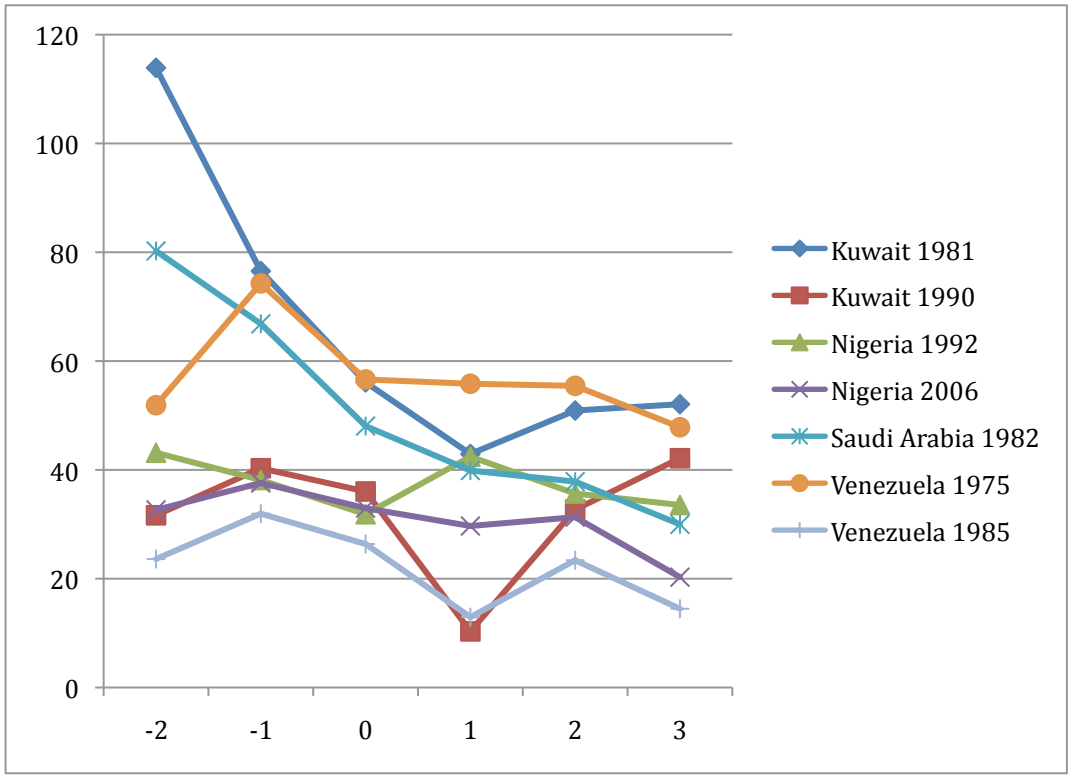
Data Appendix

Data/Variable	Description	Source
Current Account Balance (% of GDP)	Measures the balance of the current account as a percentage of gross domestic product	World Bank WDI 2012
GDP Change	Annual percent change in gross domestic product	Calculated from Penn World Tables 7.0
REER Change	Annual percent change in real effective exchange rate (depreciation is negative)	Calculated from World Bank WDI 2012
RER Change	Annual percent change in real exchange rate, relative to US dollar, with a 2005 base year (depreciation is negative)	Calculated from US Department of Agriculture Economic Research Service 2011
Oil Rents (% of GDP)	The difference between the value of crude oil production at world prices and the cost of production	World Bank WDI 2012
Oil Prices	Dollars per barrel	Federal Reserve Bank of St Louis, Federal Reserve Economic Data
Oil Production	Total annual petroleum production (thousands of barrels per day)	US Energy Information Administration 2011
GDP Growth in Reversal Period Less GDP Growth in the Pre-Reversal Period	Average annual growth in gross domestic product for years 1 through 3 minus average annual growth in gross domestic product for years -2 through 0	Calculated from Penn World Tables 7.0
GDP Growth in Reversal Period Less Long-Run Average GDP Growth	Average annual growth in gross domestic product for years 1 through 3 minus average annual growth in gross domestic product for the whole period (1970-2009)	Calculated from Penn World Tables 7.0

Average Annual REER Adjustment 0 to 3	Average annual adjustment in real effective exchange rate for years 0 through 3	Calculated from World Bank WDI 2012
Average Annual REER Adjustment -2 to 3	Average annual adjustment in real effective exchange rate for years 0 to 3	Calculated from World Bank WDI 2012
CA Peak	Current account balanced measured as a percentage of GDP at the peak of the surplus	World Bank WDI 2012
Persistence	An indicator variable that takes the value of one if the surplus is persistent	
Con/GDP growth -2 to 0	Average annual growth of consumption as a share of GDP in the pre-reversal period	Calculated from World Bank WDI 2012
Govt/GDP growth -2 to 0	Average annual growth of government expenditure as a share of GDP in the pre-reversal period	Calculated from World Bank WDI 2012
Inv/GDP growth -2 to 0	Average annual growth of investment as a share of GDP in the pre-reversal period	Calculated from World Bank WDI 2012
Openness (Trad/GDP growth -2 to 0)	Average trade (imports plus exports) as a share of GDP in the pre-reversal period	Calculated from World Bank WDI 2012
NFA Position	Net foreign asset position as a percentage of GDP in year 0	Calculated from World Bank WDI 2012

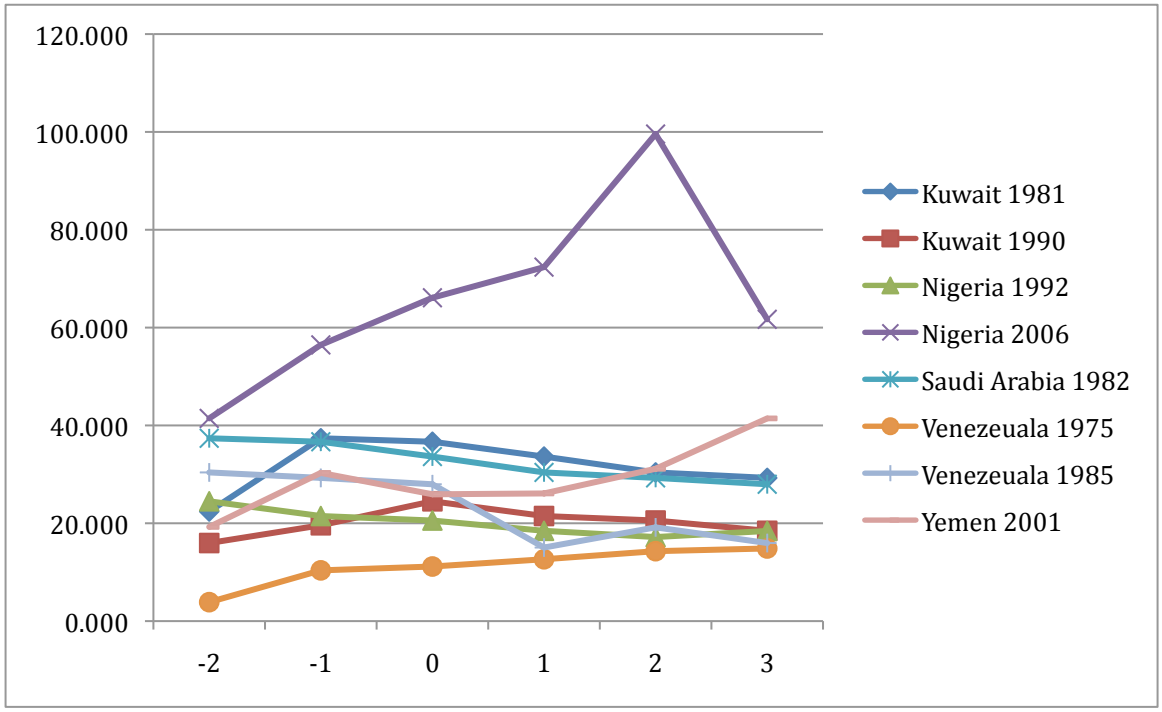
Tables and Figures

Figure 1: Oil Rents (% of GDP)



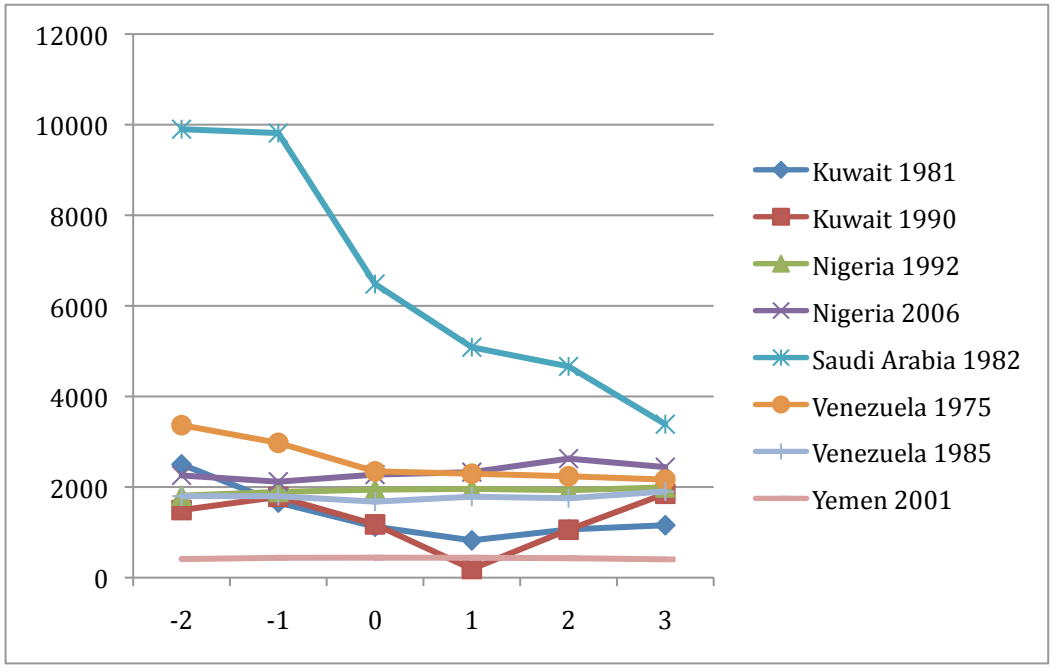
Data Source: World Bank World Development Index

Figure 2: Oil Prices (Dollars per Barrel)



Data Source: World Bank World Development Index

Figure 3: Petroleum (Oil) Production (Thousands barrels per day)



Data Source: World Bank World Development Index

Table 1: Descriptive Statistics Summary

	Average Difference in GDP Average Annual Growth for Pre-Reversal and Post-Reversal Periods	Average Difference in REER Average Annual Rate of Appreciation for Pre-Reversal and Post-Reversal Periods	Average Difference Between CA Average for Pre-reversal and Post-Reversal Periods
All Countries	-0.66	-0.95	-12.84
OECD Only	-0.51	0.08	-4.82
Non-OECD Only	-0.69	-1.28	-14.27
OPEC Only	2.70	5.15	-32.81
Non-OPEC Only	-1.04	-1.93	-10.54
Non-OECD/Non-OPEC Only	-1.17	-2.71	-11.76

Units in percentage points.

Table 2: Descriptive Statistics for All Countries

	Average	*Median*	*Standard Deviation**
Current Account Data			
Average CA Value for Years -2 through 0 (CA as % of GDP)	8.34%	5.93%	8.66
Average CA Value for Years 1 through 3 (CA as % of GDP)	-4.50%	-3.50%	13.19
Difference Between CA Averages for Years -2 through 0 and 1 through 3 (Percentage points)	-12.84	-8.99	15.05
GDP Data			
GDP Average Annual Change Years -2 through 0	2.23%	1.96%	0.04
GDP Average Annual Change Years 1 through 3	1.62%	1.84%	0.04
Difference in GDP Average Annual Change between Years -2 through 0 and 1 through 3	-0.66	-0.36	0.05
REER Data			
REER Average Annual Change Years -2 through 0 (% Change)	0.18%	0.11%	0.06
REER Average Annual Change Years 1 through 3 (% Change)	-0.52%	0.63%	0.08
Difference in REER Average Annual Change between Years -2 through 0 and 1 through 3 (Percentage points)	-0.95	-0.13	0.09

Standard deviation units in percentage points.

Table 3: Descriptive Statistics for OECD-Member Countries

	Average	*Median*	*Standard Deviation**
Current Account Data			
Average CA Value for Years -2 through 0 (CA as % of GDP)	5.20%	4.23%	2.23
Average CA Value for Years 1 through 3 (CA as % of GDP)	0.39%	0.05%	2.71
Difference Between CA Averages for Years -2 through 0 and 1 through 3 (Percentage point)	-4.82	-3.96	2.31
GDP Data			
GDP Average Annual Change Years -2 through 0 (% Change)	2.50%	2.15%	0.01
GDP Average Annual Change Years 1 through 3 (% Change)	1.99%	2.21%	0.01
Difference in GDP Average Annual Change between Years -2 through 0 and 1 through 3 (Percentage points)	-0.51	-0.29	0.02
REER Data			
REER Average Annual Change Years -2 through 0 (% Change)	-0.03%	-0.11%	0.02
REER Average Annual Change Years 1 through 3 (% Change)	0.05%	-0.41%	0.02
Difference in REER Average Annual Change between Years -2 through 0 and 1 through 3 (Percentage points)	0.08	0.75	0.03

*Units in percentage points.

Table 4: Descriptive Statistics for Non-OECD Member Countries

	Average	*Median*	*Standard Deviation**
Current Account Data			
Average CA Value for Years -2 through 0 (CA as % of GDP)	8.96%	6.35%	0.0918
Average CA Value for Years 1 through 3 (CA as % of GDP)	-5.31%	-3.93%	0.1406
Difference Between CA Averages for Years -2 through 0 and 1 through 3 (Percentage points)	-14.27	-9.94	0.1580
GDP Data			
GDP Average Annual Change Years -2 through 0 (% Change)	2.19%	1.81%	0.0445
GDP Average Annual Change Years 1 through 3 (% Change)	1.56%	1.84%	0.0390
Difference in GDP Average Annual Change between Years -2 through 0 and 1 through 3 (Percentage points)	-0.69	-0.38	0.0520
REER Data			
REER Average Annual Change Years -2 through 0 (% Change)	0.25%	-0.17%	0.0644
REER Average Annual Change Years 1 through 3 (% Change)	-0.82%	0.75%	0.0862
Difference in REER Average Annual Change between Years -2 through 0 and 1 through 3 (Percentage points)	-1.28	-0.74	0.1063

*Units for standard deviation are percentage points.

Table 5: Descriptive Statistics for OPEC-Member Countries

	Average	*Median*	*Standard Deviation**
Current Account Data			
Average CA Value for Years -2 through 0 (CA as % of GDP)	22.97%	13.83%	16.02
Average CA Value for Years 1 through 3 (CA as % of GDP)	-9.84%	-5.99%	30.62
Difference Between CA Averages for Years -2 through 0 and 1 through 3 (Percentage points)	-32.81	-16.84	31.68
GDP Data			
GDP Average Annual Change Years -2 through 0 (% Change)	-0.13%	0.67%	0.04
GDP Average Annual Change Years 1 through 3 (% Change)	2.57%	1.06%	0.05
Difference in GDP Average Annual Change between Years -2 through 0 and 1 through 3 (Percentage point)	2.70	0.13	0.09
REER Data			
REER Average Annual Change Years -2 through 0 (% Change)	-3.62%	-5.13%	0.09
REER Average Annual Change Years 1 through 3 (% Change)	1.53%	-0.83%	0.11
Difference in REER Average Annual Change between Years -2 through 0 and 1 through 3 (percentage points)	5.15	-0.61	0.15

*Units in percentage points.

Table 6: Descriptive Statistics for Non-OPEC-Member Countries

	Average	*Median*	*Standard Deviation**
Current Account Data			
Average CA Value for Years -2 through 0 (CA as % of GDP)	6.63%	5.18%	5.42
Average CA Value for Years 1 through 3 (CA as % of GDP)	-3.90%	-3.14%	8.67
Difference Between CA Averages for Years -2 through 0 and 1 through 3 (Percentage points)	-10.54	-8.20	9.34
GDP Data			
GDP Average Annual Change Years -2 through 0 (% Change)	2.50%	2.15%	0.04
GDP Average Annual Change Years 1 through 3 (% Change)	1.52%	1.89%	0.03
Difference in GDP Average Annual Change between Years -2 through 0 and 1 through 3 (Percentage points)	-1.04	-0.43	0.04
REER Data			
REER Average Annual Change Years -2 through 0 (% Change)	0.79%	0.11%	0.05
REER Average Annual Change Years 1 through 3 (% Change)	-0.86%	0.63%	0.07
Difference in REER Average Annual Change between Years -2 through 0 and 1 through 3 (Percentage points)	-1.93	-0.13	0.08

*Units in percentage points.

Table 7: Descriptive Statistics for Non-OECD, Non-OPEC Member Countries

	Average	*Median*	*Standard Deviation**
Current Account Data			
Average CA Value for Years -2 through 0 (CA as % of GDP)	7.03%	5.49%	5.78
Average CA Value for Years 1 through 3 (CA as % of GDP)	-4.73%	-3.71%	9.20
Difference Between CA Averages for Years -2 through 0 and 1 through 3 (percentage points)	-11.76	-9.26	9.71
GDP Data			
GDP Average Annual Change Years -2 through 0 (% Change)	2.50%	2.06%	0.0449
GDP Average Annual Change Years 1 through 3 (% Change)	1.46%	1.89%	0.0373
Difference in GDP Average Annual Change between Years -2 through 0 and 1 through 3 (percentage point)	-1.17	-0.43	0.0430
REER Data			
REER Average Annual Change Years -2 through 0	1.10%	-0.17%	0.0573
REER Average Annual Change Years 1 through 3	-1.36%	0.75%	0.0827
Difference in REER Average Annual Change between Years -2 through 0 and 1 through 3	-2.71	-0.74%	0.0930

* Units in percentage point.

Table 8: Income Growth and Exchange Rate Movements During Surplus Reversal *Data Set: All Countries*

	Income Growth	Real Effective Exchange Rate Appreciation/Depreciation
Lagged Dependent Variable	0.103 (0.01)***	0.057 (0.193)**
β_{-2}	-0.028 (0.010)**	-0.041 (0.040)
β_{-1}	0.019 (0.010)	-0.013 (0.40)
β_0	0.01 (0.010)	0.018 (0.039)
β_1	0.013 (0.010)	-0.011 (0.039)
β_2	0.005 (0.010)	-0.010 (0.039)
β_3	-0.001 (0.010)	-0.002 (0.039)
Constant	-0.092 (0.178)	-0.000 (0.001)
R-squared	0.069	0.061
NOB	6178	2674

Standard error in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 9: Income Growth and Exchange Rate Movements During Surplus Reversal *Data Set: OECD Countries Only*

	Income Growth	Real Effective Exchange Rate Appreciation/Depreciation
Lagged Dependent Variable	0.362 (0.028)***	0.117 (0.032)***
β_{-2}	-0.012 (0.011)	-0.012 (0.028)
β_{-1}	0.022 (0.011)**	0.004 (0.028)
β_0	0.010 (0.011)	-0.016 (0.028)
β_1	0.012 (0.011)	-0.006 (0.028)
β_2	0.008 (0.011)	-0.005 (0.028)
β_3	-0.003 (0.11)	-0.006 (0.028)
Constant	0.627 (0.164)***	0.000 (0.000)
R-squared	0.186	0.044
NOB	1269	937

Standard error in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 10: Income Growth and Exchange Rate Movements During Surplus Reversal *Data Set: Non-OECD Countries Only*

	Income Growth	Real Effective Exchange Rate Appreciation/Depreciation
Lagged Dependent Variable	0.093 (0.014)***	0.054 (0.024)*
β_{-2}	-0.031 (0.012)*	-0.053 (0.057)
β_{-1}	0.018 (0.122)	-0.019 (0.056)
β_0	0.007 (0.121)	0.027 (0.551)
β_1	0.013 (0.012)	-0.014 (0.054)
β_2	0.004 (0.012)	-0.013 (0.054)
β_3	-0.001 (0.011)	-0.002 (0.054)
Constant	-0.322 (0.219)	0.917 (1.46)
R-squared	0.068	0.062
NOB	4909	1737

Standard error in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 11: Income Growth and Exchange Rate Movements During Surplus Reversal *Data Set: OPEC Countries Only*

	Income Growth	Real Effective Exchange Rate Appreciation/Depreciation
Lagged Dependent Variable	-0.064 (0.056)	0.152 (0.079)
β_{-2}	-0.032 (0.049)	0.016 (0.129)
β_{-1}	0.045 (0.049)	-0.102 (0.129)
β_0	-0.066 (0.049)	0.002 (0.112)
β_1	0.121 (0.049)**	0.014 (0.112)
β_2	0.043 (0.045)	0.153 (0.111)
β_3	0.052 (0.049)	-0.031 (0.112)
Constant	-1.026 (1.087)	-3.162 (3.966)
R-squared	0.045	0.061
NOB	342	172

Standard error in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 12: Income Growth and Exchange Rate Movements During Surplus Reversal *Data Set: Non-OPEC Countries Only*

	Income Growth	Real Effective Exchange Rate Appreciation/Depreciation
Lagged Dependent Variable	0.121 (0.123)***	0.051 (0.019)*
β_{-2}	-0.027 (0.103)**	-0.047 (0.042)
β_{-1}	0.018 (0.010)	-0.002 (0.042)
β_0	0.015 (0.010)	0.023 (0.042)
β_1	0.002 (0.010)	-0.013 (0.041)
β_2	0.004 (0.010)	-0.034 (0.041)
β_3	-0.005 (0.010)	0.001 (0.041)
Constant	-0.103 (0.181)	0.596 (0.000)
R-squared	0.079	0.063
NOB	5836	2502

Standard error in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 13: Income Growth and Exchange Rate Movements During Surplus Reversal *Data Set: Non-OECD, Non-OPEC Countries Only*

	Income Growth	Real Effective Exchange Rate Appreciation/Depreciation
Lagged Dependent Variable	0.111 (0.014)***	0.047 (0.025)
β_{-2}	-0.029 (0.013)*	-0.064 (0.062)
β_{-1}	0.016 (0.013)	-0.006 (0.062)
β_0	0.015 (0.012)	0.036 (0.062)
β_1	0.000 (0.012)	-0.018 (0.060)
β_2	0.002 (0.012)	-0.047 (0.060)
β_3	-0.006 (0.012)	0.002 (0.060)
Constant	-0.103 (0.181)	1.36 (1.559)
R-squared	0.078	0.065
NOB	4567	1565

Standard error in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 14: Robustness Check: Real Exchange Rate

Dependent Variable: Real Exchange Rate

	(1)	(2)	(3)	(4)	(5)
Lagged Dependent Variable	0.101***	0.228***	0.099***	-0.022	0.106***
	(7.93)	(8.28)	(7.02)	(-0.42)	(8.08)
β_{-2}	0.032	0.208**	0.001	0.053	0.030
	(0.22)	(3.21)	(0.00)	(0.14)	(0.19)
β_{-1}	0.304*	-0.029	0.354*	0.086	0.333*
	(2.05)	(-0.44)	(1.98)	(0.23)	(2.11)
β_0	-0.076	0.024	-0.093	0.014	-0.086
	(-0.51)	(0.36)	(-0.52)	(0.04)	(-0.54)
β_1	-0.033	-0.013	-0.038	-0.062	-0.025
	(-0.22)	(-0.20)	(-0.21)	(-0.17)	(-0.17)
β_2	-0.024	0.014	-0.031	0.014	-0.025
	(-0.16)	(0.22)	(-0.17)	(-0.04)	(-0.16)
β_3	-0.044	0.016	-0.055	-0.069	-0.039
	(-0.30)	(0.24)	(-0.30)	(-0.19)	(-0.25)
Constant	1.943	1.373	2.021	-3.328	2.276
	(0.72)	(1.41)	(0.60)	(-0.37)	(0.79)
R-squared	0.049	0.095	0.049	0.016	0.051
NOB	6333	1295	5038	381	5952

t-values in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. Column 1 shows All Countries. Column 2 shows OECD Countries Only. Column 3 shows Non-OECD Countries Only. Column 4 shows OPEC Countries Only. Column 5 shows Non-OPEC countries only.

Table 15: Unconditional Correlations, GDP

	GDP Growth 3yr/3yr	GDP Growth 3yr/lravg	Average Annual Adjustment 0 to 3	Average Annual Adjustment -2 to 3
CA/GDP at peak	0.0074 (0.9550)	0.1617 (0.2428)	-0.5313** (0.0109)	-0.4220** (0.0394)
Persistence	0.2601** (0.0447)	-0.0573 (0.6804)	0.0813 (0.7192)	-0.0813 (0.7191)
CONS/GDP growth -2 to 0	-0.1236 (0.3975)	-0.2950** (0.0492)	0.0633 (0.7796)	0.0268 (0.9057)
GOVTEXP/GDP Growth -2 to 0	0.2784* (0.0502)	-0.4361*** (0.0024)	0.0567 (0.8021)	0.0655 (0.7720)
INVT/GDP Growth -2 to 0	-0.0643 (0.6474)	0.2036 (0.1699)	-0.0710 (0.7537)	- (0.3143)
Openness AveTrade/GDP -2 to 0	-0.0767 (0.5850)	-0.2356 (0.1032)	0.0976 (0.6657)	0.1445 (0.5212)
NFA/GDP at Peak	0.0083 (0.9520)	-0.0087 (0.9513)	0.1384 (0.5391)	0.1504 (0.5041)

Significance levels are in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 16: Growth Effects

Dependent Variable: GDP Growth 1 to3 relative to GDP Growth -2 to 0 (Difference)

	(1)	(2)	(3)	(4)	(5)
Persistence	0.055**	0.049	0.044	0.095**	-0.017
	(0.27)	(0.034)	(0.034)	(0.045)	(0.005)
CA/GDP at peak		0.0008	-0.0013		
		(0.002)	(0.0027)		
CONS/GDP growth (-2 to 0)		-0.0054	-0.076		
		(0.005)	(0.005)		
GOVT/GDP growth (-2 to 0)		0.0049	0.0018		
		(0.0035)	(0.0042)		
INVT/GDP growth (-2 to 0)		-0.0009	-0.0012		
		(0.002)	(0.0024)		
TRAD/GDP average (-2 to 0)		-0.025	-0.013		
		(0.032)	(0.033)		
NFA/GDP at peak			-2.60 e-6		
			(0.000)		
Constant	0.009	0.019	0.023	-0.006	-0.007
	(0.13)	(0.037)	(0.037)	(0.018)	(0.005)
R-squared	0.07	0.15	0.12	0.12	0.08
NOB	60	49	48	35	20

Standard error in parentheses. Column 4 excludes episodes with surpluses exceeding 10 percent of GDP. Column 5 excludes countries with deficits exceeding 6 percent of GDP. ** Significant at the 5 percent level.

Table 17: Growth Effects

Dependent Variable: GDP Growth 1 to3 relative to GDP Growth -2 to 0 (Difference)

	(1)	(2)	(3)	(4)	(5)
GOVT/GDP growth (-2 to 0)	0.006** (0.003)	0.0049 (0.0035)	0.0018 (0.0042)	0.0148 (0.0077)	0.001 (0.0019)
CA/GDP at peak		0.0008 (0.0021)	-0.0013 (0.0027)		
Persistence		0.048 (0.0339)	0.0440 (0.0343)		
CONS/GDP growth (-2 to 0)		-0.0054 (0.0047)	-0.0076 (0.005)		
INVT/GDP growth (-2 to 0)		-0.0009 (0.0023)	-0.0012 (0.0024)		
TRAD/GDP average (-2 to 0)		-0.0248 (0.0319)	-0.0133 (0.033)		
NFA/GDP at peak			-2.60 e-6 (0.000)		
Constant	0.018 (0.14)	0.019 (0.037)	0.023 (0.037)	0.045 (0.024)	-0.0038 (0.0056)
R-squared	0.08	0.15	0.12	0.12	0.018
NOB	50	49	48	29	17

Standard error in parentheses. Column 4 excludes countries with surpluses exceeding 10 percent of GDP. Column 5 excludes countries with deficits exceeding 6 percent of GDP. ** Significant at the 5 percent level.

Table 18: Growth Effects

Dependent Variable: GDP Growth 1 to 3 relative to long-term average (Difference)

	(1)	(2)	(3)	(4)	(5)	(6)
CONS/GDP growth (-2 to 0)	-0.0025** (0.0012)	-0.0029** (0.0012)	-0.0030*** (0.0012)	0.0023 (0.0019)	-0.0030* (0.0016)	-0.0038*** (0.0015)
CA/GDP at peak		0.0001 (0.0007)	-8.68 e-6 (0.0068)			-0.0009 (0.0011)
Persistence		-0.0065 (0.0084)	-0.0074 (0.0085)			-0.0142 (0.0125)
GOVT/GDP growth (-2 to 0)		-0.0032*** (0.0010)	-0.0033*** (0.0010)			-0.0034** (0.0015)
INVT/GDP growth (-2 to 0)		-0.0000 (0.0059)	-0.0000 (0.0006)			0.0001 (0.0007)
TRAD/GDP average (-2 to 0)		-0.0083 (0.0081)	-0.0076 (0.0081)			-0.0092 (0.0131)
NFA/GDP at peak			-5.48 e-6 (6.46 e-6)			-0.0001 (0.0001)
Constant	0.0016 (0.0037)	0.0048 (0.0088)	0.0050 (0.0089)	0.0065 (0.0040)	0.0035 (0.0058)	0.0259 (0.0174)
R-squared	0.087	0.3512	0.3636	0.0518	0.1207	0.5111
NOB	45	45	45	29	28	28

Standard error in parenthesis. Column 4 excludes countries with a peak surplus value of more than 10% of GDP. Columns 5 and 6 excludes countries is a peak surplus value of less than 6% of GDP. *** Significant at the 1% level. ** Significant at the 5% level. *Significant at the 10% level.

Table 19: Growth Effects

Dependent Variable: GDP Growth 0 to 3 relative to long-term average (Difference)

	(1)	(2)	(3)	(4)	(5)	(6)
GOVT/GDP growth (-2 to 0)	-0.0032*** (0.0009)	-0.0032*** (0.0010)	-0.0033*** (0.0010)	-0.0022 (0.0015)	-0.0038*** (0.0012)	-0.0034** (0.0015)
CA/GDP at peak		0.0001 (0.0007)	-8.68 e-6 (0.007)			-0.009 (0.0011)
Persistence		-0.0065 (0.0008)	-0.0073 (0.0085)			-0.0142 (0.0125)
CONS/GDP growth (-2 to 0)		-0.0028 (0.0012)	-0.0030** (0.0012)			-0.0038** (0.0015)
INVT/GDP growth (-2 to 0)		-0.0000 (0.0006)	-0.0000 (0.0006)			0.0001 (0.0007)
TRAD/GDP average (-2 to 0)		-0.0083 (0.0081)	-0.0076 (0.0081)			-0.009 (0.0001)
NFA/GDP at peak			-5.38 e-6 (6.46 e-6)			-0.0001 (0.0001)
Constant	-0.0035 (0.0028)	0.0048 (0.0088)	0.0059 (0.0089)	0.0016 (0.0045)	-0.0043 (0.0055)	0.0259 (0.0174)
R-squared	0.1902	0.3512	0.3636	0.0766	0.2529	0.5111
NOB	46	45	45	29	29	28

Standard error in parenthesis. Column 4 excludes countries with a peak surplus value of more than 10% of GDP. Column 5 excludes countries is a peak surplus value of less than 6% of GDP. *** Significant at the 1% level. ** Significant at the 5% level. *Significant at the 10% level.

Table 20: Exchange Rate Effects

Dependent Variable: Average Annual Real Effective Exchange Rate Adjustment, Year 1 to 3

	(1)	(2)	(3)	(4)	(5)	(6)
CA/GDP at peak	-0.0027** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	0.0021 (0.002)	-0.005*** (0.002)	-0.006*** (0.003)
Persistence		0.005 (0.008)	0.006 (0.009)			0.008 (0.22)
CONS/GDP growth (-2 to 0)		-0.000 (0.002)	-0.001 (0.002)			0.001 (0.004)
GOVT/GDP growth (-2 to 0)		0.0019 (0.001)	0.002 (0.001)			0.002 (0.004)
INVT/GDP growth (-2 to 0)		-0.002 (0.0013)	-0.002 (0.0013)			-0.002 (0.003)
TRAD/GDP average (-2 to 0)		0.011 (0.009)	0.012 (0.009)			0.008 (0.029)
NFA/GDP at peak			0.000 (0.00)			0.000 (0.00)
Constant	0.018** (0.008)	0.017 (0.011)	0.015 (0.012)	-0.01 (0.01)	0.05** (0.018)	0.039 (0.071)
R-squared	0.28	0.49	0.51	0.09	0.582	0.85
NOB	22	22	22	17	10	10

Standard error in parenthesis. Column 4 excludes episodes with current account surplus peak of more than 10 percent of GDP. Columns 5 and 6 exclude episodes with a current account surplus of less than 6 percent of GDP. **Significant at the 5% level. *Significant at the 10% level.

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