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As the Current Account Turns: Disaggregating the Effects of Current Account Reversals in Industrial Countries

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Abstract: This paper extends the study of current account reversals by considering the implications for the composition of output and employment. It is shown that decreases in current account deficits imply increases in tradable relative to nontradable output and/or declines in investment. The impact of current account "rebalancing" should therefore be expected to vary considerably across sectors of an economy. This inter-sectoral variation is studied by examining the dynamics of output, employment and prices using data for 55 sectors of the economy during 14 industrial country reversal episodes. The output and employment declines associated with current account reversals are most clearly evident in investment-related sectors, while sectors related to primary commodities generally perform relatively well following reversals. Reversals are also followed by increases in relative inflation for tradable goods sectors.

JEL Classification: F3, F4

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1. Introduction

In the years preceding the global financial crisis and recession, the buildup of large current account deficits in several industrial countries including Spain, the UK and the US generated considerable interest in the effects of current account reversals. In addition to their aggregate level implications, these episodes may entail a significant reallocation of resources within economies. This possibility was noted by *The Economist* (2006), which said: "America's deficit is unlikely to close without its industrial structure changing substantially." The issue was also raised in a speech by US Federal Reserve Board Chairman Ben Bernanke (2007):

> [T]he large US current account deficit cannot persist indefinitely because the ability of the United States to make debt service payments and the willingness of foreigners to hold US assets in their portfolios are both limited. Adjustment must eventually take place, and the process of adjustment will have both real and financial consequences. For example, in the United States, the growth of export-oriented sectors such as manufacturing has been restrained by the shifts in relative prices and foreign demand associated with the US trade deficit. Ultimately the necessary reduction in the trade and current account deficits will entail shifting resources out of sectors producing nontraded goods and services to those producing tradables. The greater the needed adjustment, the more potentially disruptive and costly these shifts may be.

However, most research on the topic has not given serious consideration to changes in the sectoral allocation of resources that occurs during reversals.[1] This study fills a gap in the literature by applying the event study approach that has been used elsewhere to examine current account reversals at an economy-wide level[2] to the behavior of sectoral-level output, employment and relative prices. The sectors that are most sensitive to

[1] A recent exception is Dekle, Eaton and Kortum (2008) who examine a global rebalancing scenario in a 42-country model. They find that countries with large current account deficits would experience a large shift of labor into tradable production.
[2] E.g., Milesi-Ferretti and Razin (2000) and Freund (2005).

current account reversals are identified using data on value added, employment and price deflators for 55 sectors during 14 reversals in OECD countries.

While current account reversals are associated with reduced output growth and increased unemployment, the dynamics are shown to vary considerably across sectors. In particular, investment-related sectors – both capital goods and housing-related – tend to suffer the biggest setbacks during reversals in terms of output and employment. This suggests that slowdowns in investment are as important a part of the adjustment process as shifts from non-tradable to tradable goods. On the other hand, primary commodities sectors are shown to be more likely to perform relatively well in terms of output and employment growth during reversals. These findings appear to be consistent with the experience of several countries that have seen declines in their current account deficits during the recent global downturn.

Furthermore, while current account reversals are associated with overall disinflation, there is a divergence between tradables and non-tradables sectors, with tradables sectors tending to see increasing relative prices following reversals. This is consistent with the argument made by Bernanke, as well as the results of theoretical models such as Obstfeld and Rogoff (2005).

2. Literature and Background

Several recent papers have examined the behavior of aggregate economic variables during current account reversals in industrial countries. Edwards (2005) and Freund (2005) find that, for industrial countries, current account reversals tend to be followed by slowdowns in output growth. Freund (2005) also finds that decreases in the investment to

GDP ratio and increases in exports contribute to the reversals. Freund and Warnock (2007) examine the effects of size and persistence of current account deficits. They find that larger initial deficits are associated with slower growth following the reversal, but the persistence of the deficit does not systematically affect the degree of growth slowdown. Although growth slows following a reversal on average, this is not true in all cases. Croke et al. (2006) compare episodes with increasing and decreasing output growth and find little support for the view that current account reversals generate a "disorderly adjustment," even in the episodes with decreasing output growth. Although these studies shed considerable light on the behavior of the economy in aggregate during a reversal, they do not examine the compositional effects.

Bernard and Jensen's (2004) examination of the export boom that occurred as the US current account deficit declined in the late 1980's provides some evidence at a disaggregated level, but is limited to manufacturing in one episode. They find that export growth was widespread across manufacturing, and, using plant-level data, that increased exports by already-exporting firms accounted for a larger part of export growth than newly-exporting firms. Another discussion of this episode is Yi (2006) who notes that the industry composition of exports and the geographic breakdown of exports were little changed by the boom.

Many of the studies of current account reversals also examine the role played by exchange rate movements. Edwards (2005) and Freund (2005) both find that real exchange rate depreciations tend to occur after the peak in the current account deficit. Obstfeld and Rogoff (2005) use a calibrated model to examine the changes in relative prices – exchange rates, terms of trade, and the price of traded relative to nontraded

goods – necessary to rebalance the current account under different scenarios. As they note, but do not explicitly model, movement of resources across sectors allows some adjustment to occur through changes in quantities rather than prices. This is considered empirically by Freund and Warnock (2007), who find that the mix of output and price adjustment depends on whether the deficits are driven by consumption or by investment. Consumption-driven deficits generate larger depreciations, with slower output growth before the reversal than after; investment-driven episodes see smaller depreciations and larger slowdowns from initially higher output growth rates. Croke et al. (2006) found that larger real exchange rate depreciations were associated with reversal episodes where output growth increased.

A number of studies have examined the effects of exchange rate movements at the sectoral level. Revenga (1992) found that the appreciation of the dollar in the early 1980s, which coincided with a widening current account deficit, substantially reduced employment in US manufacturing industries. However, in a broader sample of US manufacturing data, Campa and Goldberg (2001) found stronger wage effects from exchange rate movements, but weaker links to employment changes. Burgess and Knetter (1998) use data from selected industries for G-7 countries to examine the response of employment to exchange rate movements. They find considerable heterogeneity across countries and sectors. Sectoral data has also been used to examine the impact of real exchange rate movements on gross job flows by Gourinchas (1998) and Klein et al. (2003) for the US and Gourinchas (1999) for France. Baily and Lawrence (2004) link weak overall US job growth and manufacturing decline to the strong dollar over the period 2000-2003, which also saw a widening current account deficit.

Despite the fact that some research has considered sectoral effects of exchange rate movements, most of the research looking specifically at current account reversals has focused on the likelihood of reversals and on the dynamics of aggregate variables such as GDP. In addition to breaking down the dynamics to a sectoral level, this study also examines the behavior of employment, which has received little attention in previous literature, as well as relative prices. The examination of sectoral data provides some indication of the changes in the composition of output and employment that occur during reversals that are obscured by the focus on aggregate data in previous studies.

3. Theoretical Motivation

The current account, *CA*, is the difference between a country's income, which is the sum of output, *Y*, and net income on foreign assets, *rA*, where *A* is the level of net assets (which can be negative) and *r* is the rate of return, and its consumption, *C*, and investment, *I*, which are both defined here as inclusive of the government sector. That is,

$$CA = rA + Y - C - I$$

which can also be written as

$$CA = rA + NX$$

where *NX* is net exports. For a given level of *C* and *I*, the current account can change due to a change in the composition of output. For simplicity, assume that *C* and *I*, are composites of the same form, where total domestic demand is given by $D = C+I$. Letting D_T and D_N represent tradable and nontradable goods, respectively,

$$D = \left[\alpha^{\frac{1}{\sigma}} D_T^{\frac{\sigma-1}{\sigma}} + (1-\alpha)^{\frac{1}{\sigma}} D_N^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}$$

where α is the weight on tradables and σ is the elasticity of substitution between tradables and nontradables. Tradable goods consumption is an aggregate of domestic (D) and imported (M) goods consumption

$$D_T = \left[\omega^{\frac{1}{\theta}} D_D^{\frac{\theta-1}{\theta}} + (1-\omega)^{\frac{1}{\theta}} D_M^{\frac{\theta-1}{\theta}} \right]^{\frac{\theta}{\theta-1}},$$

where ω is the weight on domestic goods and θ is the elasticity of substitution between domestic and imported tradables. Letting nontraded goods be the numeraire, the terms of trade would be given by

$$Q = \frac{P_D}{P_M}.$$

Using carets to denote percentage changes, changes in the terms of trade affect the demand for domestic relative to imported goods

$$\hat{D}_D - \hat{D}_M = -\theta \hat{Q}$$

as well as the demand for nontradable relative to tradable goods

$$\hat{D}_N - \hat{D}_T = \sigma\omega\hat{Q} + \sigma\hat{P}_M.$$

The market clearing condition for nontradable output is given by

$$Y_N = D_N$$

and for tradable goods,

$$Y_T = D_D + X$$

where X is exports. Assume that exports are a decreasing function of the terms of trade, and an increasing function of foreign demand, F,

$$X = Q^{-\varepsilon} F$$

where ε is the elasticity of foreign demand.

The change in nontradables relative to tradables output is

$$\hat{Y}_N - \hat{Y}_T = \hat{D}_N - \phi\hat{D}_N - (1-\phi)\hat{X}$$

where ϕ is the ratio of domestic to total (domestic plus export) demand. This depends on the terms of trade, the price of imports relative to nontraded goods, P_M, domestic and foreign demand as follows:

$$\hat{Y}_N - \hat{Y}_T = \left[(1-\omega)\phi\theta + \omega\sigma\psi + (1-\phi)\varepsilon\right]\hat{Q} + \sigma\psi\hat{P}_M + (1-\phi)\hat{D} - (1-\phi)\hat{F}$$

where $\psi = \alpha - \phi\alpha + \phi$. This suggests that nontradables sectors should grow relative to tradables sectors due to improvements in the terms of trade, the relative price of imports and domestic demand, while an increase in foreign demand would increase the share of tradable goods in output.

An adjustment in nontradable relative to tradable output is consistent with the quotations in the introduction of this paper. However, it is important to note that national income accounting identities suggest another channel of adjustment through investment. The current account can also be expressed as the difference between net saving and investment

$$CA = NS - I$$

where $NS = Y + rA - C$. This highlights the fact that an increase in the current account balance could occur due to a decrease in investment as a share of output. Under the simplifying assumptions of no depreciation and population growth, Obstfeld and Rogoff (1995) show that the equilibrium share of investment is given in a dynamic model by

$$\frac{I}{Y} = \frac{\alpha g}{r}$$

where α is the capital share, g is the rate of labor-augmenting technological progress and r is the real interest rate.

A decrease in the long run productivity growth rate, g, would reduce desired investment and, ceteris paribus, increase the current account. Similarly, a decrease in investment due to an increase in r would increase the current account balance.

Although it is beyond the scope of this paper to identify the shocks generating current account dynamics, this suggests that current account reversals may be apparent not only in changes in the size of tradable relative to nontradable sectors, but also in the share of output that is investment-related. The importance of this channel is evident in the results described below, where many of the sectors which are shown to have the most severe declines in output and employment following current account reversals are investment-related.

4. Analysis

Reversal episodes are identified using similar criteria to Freund (2005) and Freund and Warnock (2007). Four criteria are used to identify reversal episodes that begin with the current account in significant deficit (criteria #1), and are followed by substantial (#2 and #3) and sustained (#4) decreases in the deficit:

1. The deficit must initially exceed 2% of GDP
2. The decline in the deficit must be > 2 percentage points of GDP
3. The deficit must have fallen by at least 1/3 three years after the reversal
4. The deficit must not go back above the peak level in the 4 years after the reversal.

The sectoral data used in this study are from the 60-Industry Database compiled by the Groningen Growth and Development Centre (GGDC). This dataset begins in 1979 and includes employment, real value added and price deflators for 56 sectors[3] in 27 high-income countries. For most of the series used, the data continues through 2003. Since the analysis uses growth rates for the two years prior to the reversals, only reversals from 1982 onward are included in the sample. Table 1 lists the 14 reversal episodes examined, by country and the year in which the current account deficit peaked as a share of GDP. These are a subset of the episodes studied by Freund and Warnock (2007), with the addition of Portugal (2000).[4]

Slowdowns in aggregate output growth occurred in 11 of the 14 episodes with the median growth rate of total value added decreasing from 3.25% in the two years before to 1.11% in the two years following the peak. The median growth rate of employment is 1.81% in the two years before the reversal and becomes negative at -0.51% in the two years after, with employment growth slowdowns occurring in all but two of the episodes. Figure 1 plots the median growth rates of output, employment and the price level. It shows the growth rate of value added declines to a low point two years after the reversal. Employment growth exhibits a similar dynamic, beginning a decline in the reversal year and also reaching a nadir in the second year after a reversal.

In this sample, reversals tend to be disinflationary, with the median inflation rate falling from 5.43% in the two years before the reversal year to 3.00% in the two years following. The solid line in figure 1 shows that the disinflation largely occurs in the year

[3] Data for sector 56, "private households with employed persons," are not available for several countries, so it is not used.
[4] The 1985 and 1990 reversal episodes for Greece are not included because of incompleteness of the sectoral data.

of the reversal. Compared to output and employment, the pattern for inflation is somewhat less consistent across episodes, with disinflation occurring in 9 of 14 cases. The dynamics are slightly different from those found by other studies: Croke et al. (2006) found inflation peaking in the year after a reversal before declining and Edwards (2005) found inflation rising to a peak in the year before a reversal, before declining to a low point in the second year after.[5] The discrepancies may be attributable to differences in the samples – both of those papers include episodes from time periods before this study begins, with Croke et al. examining 23 episodes from 1980-1999 and Edwards' sample including 34 cases for industrial countries from 1970-2001.

Regressions similar to those of Freund (2005) provide econometric evidence on how the dynamics of current account reversals vary at the sectoral level. Dummy variables for the years before, during and after reversal episodes show how the behavior of sectoral output, employment and prices change during current account reversals. Because inflation reflects monetary policy regimes that have evolved considerably over time, relative inflation – i.e., growth in the sectoral deflator less growth in the aggregate deflator – is used to analyze sectoral prices.

The empirical model has the form

$$\Delta y_{i,j,t} = \alpha_i \Delta y_{i,j,t-1} + \sum_{s=-3}^{3} \beta_{i,R+s} d_{j,R+s} + \gamma_{i,j} + \mu_t + \varepsilon_{i,j,t}$$

where Δy is the percentage growth rate of the dependent variable – real value added, employment and the relative price deflator, respectively – indexed by sector (i), country (j), and year (t), where d denotes dummy variables equal to one for the reversal year (R)

[5] Edwards examines several categories of countries and reversals; this refers to his "reversal 2 percent" for "industrial" countries, which is the most similar to the sample used in this study.

and each of the three years before and after, γ is a fixed effect for each sector-country pair and μ is a calendar year dummy which captures global effects. The β coefficients differ across sectors; the regressions are run separately for each sector with data pooled across countries and time periods. As in Freund (2005), a lagged dependent variable is included and, in many cases, the coefficient on it is statistically significant.[6]

Table 2 reports the number and sign of regression coefficients on the dummy variables (i.e., β_{R-3}, β_{R-2} …β_{R+3}) that are statistically significant at the 10% level for each of the three dependent variables, where the significance is calculated using heteroskedasticity-robust standard errors.

These results illustrate how the dynamics are not even across the economy or over time. Output and employment fall across numerous sectors in the two years following a reversal. For value added and employment, of the 55 sectors examined, only a small number have significant coefficients in the three years leading up to the reversal. The largest number of statistically significant coefficients occur in the two years after the reversal. In the first year after the reversal, 13 sectors have negative coefficients on value added that are significant at a greater than 10% level, and, in the second year after, 15 have significant negative coefficients (8 are significant and negative in both). More sectors have statistically significant coefficients on employment than output; the employment regressions for 20 sectors have significant negative coefficients in the year after the reversal, and 29 have significant negative coefficients two years after (16 are

[6] Because the specification includes both fixed effects and a lagged dependent variable, this can lead to biased coefficients (Nickell (1981)). A common strategy to address this is the GMM method proposed by Arellano and Bond (1991). However, Judson and Owen (1999) show that the bias on the β-coefficients decreases as T approaches 30 and is increasing in α. Since the α coefficients are small in this case the bias would therefore be negligible.

significant in both). Thus, there are sectors that show no statistically significant decline in output that still have a statistically significant drop in employment. Although previous studies of current account reversals have not emphasized the role of employment, this suggests that employment is more sensitive to current account reversals than output.

Table 3 reports the 10 sectors with the largest decreases in the median value added growth rates from the two years before the reversal to the two years after. The regression coefficients for the dummy variables for the five years surrounding the reversal are also reported, as well as p-values from an F-test testing the joint significance that all seven year-dummy variables are zero. In most cases, the large declines in growth rates are also confirmed by statistically significant negative coefficients on the dummy variables for the reversal year or one or more of the years following it.

The biggest slowdown occurs in shipbuilding, which has a median growth rate of 6.5% in the two years before a reversal, and -7.2% in the two years after. Construction also falls sharply; from a growth rate of 4.9% before to -2.5% after. Many of the other sectors that see sharp slowdowns either produce capital goods, such as aircraft, or are otherwise complementary to investment, like mechanical engineering. This is consistent with an overall slowdown in investment occurring during reversals, which is one of the channels of adjustment discussed above in section 3.

The largest slowdowns in employment growth, reported in table 4, also include several investment-related sectors. Of the ten sectors in which employment declines the most, all have statistically significant negative regression coefficients in the second year after the reversal. The relationship between the current account and housing markets

found by Aizenman and Jinjarak (2009) is evidenced by the fact that construction and real estate activities are among the sectors experiencing the sharpest employment growth slowdowns. This finding also appears consistent with the housing cycles that have occurred in some of the countries that had large current account deficits going into the worldwide recession.

Tables 5 and 6 report results for the sectors experiencing the largest increases (or smallest decreases) in value added and employment growth rates, respectively. Given the relationship between current account reversals and overall growth, it is not surprising that only 11 of 55 sectors experience accelerations in value added growth and only 4 have increases in employment growth for the two years following a reversal relative to the two years before. In the two years following the reversal, there are no sectors with statistically significant positive coefficients on value added or employment growth.

Although there are only a few sectors actually benefiting from a reversal, some sectors suffer much more than others. Tradable commodity producing sectors are clearly over-represented on the lists of sectors that either benefit or suffer relatively less from current account reversals. For example, both the forestry and mineral oil refining, coke and nuclear fuel sectors see increases in median output growth and employment growth also increases in refining, while forestry is among the sectors with the lowest employment slowdowns.

To further consider the relationship between the impact of reversals on a sector and its degree of exposure to trade, data from the OECD STAN database is used because the GGDC database does not include data on sectoral exports and imports. The two datasets match up imperfectly: the GGDC data is more highly disaggregated and, for most

countries, STAN only reports trade data for manufacturing sectors. For those sectors with data available, trade exposure was calculated as the average of imports and exports as a share of output in the current account reversal year.

The sectors which suffer most significantly include some that are highly exposed to trade such as aircraft, which has a trade exposure of 88.4%, and shipbuilding (51.4%). However, there are other sectors that see large slowdowns, such as printing and publishing (7.6%) with low exposure and some, such as construction, for which trade data were not reported, but are presumably almost entirely nontradable.

The sectors which see accelerations in value added growth following a reversal are primarily tradable, though the degree of exposure to trade varies. Some of the sectors are highly exposed to trade, such as textiles (48.4%), basic metals (46.5%) and telecommunication equipment (55.9%).[7] Other sectors are less exposed: refining, coke and nuclear fuel has a 24.9% trade share and fishing has a 17.9% share (based on available data which covers 13 and 6 countries, respectively).

Tables 7 and 8 report the sectors experiencing the largest increases and decreases in relative inflation. Nearly all the sectors with large relative price increases are tradable goods. Many of them have high degree of trade exposure, including chemicals (44.0%), mining and quarrying (97.0%) as well as the previously mentioned basic metals and aircraft and spacecraft sectors. The sectors with decreases in relative inflation are, for the most part, nonmanufacturing sectors that are likely less trade exposed[8].

[7] The sector with the largest acceleration in output growth, electronic valves and tubes, is a subcategory of telecommunication equipment, not reported separately in the STAN data.

[8] With the notable exception of office machinery, which has an average trade share of 191.0%, reflecting the fact that some countries import far more office machinery than

Relative prices increase for some material input sectors that also see accelerations in value added growth, such as basic metals and pulp, paper and paper products. The combined output and relative price effects indicate that one common aspect of the adjustment dynamic is an increase in exports of tradable commodity-type products, whose relative prices are affected by exchange rate declines. For these sectors, current account reversals have a similar effect to positive demand shocks.

Some of the tradable capital goods sectors, which see large output declines, also have increases in relative prices – that is, the output and price dynamics during reversals are similar to negative supply shocks. Among these sectors are aircraft, shipbuilding and mechanical engineering.

The interaction between inflation and output dynamics is underscored by the fact that, in the two years following reversals, many of the sectors which have statistically significant coefficients on relative inflation also have significant coefficients on employment[9]. Of the twelve sectors with significant positive coefficients on relative inflation, nine have significant negative coefficients on employment. Most of these sectors are tradable sectors, such as basic metals, other electrical machinery, pulp and paper and textiles, but there are also a couple of service sectors, inland transport and wholesale trade, in this group.

All five of the sectors with significant negative coefficients on relative inflation in the two years following reversals also have significant negative coefficients on employment.

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they produce. The STAN data includes agriculture, hunting and forestry and fishing for 8 of the 14 countries in the sample; the average trade exposure is 12.4%. Wood and products of wood and cork has a trade exposure of 21.0%, and textiles has a trade exposure of 48.4%.

[9] A smaller number have significant coefficients on output; nearly all of the sectors with significant output coefficients also have significant employment coefficients.

These are construction, financial intermediation, legal technical and advertising, insulated wire and non-metallic mineral products. The first three are service sectors, while the last two are tradable, though non-metallic metal products has a relatively low trade exposure (15.2%)[10]. In these sectors, current account reversals are equivalent to negative demand shocks.

Median output, employment and relative price growth during reversal episodes are illustrated in figure 2 for four sectors. These four examples illustrate how the patterns of adjustment vary considerably across sectors. The construction sector matches closely the aggregate pattern with both output and employment growth declining to low points two years after the reversal and then recovering. For mechanical engineering and shipbuilding, output recovers more quickly than employment, which is consistent with the results in table 2, where there were many more sectors still suffering employment declines two and three years after the reversal compared to output contractions. The dynamics of the basic metals sector is an example of how, in the wake of reversals, many primary commodity sectors do relatively well in terms of output growth and also see higher relative inflation.

5. Robustness

The robustness of the findings was examined along several dimensions, including changes to the regression specification and changing the sample by dropping selected episodes.

[10] The trade exposure of insulated wire could not be calculated because is not reported separately in the STAN data. It is a subsector of electrical machinery and apparatus, which has a trade exposure of 43.4%.

The main findings are similar under several different variations of the regression specification. Table 9 reports results from regressions run on pooled data without the fixed effects and calendar year dummies, with the fixed effects alone and the calendar year dummies alone. Comparison across specifications indicates that the results, in terms of the number, sign and timing of significant coefficients on the reversal dummies are changed only slightly by the inclusion of fixed effects and calendar year dummies.

In addition to considering changes to the specification, the effects of excluding the episode involving the largest country (US, 1987) and the most severe episode (Korea, 1996) were also examined. Although the US is arguably unique because of its economic size as well as the widespread use of the dollar as an invoicing currency, and Korea's episode was much more severe than the others,[11] the results reported in table 10 indicate that the findings are similar when these episodes are excluded from the sample. For the most part, the number of sectors with significant coefficients changed little when these episodes were dropped separately, and the pattern of a large number of significant negative coefficients on output and employment and slightly more positive than negative coefficients on relative inflation in the two years following the reversal was maintained. The largest difference occurred when Korea's episode was removed – the number of sectors with significant negative coefficients on output and employment in the two years after the reversal fell and the number of sectors with significant positive coefficients on employment in the year before the reversal increased.

[11] During the sample period, Korea arguably graduated from "developing" to "industrialized" country status. It is included in the sample because it joined the OECD in 1996.

Omitting these two episodes also has only modest effects on the composition of the sectors with the largest changes in growth rates of output, employment and relative prices reported in tables 3-8.[12] For all cases – that is, for the largest increases and decreases for all three variables, separately dropping both episodes – at least 7 of the 10 sectors with the largest changes remain on the list, with one exception: 6 of 10 sectors with largest decreases in employment growth are the same when Korea is omitted. Moreover, counting the number of sectors that remain the top 10 in each category may give an exaggerated impression of change because many of the sectors that move out of the top 10 when one of the episodes is dropped move only a modest amount to the top 11-15 and vice versa.

6. Conclusion

In general, this paper finds evidence of declining output after a current account reversal, as in Edwards (2005) and Freund (2005), as well as even more striking declines in employment. Thus the concern regarding structural adjustment that has been expressed by some economists is well-justified. However, the impacts across sectors are very uneven, both in respect to the sizes of adjustment as well as the time to adjust. While several investment-related sectors, such as construction, mechanical engineering and shipbuilding suffer significant contractions, other sectors, particularly those related to tradable commodities, either benefit or suffer much less.

Overall, the output dynamics appear to be driven as much by investment declines as by shifts between tradable and nontradable sectors. The divergence between tradables

[12] For brevity, complete tables of the results excluding the US (1987) and Korea (1996) episodes are not included here, but are available from the authors upon request.

and nontradables is more clear in the price dynamics, which are consistent with real exchange rate depreciations accompanying reversals.

Although the primary data source used confines this study to reversals in the 1982-2001 period, the findings are confirmed by the experience in several economies that have witnessed current account reversals in the period surrounding the recent global financial crisis. The US current account deficit peaked in 2006, while those of Australia and Spain peaked in 2007[13]. Table 11 reports average annual growth of total employment and employment in four broad categories (Agriculture, Construction, Industry and Services) for the two years before and two years after the reversals, calculated using data from the OECD Main Economic Indicators. These episodes are very heterogeneous in their aggregate dynamics – employment growth slowed down, but remained positive in Australia, while in Spain it became sharply negative, and in the US, moderately negative. Consistent with the findings above, the category of employment related to primary commodities (agriculture) employment did best, while the investment-related category (construction) fared worst in all three cases.

Much of the previous literature on current account reversals draws inferences regarding the costs of current account reversals. For example, Obstfeld and Rogoff (2005) suggested that elimination of the US current account imbalance would entail a 33% real decline of the US Dollar. Our results suggest that the impact of adjustment is much more severe in some sectors of the economy than in others. Clearly any policies

[13] As of this writing, data for 2011 were not available, so it could not be confirmed whether the Australian and Spanish episodes meet the fourth criterion used above to identify reversals.

devised to soften such an impact need to account for the unevenness of the effects of reversals across sectors.

Appendix: Data Sources

Aggregate Current account and GDP (Table 1): International Financial Statistics (IFS), from International Monetary Fund.

Value added, employment and price deflators: Groningen Growth and Development Centre, 60-Industry Database (http://www.ggdc.net), series VA-K (value added volume indices), Emp (persons engaged) VA-def (value added deflator growth rates); for shares (Fig. 2), series VA (value added).

Trade exposure: Output, Exports and Imports from OECD STAN database.

Employment by category (Table 11): OECD Main Economic Indicators

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Table 1. Current Account Reversal Episodes

	Current Account as % of GDP (year relative to reversal)				
	R-2	R-1	R	R+1	R+2
France (1982)	-0.61	-0.80	-2.11	-0.93	-0.17
Denmark (1986)	-2.99	-4.54	-5.20	-2.80	-1.18
Norway (1986)	4.76	4.77	-5.99	-4.51	-3.95
United States (1987)	-2.97	-3.32	-3.42	-2.39	-1.83
Australia (1989)	-3.56	-4.14	-5.69	-5.00	-3.38
United Kingdom (1989)	-1.84	-4.24	-5.12	-3.92	-1.84
Spain (1991)	-2.71	-3.46	-3.53	-3.52	-1.14
Finland (1991)	-4.99	-5.04	-5.46	-4.66	-1.30
Italy (1992)	-1.45	-2.05	-2.31	0.76	1.25
Sweden (1992)	-2.62	-1.82	-3.33	-2.08	0.34
Canada (1993)	-3.79	-3.71	-3.93	-2.34	-0.74
South Korea (1996)	-0.95	-1.68	-4.16	-1.62	11.69
Austria (1999)	-2.50	-2.46	-3.12	-2.51	-1.88
Portugal (2000)	-7.08	-8.45	-10.29	-9.89	-8.05

Table 2. Number of Sectors with Statistically Significant (10%) Coefficients

Variable	Sign	Year Relative to Current Account Reversal						
		R-3	R-2	R-1	R	R+1	R+2	R+3
Output	Positive	3	3	2	1	0	0	1
	Negative	5	2	9	4	13	15	3
Employment	Positive	3	1	2	0	0	0	0
	Negative	9	4	0	2	20	29	12
Relative Inflation	Positive	3	1	6	5	5	9	6
	Negative	3	4	2	0	3	4	10

Table 3. Largest Decreases in Value Added Growth Rate

	Sector	Median Growth Rates			Regression Coefficients on Reversal Year Dummies (t statistics in parenthesis)					Joint F-test (p-val.)
		2 yrs before	2 yrs after	Chg.	R-2	R-1	R	R+1	R+2	
1	Building and repairing of ships and boats	6.53	-7.24	-13.77	20.50* (1.84)	-4.66 (0.66)	4.77 (1.24)	-7.18 (1.30)	-0.70 (0.10)	0.10*
2	Construction	4.89	-2.50	-7.39	1.86 (1.14)	0.42 (0.39)	0.29 (0.18)	-3.76*** (3.49)	-6.14*** (4.14)	0.00***
3	Aircraft and spacecraft	10.28	3.53	-6.75	1.91 (0.24)	-0.63 (0.11)	-7.72 (1.20)	-6.61 (0.78)	-2.70 (0.22)	0.97
4	Printing & publishing	4.08	-2.35	-6.43	3.70*** (2.63)	2.01 (1.09)	-0.88 (0.33)	-4.38*** (3.02)	-7.49*** (2.66)	0.00***
5	Mechanical engineering	4.40	-1.60	-6.00	0.02 (0.01)	3.13 (1.42)	-1.33 (0.47)	-3.31 (1.35)	-5.56 (1.19)	0.21
6	Scientific instruments	8.02	2.13	-5.89	-1.19 (0.31)	3.19 (0.97)	-9.10*** (2.64)	-0.98 (0.21)	-5.33 (0.94)	0.22
7	Other instruments	10.06	4.52	-5.54	2.93 (0.61)	1.42 (0.32)	-5.09 (0.86)	3.87 (0.66)	-7.93 (1.16)	0.92
8	Legal, technical and advertising	6.32	1.60	-4.72	2.49 (1.13)	0.34 (0.25)	-4.05 (1.58)	-2.74** (2.01)	-2.42 (0.88)	0.08*
9	Other electrical machinery and apparatus nec	5.55	0.85	-4.70	-2.27 (1.00)	2.23 (0.77)	-3.27 (0.96)	0.61 (0.13)	-9.75* (1.76)	0.20
10	Fabricated metal products	4.60	-0.02	-4.62	0.28 (0.15)	-0.66 (0.38)	-3.05 (1.27)	-3.07** (2.41)	-4.11 (1.08)	0.39

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4. Largest Decreases in Employment Growth Rate

	Sector	Median Growth Rates			Regression Coefficients on Reversal Year Dummies (t statistics in parenthesis)					Joint F-test (p-val.)
		2 yrs before	2 yrs after	Chg.	R-2	R-1	R	R+1	R+2	
1	Leather and footwear	-3.76	-11.89	-8.13	-4.61* (1.74)	-0.99 (0.51)	-1.91 (1.06)	-4.76 (1.58)	-10.52*** (2.63)	0.00***
2	Construction	4.03	-3.59	-7.62	0.85 (0.65)	1.36 (1.55)	0.21 (0.15)	-4.39*** (4.54)	-7.45*** (3.99)	0.00***
3	Motor vehicles	1.37	-5.39	-6.76	-1.25 (0.94)	-0.70 (0.32)	0.93 (0.55)	-2.77 (1.59)	-8.06*** (2.90)	0.01**
4	Mechanical engineering	1.20	-5.14	-6.34	-1.49 (1.35)	0.91 (0.71)	-0.44 (0.32)	-4.18*** (2.95)	-4.17* (1.67)	0.02**
5	Real estate activities	5.69	-0.65	-6.34	2.27 (1.09)	0.83 (0.49)	-3.22* (1.80)	-3.40 (1.63)	-4.45** (2.42)	0.07*
6	Renting of machinery and equipment	6.32	1.16	-5.16	-4.25 (1.55)	2.55 (0.77)	2.70 (0.42)	-6.09* (1.78)	-7.72*** (3.73)	0.01**
7	Insulated wire	-0.12	-5.12	-5.00	-0.93 (0.34)	0.62 (0.19)	-5.62 (1.08)	-4.30 (1.02)	-7.86*** (3.14)	0.35
8	Fabricated metal products	1.46	-3.44	-4.90	0.91 (0.72)	-0.70 (0.53)	-0.92 (0.76)	-2.61** (1.98)	-4.12** (2.51)	0.03**
9	Legal, technical and advertising	6.45	2.04	-4.41	-1.71 (1.17)	0.07 (0.04)	-1.03 (0.69)	-4.50*** (2.80)	-3.91* (1.70)	0.33
10	Wood & products of wood and cork	-0.27	-4.06	-3.79	-0.57 (0.31)	0.57 (0.42)	0.34 (0.23)	-5.71*** (3.12)	-4.70*** (2.72)	0.00***

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5. Largest Accelerations/Smallest Decreases in Value Added Growth Rate

	Sector	Median Growth Rates			Regression Coefficients on Reversal Year Dummies (t statistics in parenthesis)					Joint F-test (p-val.)
		2 yrs before	2 yrs after	Chg.	R-2	R-1	R	R+1	R+2	
1	Electronic valves and tubes	19.06	22.71	3.65	-11.83 (0.79)	17.20* (1.74)	13.59 (1.07)	4.85 (0.68)	-9.44 (1.12)	0.58
2	Fishing	-0.77	2.05	2.82	-5.14** (1.99)	-6.01* (1.80)	-4.79 (1.28)	1.92 (0.46)	2.45 (0.48)	0.40
3	Forestry	-0.11	2.27	2.38	-6.55* (1.90)	2.82 (0.87)	5.77 (1.42)	-0.04 (0.01)	-5.76 (1.24)	0.13
4	Computer and related activities	6.67	9.00	2.33	0.88 (0.36)	5.96 (1.37)	-1.36 (0.59)	2.08 (1.08)	-4.03 (1.14)	0.49
5	Mineral oil refining, coke & nuclear fuel	-0.73	1.39	2.12	-11.07 (1.45)	-5.34 (0.73)	22.09 (1.08)	10.99 (1.49)	-17.34 (1.49)	0.11
6	Basic metals	2.40	3.94	1.54	-0.37 (0.18)	-1.05 (0.56)	1.79 (0.72)	-0.59 (0.32)	0.42 (0.18)	0.61
7	Telecommunication equipment	7.09	7.77	0.68	8.91 (0.85)	4.25 (0.70)	-7.23 (1.39)	11.74 (0.91)	-2.35 (0.34)	0.44
8	Pulp, paper & paper products	1.68	2.35	0.67	-2.18 (1.32)	-2.69** (2.25)	3.15 (1.22)	-0.98 (0.62)	-0.24 (0.08)	0.56
9	Textiles	-1.97	-1.62	0.35	0.35 (0.21)	-3.32** (2.15)	-2.06 (0.98)	-0.89 (0.56)	-1.32 (0.73)	0.55
10	Activities auxiliary to financial intermediation	2.43	2.73	0.30	2.83 (0.37)	-11.52* (1.95)	-0.33 (0.06)	-3.32 (0.40)	-0.67 (0.08)	0.06*

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6. Largest Accelerations/Smallest Decreases in Employment Growth Rate

	Sector	Median Growth Rates			Regression Coefficients on Reversal Year Dummies (t statistics in parenthesis)					Joint F-test (p-val.)
		2 yrs before	2 yrs after	Chg.	R-2	R-1	R	R+1	R+2	
1	Electronic valves and tubes	-0.85	0.25	1.10	-3.86 (0.81)	5.24 (1.09)	1.80 (0.69)	-0.32 (0.15)	-3.69 (1.16)	0.48
2	Mineral oil refining, coke & nuclear fuel	-2.52	-1.60	0.92	-1.43 (0.44)	-3.30 (0.97)	3.50 (0.91)	3.78 (1.21)	2.46 (0.46)	0.81
3	Agriculture	-2.80	-2.16	0.64	-1.31* (1.71)	0.45 (0.59)	-0.14 (0.17)	-0.67 (0.86)	-0.52 (0.43)	0.88
4	Inland transport	-0.20	0.32	0.52	-1.93*** (3.05)	0.37 (0.64)	0.08 (0.11)	-0.59 (0.88)	-2.59*** (3.79)	0.00***
5	Public administration and defense; compulsory social security	0.49	0.43	-0.06	0.65 (1.17)	-1.08 (1.58)	-0.52 (0.77)	-0.21 (0.28)	-0.32 (0.23)	0.71
6	Education	2.01	1.87	-0.14	-0.02 (0.04)	0.07 (0.11)	-0.04 (0.08)	-0.32 (0.68)	-0.37 (0.46)	0.07*
7	Forestry	-1.36	-1.50	-0.14	-0.71 (0.39)	2.29 (1.54)	-1.04 (0.70)	1.31 (0.45)	0.50 (0.20)	0.12
8	Other instruments	-0.95	-1.09	-0.14	1.81 (0.50)	-0.71 (0.25)	2.26 (0.67)	-3.77* (1.78)	-5.23** (2.08)	0.82
9	Communications	0.63	0.16	-0.47	1.05 (1.22)	0.59 (0.64)	-0.24 (0.35)	1.18 (1.51)	-2.79*** (3.75)	0.00***
10	Electricity, gas and water supply	-0.45	-0.98	-0.53	-0.09 (0.09)	-0.84 (0.91)	1.03 (1.65)	-1.02 (1.17)	-2.35 (1.01)	0.43

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7. Largest Increases in Relative Inflation

	Sector	Median Growth Rates			Regression Coefficients on Reversal Year Dummies (t statistics in parenthesis)					Joint F-test (p-val.)
		2 yrs before	2 yrs after	Chg.	R-2	R-1	R	R+1	R+2	
1	Insurance and pension funding, except compulsory social security	-0.01	5.63	5.64	-7.70 (1.28)	6.68 (0.95)	-0.30 (0.08)	2.74 (0.93)	8.35* (1.94)	0.26
2	Chemicals	-3.16	1.44	4.60	0.64 (0.30)	-1.22 (0.90)	-0.92 (0.48)	1.72 (1.07)	2.78 (1.53)	0.96
3	Basic metals	-1.60	2.51	4.11	3.81 (1.57)	-1.65 (0.70)	0.07 (0.05)	4.69** (2.21)	5.18* (1.76)	0.23
4	Aircraft and spacecraft	-2.72	0.39	3.11	-2.85** (2.48)	-2.40 (1.12)	2.62 (1.11)	0.33 (0.21)	2.68 (0.86)	0.44
5	Mining and quarrying	-4.50	-1.50	3.00	-2.40 (0.88)	-5.04 (1.52)	-4.18 (1.05)	-1.31 (0.45)	-1.32 (0.45)	0.94
6	Building and repairing of ships and boats	-2.72	0.00	2.72	-3.30*** (2.76)	-1.94 (0.86)	2.53 (1.24)	1.19 (0.71)	3.74 (1.27)	0.21
7	Pulp, paper & paper products	-1.00	1.49	2.49	0.58 (0.37)	-1.90 (1.09)	1.21 (0.53)	4.84*** (3.02)	6.40*** (2.66)	0.19
8	Railroad equipment and transport equipment nec	-2.40	-0.19	2.21	-2.25 (1.59)	-4.49** (2.23)	1.79 (0.78)	0.38 (0.24)	2.29 (0.75)	0.04**
9	Rubber & plastics	-2.50	-0.35	2.15	0.22 (0.16)	-1.98 (1.29)	1.73 (0.76)	0.66 (0.62)	1.76 (1.14)	0.04**
10	Mechanical engineering	-2.35	-0.41	1.94	-0.67 (0.64)	0.27 (0.13)	-0.52 (0.37)	-0.33 (0.32)	2.14* (1.78)	0.08*

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8. Largest Decreases in Relative Inflation

	Sector	Median Growth Rates			Regression Coefficients on Reversal Year Dummies (t statistics in parenthesis)					Joint F-test (p-val.)
		2 yrs before	2 yrs after	Chg.	R-2	R-1	R	R+1	R+2	
1	Fishing	1.75	-4.27	-6.02	5.02*** (2.73)	5.75 (1.53)	4.85* (1.96)	-2.30 (0.63)	-7.22 (1.44)	0.25
2	Forestry	-0.31	-2.78	-2.47	2.76 (1.29)	0.50 (0.18)	-0.06 (0.02)	-2.44 (0.57)	2.69 (0.63)	0.94
3	Construction	1.25	-0.77	-2.02	-0.38 (0.37)	-0.03 (0.03)	0.61 (0.57)	-2.32 (1.53)	-2.70* (1.96)	0.02*
4	Office machinery	-32.53	-34.43	-1.90	0.02 (0.38)	0.05 (0.55)	0.19 (1.61)	0.11 (1.14)	0.13 (1.38)	0.19
5	Wood & products of wood and cork	0.85	-0.90	-1.75	0.09 (0.06)	1.62 (0.96)	1.09 (0.42)	-0.73 (0.31)	0.35 (0.14)	0.38
6	Water transport	-0.03	-1.73	-1.70	2.15 (0.63)	2.86 (0.86)	1.38 (0.46)	-2.47 (0.64)	2.59 (0.74)	0.90
7	Activities auxiliary to financial intermediation	1.15	-0.48	-1.63	1.93 (0.57)	-1.20 (0.42)	-3.50 (1.38)	0.97 (0.52)	-1.58 (0.58)	0.25
8	Computer and related activities	1.75	0.27	-1.48	0.17 (0.17)	1.79 (1.52)	1.15 (1.00)	-0.77 (0.86)	-1.09 (1.27)	0.10
9	Legal, technical and advertising	1.92	0.82	-1.10	0.72 (0.89)	1.90* (1.91)	1.13 (1.50)	-1.43** (1.99)	-0.92* (1.67)	0.35
10	Textiles	0.34	-0.57	-0.91	-0.03 (0.02)	-0.93 (1.03)	0.94 (0.63)	0.44 (0.41)	2.960* (1.75)	0.36

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9. Number of Sectors with Statistically Significant (10%) Coefficients (Alternate Specifications)

Variable	Specification	Sign	Year Relative to Current Account Reversal						
			R-3	R-2	R-1	R	R+1	R+2	R+3
Output	Pooled	Positive	3	5	0	0	0	0	2
		Negative	8	1	11	9	15	19	1
	Fixed Effects	Positive	2	3	0	0	0	0	1
		Negative	7	2	11	9	15	16	4
	Year Dummies	Positive	3	3	2	0	0	0	1
		Negative	7	2	8	4	15	17	1
Employment	Pooled	Positive	2	2	2	0	0	0	0
		Negative	10	2	2	4	25	28	10
	Fixed Effects	Positive	4	3	2	0	0	0	0
		Negative	8	2	1	4	24	30	10
	Year Dummies	Positive	2	1	2	1	0	0	1
		Negative	9	4	2	3	23	27	10
Relative Inflation	Pooled	Positive	6	4	6	3	1	9	4
		Negative	3	2	3	0	2	3	4
	Fixed Effects	Positive	6	4	6	7	1	9	5
		Negative	3	1	4	0	3	4	4
	Year Dummies	Positive	3	1	6	7	4	6	5
		Negative	3	4	2	0	3	3	9

Table 10. Number of Sectors with Statistically Significant (10%) Coefficients, excluding US(1987) and Korea (1996) episodes

			R-3	R-2	R-1	R	R+1	R+2	R+3
Output	Excluding US (1987)	Negative	6	2	8	3	14	12	2
		Positive	2	3	4	1	0	0	3
	Excluding Korea (1996)	Negative	5	2	3	5	10	10	5
		Positive	4	4	3	1	0	1	2
Employment	Excluding US (1987)	Negative	12	4	0	2	19	28	12
		Positive	3	2	2	1	0	0	0
	Excluding Korea (1996)	Negative	6	2	0	1	16	20	12
		Positive	5	1	10	4	1	0	1
Relative Inflation	Excluding US (1987)	Negative	2	3	2	0	3	4	11
		Positive	2	4	7	4	5	7	3
	Excluding Korea (1996)	Negative	4	8	5	0	2	2	4
		Positive	3	3	5	5	7	8	5

Table 11. Average Employment Growth During Three Recent Reversals

Reversal Episode	Employment Category	Two Years Before	Two Years After	Change
Australia (2007)	Total Employment	2.99	1.75	-1.24
	Services	3.16	1.77	-1.40
	Construction	6.76	2.31	-4.45
	Industry ex. Const.	0.66	1.11	0.46
	Agriculture	-0.90	1.61	2.50
Spain (2007)	Total Employment	4.71	-3.74	-8.46
	Services	5.93	-0.12	-6.05
	Construction	6.05	-17.83	-23.88
	Industry ex. Const.	1.25	-7.67	-8.91
	Agriculture	-2.31	-8.17	-5.86
United States (2006)	Total Employment	1.43	0.32	-1.11
	Services	1.62	0.91	-0.71
	Construction	4.97	-3.41	-8.38
	Industry ex. Const.	-1.60	-1.01	0.59
	Agriculture	-1.75	-0.88	0.87

Fig. 1 Median Growth Rate of Aggregate Variables

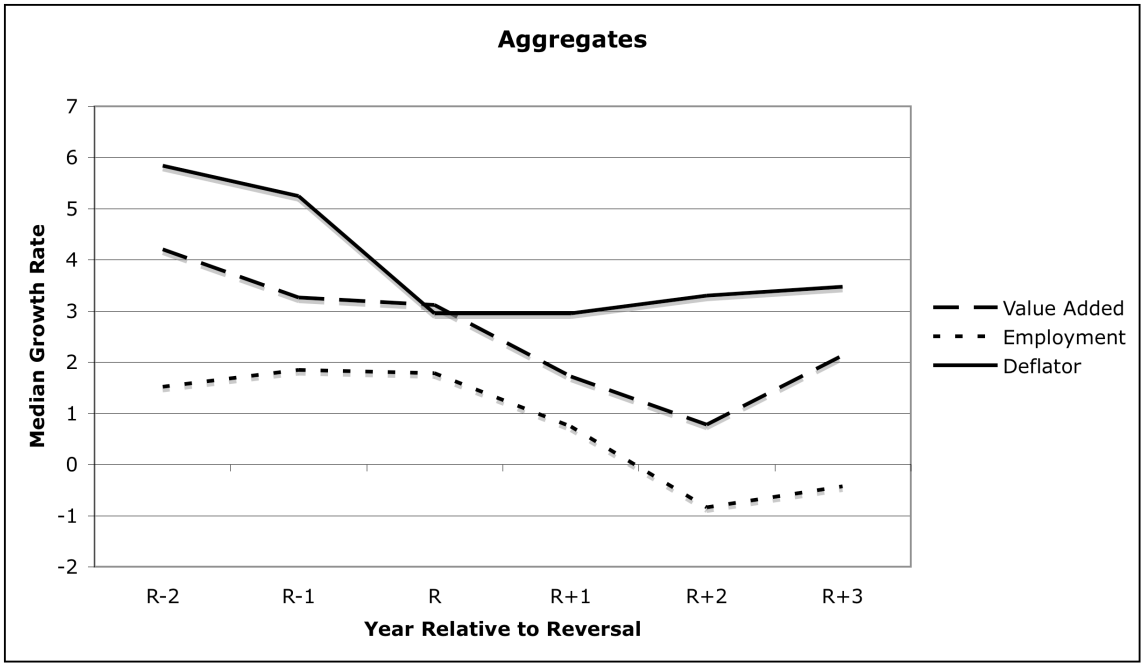

Fig. 2. Dynamics of Selected Sectors