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Will It Disrupt the Rest of the World?

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Abstract

In recent years, a number of studies have analyzed the experiences of a broad range of industrial economies during periods when their current account deficits have narrowed. Such studies identified systematic aspects of external adjustment, but it is unclear how good a guide the experience of other countries may be to the effects of a future narrowing of the U.S. external imbalance. In contrast, this paper focuses in depth on the historical experience of external adjustment in the United States. Using data from the past thirty-five years, we compare economic performance in episodes during which the U.S. trade balance deteriorated and episodes during which it adjusted. We find trade balance adjustment to have been generally benign: U.S. real GDP growth tended to fall, but not to a statistically significant extent; housing construction slumped; inflation generally rose modestly; and although nominal interest rates tended to rise, real interest rates fell. The paper then compares these outcomes to those in foreign industrial economies. We find that the economic performance of the United States during periods of external adjustment is remarkably similar to the foreign experience. Finally, we also examine the performance of the foreign industrial economies during the periods of U.S. deterioration and adjustment. Contrary to concerns that U.S. adjustment will prove injurious to foreign economies, our analysis suggests that the foreign economies fared reasonably well during past periods when the U.S. trade deficit narrowed: the growth of domestic demand and real GDP abroad generally strengthened during such episodes, although inflation and interest rates tended to rise as well.

Keywords: current account deficit, trade deficit, exchange rate adjustment, disorderly correction.

JEL Classification: F32, F41.

I. Introduction and Summary

Observers have raised concerns that a future adjustment of the U.S. current account deficit driven by exchange rate depreciation may prove "disorderly" for financial markets and U.S. economic performance. (See, inter alia, Eichengreen, 2004, Roubini and Setser, 2005, and Edwards, 2005.) In particular, it has been suggested that a fall in the dollar could boost interest rates, depress stock prices, and push the economy into recession. Such developments, it is argued, could outweigh the stimulus provided by a falling dollar via a rise in net exports, particularly if it took some time for net exports to respond.

How likely is the disorderly adjustment scenario to arise in practice? One approach to answering this question has been to examine the record of past external adjustments in industrial economies. By and large, such studies suggest that the experience of external adjustment has been reasonably benign, and that exchange rate changes associated with adjustment have not led to economic distress. Freund (2005) found, in 25 episodes of current account adjustment in industrial economies, indications of only moderate declines in GDP growth. Croke, Kamin, and Leduc (2006) revisited Freund's sample and found that in episodes where real exchange rates depreciated, growth was maintained; in episodes where real exchange rates did not depreciate, growth tended to decline, but that decline likely was the cause rather than the effect of current account adjustment. Freund and Warnock (2006) and Debelle and Galati (2005) come to similar conclusions, while Gagnon (2005) finds that currency crashes in industrial economies have generally led to lower, not higher, long-term interest rates. In contrast, Edwards (2005) presents results suggesting more disruptive effects of current account adjustment, but his methodology may not adequately control for the endogeneity of the current account with respect to growth.

These studies, for the most part, tend to undercut the view that a future U.S. external adjustment will be disruptive. Yet, it is generally acknowledged that owing to the size of its economy and of its external deficits, external adjustment in the United States may differ greatly from that in other industrial countries. The episodes studied in the above-mentioned papers include only one U.S. experience, the reduction of the trade deficit in the late 1980s, and accordingly any inferences drawn from them will be dominated by the experience of foreign economies.

The purpose of this paper is to characterize the effects of external adjustment on macroeconomic performance while focusing more closely on the U.S. historical experience. By so doing, we hope to make our findings as relevant as possible to a future U.S. adjustment. Using data from the past thirty-five years, this paper compares the economic performance of the U.S. economy during three episodes in which the U.S. nominal trade balance deteriorated significantly with economic performance in two episodes during which the trade balance adjusted. (Throughout this paper, we refer to a widening of the trade deficit as a "deterioration" and a narrowing of the trade deficit as an "adjustment.")   The paper then examines the extent to which the behavior of key economic variables differed across the two types of episodes.[1]

As a general statement, we find that the adjustment of the trade balance in these instances has been benign, occurring without financial crisis or significant economic upheaval. Nevertheless, the process of external adjustment has left a clear imprint on economic performance, with the following being some of the key features of the U.S. adjustment episodes:

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[1]This approach, which allows us to analyze developments in a single country, contrasts with that used in the studies discussed above, which focus on especially pronounced episodes of external adjustment in many countries. By concentrating on the largest and most sustained adjustments, the approach taken by previous studies assesses periods when external adjustment has the greatest chance of affecting aggregate macroeconomic outcomes. However, that approach entails comparing economic performance during pronounced adjustment periods with performance during other years; those other years may represent an inadequate control sample, as they include both periods of deterioration and periods of adjustment not pronounced enough to qualify as adjustment episodes. As the approach taken in this paper explicitly distinguishes between deterioration and adjustment periods, it is less subject to this problem.

- The real exchange value of the dollar has been roughly 13 percent weaker on average during periods of adjustment than during periods of deterioration.

- Real domestic demand has grown 2.6 percentage points more slowly during periods of trade balance adjustment than during periods of deterioration; most notably, growth of residential construction plunged at an annual rate of nearly 14 percentage points during adjustment periods.

- Slower domestic demand was offset in part by a substantial 1.6 percentage point rise in the contribution to GDP growth from net exports, as real exports surged and real imports decelerated.[2]

- On balance, real GDP growth was 1.1 percentage points slower during periods of external adjustment than during periods of deterioration, although this slowing is not statistically significant.

- Broad measures of inflation were generally higher during periods of external adjustment than during periods of deterioration. During adjustment, prices of tradeable goods appear to have risen relative to those of non-tradeable goods, thus supporting the process whereby exports rose and imports declined.

- Although nominal interest rates averaged a little higher during adjustment periods than during deterioration periods, real interest rates were lower during periods of adjustment.

These findings suggest that external adjustment in the United States, at least historically, has not been highly disruptive. Although domestic demand growth generally slowed during adjustment episodes, the effects on overall GDP growth were largely offset by an expansion of net exports.

Moreover, although our analysis is purely descriptive and does not address sources of shocks or directions of causality, it presents evidence that the weakening of domestic demand may not have owed to the external adjustment process itself. In the textbook case, exchange rate depreciation stimulates net exports and economic activity, thus pushing up real interest rates and curtailing domestic demand. Yet, we find that real interest rates declined during adjustment

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[2] Of course, given that our episodes are defined by widening and narrowing of the nominal trade balance, an upward swing in the contribution of real net exports—from negative during periods of deterioration to positive during periods of adjustment—follows closely from our definitions (apart from the nominal to real translation).

episodes. This lends support to an alternative possibility: autonomous declines in domestic demand may have led to lower real interest rates, declines in the dollar, and thus increases in net exports. That is, external adjustment may have been the effect rather than the cause of lower domestic demand and GDP growth.[3] If this was the case, external adjustment would have played a stabilizing role, expanding net exports even as domestic demand weakened.

Our finding of relatively non-disruptive adjustment in the United States lines up well with the studies of adjustment, noted above, which draw primarily from the experiences of foreign industrial economies. To confirm that the U.S. and foreign industrial economies have responded similarly to the process of external adjustment, we identified periods of trade balance deterioration and adjustment in 20 OECD countries and, as we had for the United States, compared macroeconomic performance during the two types of episodes. By and large, we found the shifts in foreign real GDP growth and its components during transitions from external deterioration to adjustment to be remarkably similar to those in the United States: foreign GDP growth fell 1.1 percentage points as a 2.75 percentage point decline in domestic demand growth was offset by a 1.44 percentage point rise in the contribution of net exports to GDP growth. The foreign adjustment episodes did involve much less real exchange rate depreciation than in the United States, and foreign real interest rates rose rather than fell as in the United States. All told, however, we found little support for the view that the U.S. economy would exhibit a different—and perhaps more disorderly—response to external adjustment than other industrial economies.

Finally, in addition to raising concerns that a closing of the deficit would be disruptive to the U.S. economy, observers have also raised concerns about the effect of U.S. external adjustment on foreign economies. Lower U.S. trade deficits imply lower trade surpluses abroad, and contagion

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[3] As was noted, this is consistent with the conclusions reached by Croke, Kamin, and Leduc, 2006, Freund and Warnock, 2006, and Debelle and Galati, 2005, based on their multi-country analyses.

to foreign financial markets from disruptions in U.S. markets has also been highlighted as a risk. To shed some light on this concern, we extended the analyses described above to compare the macroeconomic performance of the foreign industrial economies during periods of U.S. trade balance deterioration and adjustment.

We found the performance of the foreign economies to be, in many respects, the mirror image of that of the U.S. economy. (This is not surprising, given our finding that the U.S. and foreign economies exhibit similar responses to their own external adjustment.) During periods of U.S. trade balance adjustment, the foreign economies exhibited (relative to periods of U.S. deterioration): higher growth of domestic demand and real GDP; weaker net exports; higher rates of inflation, with prices of non-tradeable goods rising relative to those of tradeables; and higher nominal and real interest rates. Some of these developments—in particular, the higher inflation, interest rates, and GDP growth—suggest that our trading partners likely were experiencing positive shocks to their domestic demand alongside the effects of slower U.S. demand for their products. In any event, the historical record suggests that U.S. external adjustment generally has not been injurious to our trading partners.

The remainder of this paper is organized as follows: The next section sketches out the methodology that we have used in our work. Section III section compares the performance of the U.S. economy during adjustment and deterioration episodes, while Section IV replicates the same analysis for the foreign industrial economies. Section V addresses the performance of the foreign economies during U.S. deterioration and adjustment periods. The final section offers some conclusions.

II. Methodology

Looking at the U.S. experience in recent decades, we identify three periods in which the trade balance on goods and services deteriorated significantly: 1975:Q3 to 1978:Q1, 1980:Q4 to 1987:Q2, and 1997:Q2 to 2005:Q4. (These are the blue regions in Figure 1.) Although these periods were identified judgmentally rather than through application of formal numerical criteria, they quite obviously correspond to peaks and troughs in the trade balance. (Also, we found our results were not sensitive to small changes in the dating of the deterioration and adjustment periods.) We focus on the trade balance because theory indicates that improvement in the trade balance is necessary for sustained external adjustment. Only if the trade deficit is substantially closed will the growth of the U.S. net external debt be reined in so that the ratio of debt to GDP stabilizes.[4]

As shown in Figure 1, during the first of these episodes of deterioration, the trade balance slipped from a surplus of 1 percent of GDP to a deficit of 2 percent. In the second episode, during the 1980s, the trade balance declined from about balance to a deficit of 3 percent of GDP. Finally, in the latest episode, the trade deficit has widened from just over 1 percent of GDP to about 6 percent of GDP since mid-1997.

We also define two periods of trade balance adjustment: 1978:Q2 to 1980:Q3 and 1987:Q3 to 1992:Q1 (the yellow regions in Figure 1). In the first of these episodes, the trade balance improved about 2 percent of GDP over 2½ years. In the second episode, the trade balance improved 3 percent of GDP over 5½ years.

Having identified these episodes, we compare the real growth rates of GDP expenditure components during periods when the trade balance has adjusted with the behavior when the trade balance has deteriorated. We replicate this analysis for each component's share of nominal GDP,

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[4] See Gramlich (2004) for a straightforward derivation and discussion of this result.

for the growth rates of various categories of imports and exports, and for other key macroeconomic variables.

Specifically, as indicated in the equation below, we regress the growth rate (or change in the nominal GDP share) of a given variable (y) on dummy variables indicating periods of trade balance deterioration ($D^{deterioration}$), periods of trade balance adjustment ($D^{adjustment}$), and periods when the trade balance was little changed (D^{other}).[5] The estimated coefficients on the dummy variables measure the average performance of that variable during periods of deterioration and periods of adjustment. This methodology is equivalent to comparing means of variables across the different types of episodes, but it facilitates tests of statistical significance and also provides a framework in which we can test the robustness of our results.[6]

$$ y = \beta_1 * D^{deterioration} + \beta_2 * D^{adjustment} + \beta_3 * D^{other} + \varepsilon $$

Our results are reported in Tables 1-3 and discussed in detail below. As a robustness check, we run an alternative specification that includes U.S. GDP growth as an additional control variable. The purpose of this specification is to control for effects of the business cycle in order to more clearly identify the effects of trade balance deterioration and adjustment. The results from these regressions are reported in Table 4 and are similar to our baseline results.

III. Results for the U.S. Economy

<u>GDP components</u>

Table 1 focuses on the components of U.S. GDP. Column (1) summarizes the growth of real quantities of these components during periods of trade balance deterioration, column (2) draws on periods of adjustment, and column (3) presents the difference. Columns (4) through (6) present

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[5] The trade balance was comparatively little changed from 1970:Q1 through 1975:Q2 and from 1992:Q2 through 1997:Q1; as such, we see these neither as periods of significant deterioration nor as periods of adjustment.

[6] To test the statistical significance of the difference in performance between deterioration and adjustment periods, we estimate an equivalent specification ($y = \alpha + \gamma_1 * D^{adjustment} + \gamma_2 * D^{other} + \varepsilon$) and then evaluate the t-statistic on γ_1. (Note that $\gamma_1 = \beta_2 - \beta_1$.)

analogous calculations for changes in the shares of components in nominal GDP. Selected series are graphed in Figures 2 and 3.

Focusing first on column (1), it is apparent that the periods of trade balance deterioration enjoyed vigorous expansion as strong growth in domestic demand was only partially offset by a deterioration in net exports. Real GDP growth (line 1) averages 3½ percent and domestic demand growth (line 2) averages over 4 percent. All of the major components of domestic demand grow solidly, but the 8.2 percent growth of total investment spending is notable and the 9.3 percent growth of residential investment is doubly so. Interestingly, real exports expand during these periods, averaging 3½ percent growth, but imports grow over 10 percent. Accordingly, real net exports deteriorate, subtracting about ¾ percentage point from GDP growth on average.

Turning to column (2), one would expect that adjustment of the trade balance would be associated with weaker domestic demand and stronger net exports, and this is confirmed by the data. During periods of adjustment, domestic demand growth averages only about 1½ percent; as indicated in column (3), this represents a statistically significant slowing of 2.6 percentage points compared with periods of trade balance deterioration. All components of domestic demand weaken, but the slowing of residential investment is especially pronounced: its growth rate swings down an enormous 13.8 percentage points, to -4.4 percent, and its share of nominal GDP switches from rising nearly 0.3 percentage point a year during periods of deterioration (column 4) to declining about 0.4 percentage point a year during adjustment episodes (column 5).[7] Housing is the foremost example of a non-traded good and, as such, its production would be expected to boom during periods of deterioration but to fall off during periods of adjustment (as shifts in relative prices redirect resources toward the production of tradables).

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[7] A negative relationship between house prices and the current account balance has been noted by a number of observers. (See, for example, Ahearne et. al., 2005.) Higher house prices may stimulate residential investment and may encourage consumption as well.

During periods of adjustment, a portion of the weakening in domestic demand growth is offset by a swing in the contribution from net exports to a positive 0.9 percentage point. Real export growth soars to 11¾ percent, 8¼ percentage points above its pace during the years of deterioration, and real import growth slows 9 percentage points to only about 1 percent annually.

On balance, real GDP growth averages only about 2½ percentage points during periods of adjustment, about 1 percentage point slower than during periods of deterioration, although this difference falls short of statistical significance (t-value of 1.38). This result, while statistically insignificant, is surprising. In principle, if adjustment comes in response to a downward shock to the exchange rate, then higher net exports might be expected to offset weaker domestic demand, leaving GDP growth little changed—or even higher—on net. This issue will be discussed further below.

Another expectation we bring to external adjustment is that in response to real exchange rate depreciation, production of tradeable goods should perform more strongly than that of non-traded goods. Our findings provide only mixed confirmation of this prediction. Lines 13-15 present results for a breakdown of GDP into goods, services, and structures. The growth of structures GDP, which is non-traded, does indeed fall off sharply, by a statistically significant 4.2 percentage points. However, the growth of goods GDP, which is generally tradeable, also declines, by 1.1 percentage points (although this difference is not statistically significant). The growth of services GDP, which is generally considered to be non-traded, falls just 0.4 percentage point. Nonetheless, these results are likely clouded by the fact that some services are tradeable.

In an attempt to draw a finer line between tradeable and non-traded output, lines 11-12 present calculations based on data on U.S. GDP by industry.[8] As is conventionally done,

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[8] These data are published on an annual frequency; we used a cubic spline technique to transform these series to a quarterly frequency.

agriculture, mining, and manufacturing are classified as tradeable, whereas construction, utilities, wholesale and retail trade, and government are classified as non-traded. The remaining services industries were split into traded and non-traded following the classification in Jensen and Kletzer (2005).[9] These calculations suggest that both traded and non-traded output performance weakens during adjustment, but growth of traded output slows by more. These differences, however, are not statistically significant.

The anomalous decline in both traded and non-traded sectors, discussed further below, may reflect that the initial impetus to trade adjustment owes to autonomous movements in domestic demand in addition to or instead of shocks to the dollar. In Table 4, which controls for U.S. GDP growth and thus may allow greater scope to identify the effects of external adjustment, the growth of goods GDP rises during adjustment episodes whereas that of both services and structures GDP declines; these movements are more consistent with the standard external adjustment scenario, although none of them are statistically significant. In contrast, growth of the traded aggregate continues to decline, albeit by a lesser and statistically insignificant amount.

Trade components

Does external adjustment rely more on export expansion or on import compression? Does it rely on strong performance in just a few trade categories, or are adjustments widespread? To address these questions, Table 2 compares movements in the components of trade during adjustment and deterioration periods. It indicates, first, that historically, external adjustment has involved both increases in the growth of exports and declines in the growth of imports. Secondly,

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[9] In particular, traded services include information services; finance and insurance; professional, scientific, and technical services; and management of enterprises. Non-traded services include transportation and warehousing; real estate and rental and leasing; administrative and waste management services; education, health care, and social assistance; arts, entertainment, recreation, accommodation, and food services; and other services, except government.

no particular sub-categories of trade stand out as being especially important to adjustment, either on the import or the export side.

Prices, exchange rates, and interest rates

Table 3 examines whether other key economic variables differ systematically across the two types of periods. Unlike the variables reported in the previous tables, many of these variables have a significant secular trend, which complicates the time-series comparisons that we are making. The recent deterioration episode is particularly tricky in this respect, as there is no subsequent period of adjustment and because the low levels of inflation and nominal interest rates that have prevailed in recent years tend to pull down the averages for the deterioration periods. Selected series are graphed in Figure 4.

Accordingly, the first column in Table 3 uses our benchmark model to estimate the average difference in a variable's performance during periods of adjustment and periods of deterioration. The second column runs the regressions only through 1992 and thus focuses on the two matched episodes of deterioration and adjustment in our sample. The third column adds a time trend to our benchmark specification. And the final column defines the dependent variable as the variable of interest less its twenty-quarter moving average.

One result that emerges from the regressions is that broad measures of U.S. inflation (lines 1-2) generally appear to be higher during periods of adjustment than during periods of deterioration, suggesting a moderate effect of external adjustment on U.S. inflation.[10] Lines 8-11 report the behavior of relative prices. By and large, moves in relative prices appear to support the process of adjustment in a manner consistent with what theory would suggest. Percent changes in

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[10] We have also estimated models (not shown in the table) that take the change in inflation as the dependent variable. We find that core PCE prices, goods GDP prices, and services GDP prices all accelerate at a pace of about 0.2 percentage points a year in periods of adjustment relative to periods of deterioration. The exceptions are CPI and structures inflation, which tend to slow a touch during adjustment periods.

the ratio of prices of non-traded to traded categories decline during the adjustment process, as do changes in the ratio of services prices to goods prices and in the ratio of structures prices to goods prices. This change in the evolution of relative prices during periods of external adjustment helps to shift U.S. demand away from goods (a proxy for tradables) and toward services and structures (proxies for non-tradables). In parallel, the shift in relative prices provides incentives for U.S. producers to shift toward the production of traded goods.

Lines 12 and 13 focus on the exchange rate. We find that on average during episodes of adjustment, the broad real dollar is about 13 percent weaker than during periods of deterioration. The annual rate of dollar depreciation appears (for three of the four specifications) to be 2 percentage points higher during periods of adjustment than during periods of deterioration, although the difference is not statistically significant. We note, however, that the dating of our episodes is geared toward adjustment of the nominal trade balance, which is not fully aligned with movements in exchange rates. The dollar started to depreciate during each of the deterioration periods shown in Exhibit 1, but it took time for the declines to show through to improved trade balances, consistent with J-curve effects. Accordingly, our results may understate the size of the currency moves that contributed to the adjustment of the trade balance.

Another important result is that trade prices (lines 14 and 15) increase significantly more rapidly during periods of external adjustment. We find that price inflation for imports and exports of core goods is higher by roughly 4 percentage points a year during periods of external adjustment.[11] These increases in rates of import and export price inflation during adjustment periods are considerably larger than can be explained by the 2 percentage point increase in the dollar's rate of depreciation during those periods.

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[11] Core goods imports exclude computers, semiconductors, and oil. Core goods exports exclude computers and semiconductors.

What, then, is driving this surge in trade prices during external adjustment? Lines 16-19 look at the behavior of oil and commodity prices, important inputs in the production of some imports and exports.[12] The results are mixed. The level of oil prices is lower during adjustment periods, but the rate of change of those prices is (insignificantly) higher. Conversely, the level of non-fuel commodity prices is higher but their rate of change is (insignificantly) lower.[13] All told, the variables that we consider do not seem able to explain fully the marked rise in the inflation rates of both import prices and export prices that have been a feature of U.S. adjustment episodes.

As shown in the next block of results, we find that nominal interest rates—both long-term and short-term—are generally higher, but real interest rates average 1 to 2 percentage points lower, during periods of external adjustment.[14] These results will be discussed in greater detail below.

External adjustment and domestic demand

In standard textbook models of exchange-rate driven external adjustment, exchange rate depreciation stimulates net exports and pushes up trade prices. Both of these factors put upward pressure on domestic inflation, which prompts monetary policy to tighten and, thus, leads to a rise in real long-term interest rates. This increase in real long-term interest rates, in turn, induces a slowing of domestic consumption and investment. In principle, if the economy starts out in equilibrium and if monetary policy is geared toward price stability with maximum sustainable employment, the monetary policy reaction and the rise in real long-term rates should be just sufficient to maintain the economy's growth rate; that is, higher interest rates should induce a decline in domestic demand growth just sufficient to offset the rise in net exports.

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[12] Of course, the prices of oil and other commodities are themselves quite responsive to moves in the dollar.

[13] As discussed further below, average foreign inflation appears to be higher during periods of U.S. adjustment, but the difference is not large enough to account for the rise in trade prices.

[14] We calculate the long-term real interest rate as the ten-year Treasury yield minus the four-quarter change in the CPI and the real Federal Funds rate as the nominal rate minus the annualized quarterly change in the CPI.

In the two episodes of adjustment that we study, however, the growth rate of domestic demand falls more than the contribution from net exports rises, and GDP growth is accordingly lower (albeit not to a statistically significant extent). We are uncertain what is driving this result, especially given our finding that real interest rates--which we would expect to be a key mechanism for delivering adjustment of domestic demand--appear to have been lower during the periods of adjustment. One explanation is that growth of output and domestic demand have been unsustainably strong during periods of trade balance deterioration, and the slowdown in GDP growth during the adjustment has reflected, at least in part, a necessary moderation in domestic demand. In fact, it is possible that it was this slowing of demand and growth that led—via reductions in real interest rates and declines in the dollar—to external adjustment, rather than external adjustment leading to slowing growth. Note that in this scenario, external adjustment plays a stabilizing role, cushioning the decline in domestic demand through expansion of net exports.

This story that a cyclical weakening of domestic demand has represented a primary impetus for trade balance adjustment receives further support from the finding, noted above, that growth of goods GDP (and traded GDP more generally) slows more than that of services GDP (and non-traded GDP) during periods of adjustment. In principle, a depreciation shock to the exchange rate would boost traded goods output and depress non-traded goods output. However, if the initial impetus for adjustment is, instead, a cyclical slowing of the economy, this could explain why goods GDP growth falls off so much during adjustment: the demand for goods is generally more sensitive to cyclical conditions than the demand for services (see, for example, Stock and Watson, 2003), and thus cyclical effects on goods and services output may outweigh the effects of a more depreciated real exchange rate.

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Real versus nominal external adjustment

Our results shed light on the differing features of real adjustment (the narrowing of the deficit in real net exports) compared with nominal adjustment (the narrowing of the nominal trade deficit). On the export side, external adjustment has reflected both increases in real exports (Table 1, column 2) and higher export prices (Table 3); accordingly, the share of nominal exports in GDP rises significantly (Table 1, column 5 and Figure 3). Conversely, whereas external adjustment also involves weaker real import growth relative to GDP (Table 1, column 2), the share of nominal imports in GDP does not decline significantly; increases in import prices (Table 3) offset slower import quantities, leaving the dollar value of imports little changed.

These results confirm research suggesting that import elasticities of demand are close to unity.[15] Thus, when the dollar depreciates, increases in import prices lead to proportionate reductions in import quantities, leaving import values unchanged. Conversely, in response to dollar depreciation, increases in dollar export prices and export quantities both act in the same direction, raising the dollar value of exports. Accordingly, the improvement in real net exports associated with external adjustment has reflected both increases in real exports and declines in real imports; in contrast, the reduction of the nominal trade balance has mainly reflected increases in nominal exports, with nominal imports staying about flat. (See, also, Gust and Sheets, 2006.)

IV. Does the U.S. Experience with Adjustment Differ from Foreign Experiences?

In the introduction, we noted that prior studies of external adjustment in a broad range of industrial economies had generally supported a relatively benign view. The question was whether the United States, owing to its particular characteristics (large size, low degree of openness, high degree of flexibility), might exhibit different behavior than that indicated by a broad sample of

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[15] See Hooper and Marquez (1995), Senhadji and Montenegro (1999), and Marquez (2002), who estimate this elasticity using aggregate data.

industrial economies. The results of the preceding section suggest that the *prima facie* answer to this question is: no. Consistent with findings by Freund (2005), Freund and Warnock (2006), Debelle and Galati (2005), and Gagnon (2005), external adjustments in the United States have been associated with some slowdown in GDP growth but not with marked disruptions to activity or financial markets.

In this section, we focus more closely on the extent of any differences in the external adjustment process between the United States and the other industrial economies. Using the methodology applied to U.S. data as described in Sections II and III, we estimate the value of a wide range of macroeconomic variables in 20 OECD countries during periods when their trade balances deteriorated and periods when their balances improved.[16] As a measure of the net effect of external adjustment, we then calculate the differences in performance between the adjustment and deterioration periods for the foreign industrial countries, and compare those differences to the analogous calculations performed on U.S. data.

Methodology

As in our analysis of the United States, we first identify periods of trade balance deterioration and adjustment. To automate this process we calculate a 9-quarter centered moving average of the ratio of the trade balance to GDP for each of the 20 countries. We then identify periods of deterioration or adjustment if the following two criteria are satisfied: (1) the trade balance/GDP ratio moves by at least 1 percentage point (up or down) over the period; and (2) the trade balance/GDP ratio moves by an average of at least 0.1 percentage point per quarter over the period. The numerical criteria are obviously arbitrary, but visual inspection suggests that they do a

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[16] The countries include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

reasonable job of tracking periods of upswing and downswing in foreign trade balances (see Table 9).[17] All told, we identified 79 adjustment episodes and 78 deterioration episodes.

With these periods of deterioration and adjustment in hand, we replicate the analysis that was applied to the U.S. data (Sections II and III), but use a pooled time series that includes both the United States and the 20 foreign OECD countries. The U.S. data are included in the regression to facilitate statistical comparison of the parameters for the United States with those of the foreign countries. Thus, to distinguish the effects of adjustment and deterioration in the United States from the effects abroad, we add interaction terms in which the standard period dummy variables are multiplied by a dummy variable ($D^{U.S.}$) that equals one for the United States and zero otherwise.

$$y_{i,t} = \beta_1 * D_{i,t}^{deterioration} + \beta_2 * D_{i,t}^{adjustment} + \beta_3 * D_{i,t}^{other}$$

$$_+ \alpha_1 * D_{i,t}^{deterioration} * D^{U.S.} + \alpha_2 * D_{i,t}^{adjustment} * D^{U.S.} + \alpha_3 * D_{i,t}^{other} * D^{U.S.} + \varepsilon_{i,t}$$

y: macroeconomic variable, i: country index, t: time index

Results

Table 5 presents the results of our analysis of the components of real GDP in both the foreign economies and the United States. As in Table 1 for the United States, columns (1) through (3) in Table 5 show the performance of these components during deterioration periods, adjustment periods, and the difference between the two. Column (4) presents the adjustment-minus-deterioration calculations for the United States. The U.S. estimates are based on the same dates for deterioration and adjustment periods as in Tables 1-4, but draw on the OECD and UN databases that are used for the foreign countries; accordingly, these estimates differ, but just slightly, from

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[17] For robustness, we identified an alternative set of deterioration and adjustment periods based on a more stringent criterion that the change in the trade balance/GDP ratio must be at least 2 percentage points. This led to fewer but more pronounced episodes. However, it did not much change the results for the behavior of macroeconomic variables during deterioration and adjustment periods.

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those shown in Table 1.[18] Column (5) shows the differences between the adjustment-minus-deterioration calculations for the foreign countries and the United States, and indicates whether those differences are statistically significant. Finally, columns (6) through (10) present the analogous estimates for the change in nominal shares in GDP.

The salient message from Table 5 is the remarkably similar pattern of results for the foreign industrial countries compared with in the United States. In both cases, GDP growth falls by 1.1 percentage points in adjustment periods compared with in deterioration periods, with the growth of domestic demand falling by about 2¾ percentage points and the contribution of net exports to GDP growth rising around 1¼ percentage points. None of the differences for growth rates in the adjustment-minus-deterioration calculations (column 5) are statistically significant. That said, residential investment appears to fall off far more during adjustment periods in the United States than in foreign economies.

As with Table 3 for the United States alone, Table 6 compares adjustment-minus-deterioration calculations between foreign countries and the United States for prices, exchange rates, and interest rates. Here, some systematic differences do emerge. Most notably, as shown in lines 6 and 7, the external adjustment in the foreign economies appears to be associated with only a small amount of real exchange rate depreciation, compared with the more pronounced depreciation associated with U.S. adjustment. This difference may explain why the foreign economies appear to experience only small increases in consumer price inflation (lines 1 and 2) during adjustment periods and no increases in trade price inflation (lines 8 and 9). Interestingly, during adjustment periods, foreign nominal long-term interest rates and policy rates (lines 10 and 12) rise about the same as in the United States. However, because foreign inflation rises by much less than in the

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[18] We did not use the algorithm described earlier in Section IV to re-identify the dates of deterioration and adjustment periods for the United States. The algorithm would identify periods for the United States that generally line up with our judgmentally chosen dates, but with some small deviations.

United States, real short- and long-term interest rates rise abroad, whereas they fall in the United States.

Interpretation

It is clear that during external adjustment, the growth of GDP and its components have reacted quite similarly in the foreign economies and in the United States. Moreover, compared with in the United States, it seems even less likely in the foreign economies that exchange rate declines caused the fall in GDP growth during adjustment, given the relatively modest amounts of depreciation we identified. This does raise the question, however, of why did foreign real interest rates rise rather than fall (as in the United States) during adjustment, and what caused foreign GDP growth to fall?

One possible explanation is that foreign monetary authorities historically have been more focused on the exchange rate than in the United States, so a smaller amount of depreciation led to greater real interest rate adjustment. Then, even a relatively modest amount of depreciation could have led to higher interest rates which lowered GDP growth (even though it would have been the lower GDP growth that achieved trade adjustment rather than the change in currency values). Or, alternatively, the initial shock might have been a slowdown in domestic demand leading to both declines in GDP growth and in the currency—but unlike in the United States, foreign authorities chose to raise real interest rates in response to exchange rate depreciation rather than lowering them in response to weaker activity. Resolving this issue will require further investigation.

V. Performance of Foreign Economies during U.S. External Adjustment

U.S. external adjustment implies a reduction in the U.S. trade deficit and, accordingly, reductions in the trade surpluses of our trading partners. Some observers have voiced concerns that U.S. adjustment could pose a significant threat to economic activity abroad. What does the

historical record indicate? Here, we compare the macroeconomic performance of the 20 OECD

countries we studied in Section IV during the same periods of U.S. external deterioration and

adjustment that we used to analyze U.S. macroeconomic performance in Sections II and III.[19] All

performance indicators represent averages over the foreign OECD sample, weighted by nominal

dollar-value GDP at market exchange rates. The results are shown in Tables 7 and 8, and selected

series are graphed in Figures 5-8.

Analogous to Table 1 for the United States, Table 7 summarizes the performance of GDP

and its components abroad. Column 1 indicates their average growth rates during periods when the

U.S. trade deficit widened, column 2 presents analogous calculations for periods when the U.S.

trade deficit narrowed, and column 3 indicates the difference; columns 4-6 analyze the shares of

components in nominal GDP.

The central message of Table 7 is that foreign real GDP growth has been higher during

periods of U.S. external adjustment than during periods of U.S. deterioration. Net exports impose a

slight drag on GDP growth during U.S. adjustment periods, but this is offset by stronger domestic

demand growth. All components of domestic demand show more rapid growth during U.S.

adjustment periods, although these differences are only statistically significant for consumption.

In Section III, we noted that it was difficult to explain the decline in U.S. GDP growth

solely by referring to a decline in the dollar. An autonomous decline in the dollar should have

boosted net exports and left U.S. GDP growth at least as high as during periods of trade balance

deterioration—therefore, some autonomous softening of domestic demand must also have been

involved. By the same token, the rise in foreign GDP growth during periods of U.S. adjustment

cannot be fully explained either by declines in the dollar or softenings of U.S. domestic demand.

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[19] We restrict our analysis to the OECD countries as data are available for them on a consistent and sectorally dis-
aggregated basis. Clearly, this sample excludes a significant and growing share of the global economy.

Either of these two events would have weighed on net exports in our trading partners, inducing declines in activity and prices that should have led to some decline in interest rates. Lower foreign interest rates, in turn, would have been expected to boost domestic demand abroad, but not to the extent that overall GDP growth would actually exceed what it would have been in the absence of U.S. external adjustment. Therefore, an autonomous strengthening of domestic demand abroad also appears to have been at work in pushing up foreign GDP growth during periods of U.S. adjustment.

Table 8 summarizes the performance of foreign prices, exchange rates, and interest rates during periods of U.S. trade adjustment and deterioration. These calculations also point to a positive shock to domestic demand abroad during periods of U.S. trade adjustment. First, although foreign currencies are more appreciated during periods of U.S. adjustment (line 6), the results on lines 1-4 generally indicate that inflation is higher during periods of U.S. adjustment than deterioration, consistent with higher demand and growth.

Second, as also noted above, we would expect declines in the U.S. trade deficit, by themselves, to be reflected in lower net exports of our trading partners, diminished activity and prices, and hence lower interest rates. In fact, lines 10-13 of Table 8 point, for the most part, to higher nominal and real interest rates during periods of U.S. adjustment compared with periods of U.S. deterioration.

To sum up, the foreign industrial economies generally appear not to have been adversely affected by past U.S. external adjustments. Their benign experience appears to reflect more than merely flexible responses to the effects of reduced U.S. trade deficits. In fact, just as U.S. adjustments appear to have been associated with negative shocks to U.S. domestic demand, U.S. adjustments also appear to have been associated with positive shocks to domestic demand in

foreign countries. And just as U.S. external adjustment may have played a stabilizing role in the United States, cushioning the falloff in domestic demand, the counterpart declines in net exports abroad may have played a similar stabilizing role by offsetting some of strength of domestic demand in foreign economies.

VI. Conclusion

In this paper, we have analyzed the effects of U.S. external adjustment by comparing past episodes when the trade balance deteriorated with those when it narrowed. At the most general level, the purpose of our research was to identify the basic empirical characteristics of U.S. external adjustment. More specifically, we were interested in assessing the historical support for claims that future external adjustment in the United States, likely driven by a decline in the dollar, would prove injurious both for the U.S. economy and for that of our foreign trading partners.

We found that during periods of U.S. external adjustment, real GDP growth did tend to slow somewhat as improvements in net exports were more than offset by deteriorations in domestic demand. However, this slowing of real GDP growth was not statistically significant. Moreover, several features of the external adjustment episodes—the fall in real interest rates and the slowing of tradeable output growth—indicate that declines in GDP growth may in part have reflected autonomous weakenings of domestic demand. That is, declines in GDP growth may have been the cause as much as the outcome of external adjustment.

Our findings of relatively benign external adjustment episodes in the United States are consistent with the results of prior research focusing on the experiences of industrial economies more generally. To further explore this issue, we analyzed the macroeconomic performance of 20 foreign OECD countries during periods when their trade balances deteriorated and improved, using the same methodology that we had applied to U.S. data. Comparing adjustment episodes with

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deterioration episodes, we found that the foreign economies experienced falloffs in domestic demand growth, offsetting improvements in net exports, and resultant small declines in GDP growth that were remarkably similar to those in the United States. The foreign economies did experience much smaller real exchange rate depreciations during adjustment periods than in the United States, and increases rather than declines in real interest rates. All told, however, our results cast doubt on the proposition that the United States will exhibit unique responses to external adjustment.

Finally, our research addressed the concern that U.S. external adjustment might substantially drag down growth in our trading partners. In the mirror image to the experience of the United States, we found that compared with periods of U.S. trade balance deterioration, GDP growth in the foreign industrial economies actually rose during U.S. adjustment episodes: domestic demand strengthened significantly more than net exports weakened. This result, together with findings that foreign inflation and interest rates also rose during U.S. adjustment episodes, suggests that just as these adjustment episodes have been associated with negative demand shocks in the United States, they have been associated with positive demand shocks abroad.

This juxtaposition of negative demand shocks here and positive shocks abroad may be mere coincidence. An alternative possibility is that the U.S. trade deficit is most likely to adjust when both U.S. domestic demand experiences a negative shock and domestic demand abroad receives a positive shock. Such a combination of shocks would lead not only to a maximum income effect on the U.S. trade balance—lowering U.S. imports and raising U.S. exports—but also to a maximum exchange rate effect, with declining interest rates in the United States and rising interest rates abroad both pushing the dollar down. We leave it to additional research to pursue this issue further.

There is no guarantee that future adjustment episodes will follow in the footsteps of past episodes, and we cannot preclude the possibility that a reduction of the U.S. trade deficit will be injurious to both the U.S. and foreign economies. For example, the U.S. trade and current account deficits are presently much larger than they were at the start of prior adjustment episodes, so a future correction may involve considerably more adjustment than in the past; this, in turn, could entail more disruptive effects than the historical experience would indicate.   However, the historical evidence suggests, at a minimum, that it is quite possible for the U.S. trade deficit to narrow without undue economic distress, either at home or abroad. Moreover, past experience points to the possibility that when U.S. external adjustment materializes, it could do so in a way that helps stabilize the global economy, cushioning declines in U.S. demand and limiting overheating in foreign economies.

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Data Source Appendix

- Data for the U.S. current account and international trade in goods and services are from the Balance of Payments Accounts, Bureau of Economic Analysis (BEA), http://www.bea.gov/bea/di/home/bop.htm.

- U.S. GDP data are from the BEA's National Income and Product Accounts (NIPA), http://www.bea.gov/bea/dn/home/gdp.htm.

- The traded and non-traded GDP data are constructed from the BEA's GDP-by-Industry Accounts, http://www.bea.gov/bea/dn2/home/annual_industry.htm. Traded output is defined as the sum of agriculture; mining; manufacturing; information services; finance and insurance; professional, scientific, and technical services; and management of enterprises (using "chained" arithmetic, as appropriate). Non-traded output includes construction, utilities, wholesale and retail trade, government; transportation and warehousing; real estate and rental and leasing; administrative and waste management services; education, health care, and social assistance; arts, entertainment, recreation, accommodation, and food services; and other services, except government. The annual data are converted to quarterly using a cubic spline technique.

- The U.S. GDP Gap is from the OECD Economic Outlook database. Information about this database can be found at http://www.oecd.org.

- The U.S. CPI is from the Bureau of Labor Statistics, http://www.bls.gov/cpi/home.htm.

- The U.S. broad real dollar index and U.S. interest rates are from the Federal Reserve Board, http://www.federalreserve.gov/releases/.

- Core import and export prices are constructed by the Federal Reserve Board from the NIPA data.

- U.S. oil import prices are provided by the BEA. Non-fuel commodity prices are from the International Monetary Fund, http://www.imf.org/external/np/res/commod/index.asp.

Foreign Data

- National Accounts data are from the OECD Quarterly National Accounts database and from countries' national statistical agencies.

- The traded and non-traded output data for all countries are from the United Nations, http://unstats.un.org/unsd/snaama/dnllist.asp. These data provide a breakdown of nominal and real gross value added for every country on an annual basis. Traded output is defined as the sum of Agriculture, Forestry, Fishing and Mining, and Manufacturing and Utilities. Non-traded output is the sum of Construction, Wholesale and Retail trade, Transport, Communications and Other Activities. The annual data are converted to quarterly using a cubic spline technique.

- The output gap, current account, import and export price deflators, and interest rates are from the OECD Economic Outlook database. Information about this database can be found at http://www.oecd.org.

- The consumer price index for most countries are from their national statistical agencies. CPI data for countries in the euro area are from the European Central Bank, http://www.ecb.int. They define core CPI as headline excluding food, energy, alcohol and tobacco. All other countries core CPI use headline excluding food and energy.

- The nominal and real effective exchange rates are from the Bank for International Settlements, http://www.bis.org/statistics/eer/index.htm.

- The bilateral exchange rates are from Bloomberg and the Federal Reserve Board, http://www.federalreserve.gov/releases/H10/Hist/.

Table 1: U.S. GDP Components

		Real Growth Rates (percent, a.r.)			Change in Nominal Shares (percentage pts., a.r.)		
		Trade Balance Deterioration (1)	Trade Balance Adjustment (2)	Adjustment Minus Deterioration (3)	Trade Balance Deterioration (4)	Trade Balance Adjustment (5)	Adjustment Minus Deterioration (6)
1.	**GDP**	3.52 **	2.47 **	-1.05			
2.	Domestic Demand	4.19 **	1.56 **	-2.63 **	0.62 **	-0.68 **	-1.30 **
3.	Consumption	3.95 **	2.14 **	-1.80 **	0.27	0.22	-0.05
4.	Investment	8.24 **	-0.56	-8.80 **	0.34	-0.80 **	-1.14 **
	of which:						
5.	Non-Residential Fixed	4.67 **	3.50 **	-1.17	-0.12	-0.04	0.08
6.	Residential	9.34 **	-4.42	-13.76 **	0.26 **	-0.39 **	-0.65 **
7.	Government	2.82 **	2.09 **	-0.73	0.02	-0.09	-0.10
8.	Exports	3.51 **	11.70 **	8.18 **	-0.23 **	0.70 **	0.94 **
9.	Imports	10.19 **	1.15	-9.04 **	0.39 **	0.03	-0.36
10.	Net Exports /1	-0.72 **	0.90 **	1.62 **	-0.62 **	0.68 **	1.30 **
11.	Traded	4.35 **	2.71 **	-1.64	-0.15 **	-0.07	0.08
12.	Non-Traded	3.04 **	2.75 **	-0.29	0.15 **	0.07	-0.08
13.	Goods GDP	4.19 **	3.06 **	-1.13	-0.52 **	-0.21	0.31
14.	Services GDP	3.09 **	2.70 **	-0.39	0.38 *	0.51	0.12
15.	Structures GDP	4.02 **	-0.19	-4.21 *	0.13	-0.30 **	-0.44 **
	Memo:						
16.	Current Account Balance				-0.65 **	0.68 **	1.33 **
17.	Trade Balance				-0.60 **	0.66 **	1.26 **
18.	GDP Gap (Actual/Potential-1, %)	-1.26 **	0.69 *	1.95 **			
19.	Change in GDP Gap	0.44	-0.57	-1.01			

* Denotes significance at the 10 percent level.

** Denotes significance at the 5 percent level.

/1 The regressions for this variable in real terms are expressed as percentage point contributions to real GDP growth.

Table 2: U.S. Trade Components

	Real Growth Rates (percent, a.r.)			Change in Nominal Shares (percentage pts., a.r.)/1		
	Trade Balance Deterioration (1)	Trade Balance Adjustment (2)	Adjustment Minus Deterioration (3)	Trade Balance Deterioration (4)	Trade Balance Adjustment (5)	Adjustment Minus Deterioration (6)
Exports						
1. Goods	3.38 **	13.20 **	9.82 **	-0.24 **	0.57 **	0.81 **
2. Agricultural	3.23	15.33 **	12.11 *	-0.49	-0.23	0.26
3. Industrial Supplies	1.92	12.57 **	10.65 **	-0.14	0.14	0.29
4. Capital Goods	4.55 **	19.12 **	14.57 **	-0.11	0.78	0.89
5. Machinery	0.28	11.25 **	10.97 **	-0.36	-0.17	0.19
6. Computers	22.29 **	38.42 **	16.13 **	0.12	-0.04	-0.16
7. Semiconductors	33.84 **	52.12 **	18.28	0.05	0.17	0.12
8. Aircraft	24.68 **	37.61 **	12.93	0.09	0.82	0.73
9. Automotive	5.44 *	6.76	1.32	0.23	-0.59	-0.82
10. Consumer	5.99 *	19.66 **	13.67 **	0.23	0.34	0.11
11. Services	4.91 **	8.31 **	3.40	0.01	0.13 **	0.13 **
Imports						
12. Goods	10.86 **	1.21	-9.65 **	0.33 **	0.02	-0.32
13. Oil	12.24 **	3.04	-9.20	-0.81	0.44	1.25
14. Foods	10.49 **	-1.49	-11.97	-0.26	-0.41	-0.15
15. Non-oil Industrial Supplies	9.31 **	-1.16	-10.46 **	-0.60	-0.42	0.18
16. Capital Goods	17.23 **	13.61 **	-3.61	-0.10	1.24 **	1.34 **
17. Machinery	13.70 **	5.41	-8.29	0.06	0.41	0.35
18. Computers	43.53 **	40.05 **	-3.48	0.03	0.33 **	0.30 *
19. Semiconductors	34.47 **	45.74 *	11.26	-0.17 *	0.26 *	0.43 **
20. Aircraft	33.30	54.06	20.76	-0.02	0.25	0.27
21. Automotive	12.31 **	-0.44	-12.74 **	0.36	-0.70	-1.07 *
22. Consumer	15.00 **	2.31	-12.69 **	0.61 **	-0.09	-0.70
23. Services	7.97 **	1.48	-6.49 **	0.05 **	0.01	-0.05

* Denotes significance at the 10 percent level.

** Denotes significance at the 5 percent level.

/1 Nominal shares for the categories of trade are defined as the percent of toal exports (or imports) of goods and services.

Table 3: U.S. Prices and Related Variables -- Adjustment Minus Deterioration (percentage points, a.r.)

	Benchmark Model (1)	Data Through 1992:Q1 (2)	Time Trend (3)	Deviation from 20-Quarter Moving Average (4)
Domestic Prices				
1. CPI Inflation	3.05 **	1.77 **	2.74 **	2.69 **
2. Core PCE Inflation	1.75 **	-0.04	1.46 **	0.86 **
3. Traded Inflation	2.67 **	1.43	2.37 *	2.18 *
4. Non-Traded Inflation	1.01	-0.18	0.67	0.76
5. Goods GDP Inflation	2.56 **	0.89	2.20 **	1.78 **
6. Services GDP Inflation	1.17 **	-0.39	0.83 *	0.96 **
7. Structures GDP Inflation	0.49	0.43	0.18	1.11
8. Percent Change in Non-traded Prices Relative to Traded	-1.65 **	-1.58 **	-1.69 **	-1.42 **
9. Percent Change in Prices of Services Relative to Goods	-1.40 **	-1.24 **	-1.37 **	-0.83 **
10. Percent Change in Prices of Structures Relative to Goods	-2.12 **	-0.48	-2.06 **	-0.72
11. Percent Change in Prices of Services and Structures Relative to Goods	-1.43 **	-1.01 **	-1.39 **	-0.73 **
Exchange Rates				
12. Broad Real Dollar Index (Mar. 1973 = 100)	-13.09 **	-13.41 **	-13.06 **	-12.96 **
13. Broad Real Dollar (percent change)	-2.36	-2.34	-2.20	2.92
Trade and Commodity Prices				
14. Core Import Price Inflation /1	4.66 **	3.63 *	4.12 **	2.15
15. Core Export Price Inflation /1	4.46 **	4.09 **	4.07 **	3.87 **
16. Oil Import Price ($/b)	-5.77 **	-4.04 **	-4.73 **	-1.88
17. Oil Import Price (percent change)	16.73	29.99	10.35	17.90
18. Non-fuel Primary Commodity Price (1995 = 100)	8.61 **	10.01 **	10.93 **	7.20 **
19. Non-fuel Primary Commodity Price (percent change)	-0.37	-2.04	-2.10	-3.64
Interest Rates				
20. Nominal 10-year Treasury Yield	1.16 **	-1.33 **	0.98 *	0.37
21. Real 10-year Treasury Yield /2	-1.58 **	-2.61 **	-1.44 **	-2.20 **
22. Federal Funds Rate	2.11 **	-0.44	1.83 **	1.80 **
23. Real Federal Funds Rate /3	-0.94	-2.21 **	-0.91	-0.88

* Denotes significance at the 10 percent level.

** Denotes significance at the 5 percent level.

/1 Core imports are imports of goods excluding oil, computers, and semiconductors. Core exports are exports of goods excluding computers and semiconductors.

/2 Real rate is defined as the nominal rate minus the 4-quarter percent change in the CPI.

/3 Real rate is defined as the nominal rate minus the annualized quarterly percent change in the CPI.

Table 4: U.S. GDP Components (Regressions include U.S. real GDP growth as an explanatory variable)

		Real Growth Rates (percent, a.r.)			Change in Nominal Shares (percentage pts., a.r.)		
		Trade Balance Deterioration	Trade Balance Adjustment	Adjustment Minus Deterioration	Trade Balance Deterioration	Trade Balance Adjustment	Adjustment Minus Deterioration
		(1)	(2)	(3)	(4)	(5)	(6)
1.	**GDP**						
2.	Domestic Demand	0.57 **	-0.99 **	-1.56 **	0.55 **	-0.73 **	-1.28 **
3.	Consumption	2.30 **	0.98 **	-1.31 **	1.36 **	0.98 **	-0.38
4.	Investment	-6.77 **	-11.11 **	-4.34 *	-1.40 **	-2.02 **	-0.63 *
	of which:						
5.	Non-Residential Fixed	-1.15	-0.60	0.56	-0.30 **	-0.17	0.13
6.	Residential	-0.26	-11.17 **	-10.91 **	-0.03	-0.59 **	-0.56 **
7.	Government	2.16 **	1.62 **	-0.54	0.59 **	0.31 **	-0.27 *
8.	Exports	-1.20	8.38 **	9.59 **	-0.30 **	0.65 **	0.96 **
9.	Imports	4.65 **	-2.75	-7.39 **	0.24	-0.08	-0.32
10.	Net Exports /1	-0.59 **	1.00 **	1.58 **	-0.55 **	0.73 **	1.28 **
11.	Traded	1.88 **	0.97	-0.91	-0.41 **	-0.25 **	0.16
12.	Non-Traded	1.66 **	1.78 *	0.12	0.41 **	0.25 **	-0.16
13.	Goods GDP	-2.47 **	-1.62 **	0.85	-1.72 **	-1.05 **	0.67 **
14.	Services GDP	2.84 **	2.53 **	-0.32	1.90 **	1.57 **	-0.33 *
15.	Structures GDP	-2.68 **	-4.90 **	-2.22	-0.17	-0.52 **	-0.35 **
	Memo:						
16.	Current Account Balance				-0.58 **	0.73 **	1.31 **
17.	Trade Balance				-0.53 **	0.71 **	1.24 **
18.	GDP Gap (Actual/Potential-1, %)	-1.84 **	0.29	2.13 **			
19.	Change in GDP Gap	-2.95 **	-2.94 **	0.02			

* Denotes significance at the 10 percent level.

** Denotes significance at the 5 percent level.

/1 The regressions for this variable in real terms are expressed as percentage point contributions to real GDP growth.

Table 5: Foreign GDP Components

		Real Growth Rates (percent, a.r.)					Change in Nominal Shares (percentage pts., a.r.)				
		Foreign		Adjusment Minus Deterioration			Foreign		Adjusment Minus Deterioration		
		Deterioration	Adjustment	Foreign	U.S.	Difference	Deterioration	Adjustment	Foreign	U.S.	Difference
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1.	**GDP**	3.40 **	2.29 **	-1.11 **	-1.09	0.02					
2.	Domestic Demand	4.27 **	1.52 **	-2.75 **	-2.68 **	0.07	1.18 **	-1.18 **	-2.36 **	-1.31 **	1.05
3.	Consumption	3.60 **	1.93 **	-1.67 **	-1.81 **	-0.15	0.24 **	-0.29 **	-0.53 **	-0.04	0.48
4.	Investment	10.07 **	2.95 **	-7.12 **	-8.73 **	-1.61	0.64 **	-0.85 **	-1.50 **	-1.16 **	0.33
	of which:										
5.	Residential	7.18 **	1.42 *	-5.76 **	-13.69 **	-7.94	0.14 **	-0.22 **	-0.36 **	-0.64 **	-0.28
6.	Government	3.68 **	2.24 **	-1.44 **	-0.87	0.57	0.28 **	-0.05	-0.33 **	-0.10	0.23
7.	Exports	5.31 **	7.74 **	2.43 **	8.24 **	5.80	0.04	0.89 **	0.85 **	0.94 **	0.09
8.	Imports	8.82 **	4.62 **	-4.20 **	-9.06 **	-4.86	1.19 **	-0.27 *	-1.47 **	-0.36	1.11
9.	Net Exports /1	-0.66 **	0.78 **	1.44 **	1.23 **	-0.21	-1.16 **	1.16 **	2.32 **	1.30 **	-1.02
10.	Traded	2.75 **	2.39 **	-0.36 *	-2.23 *	-1.87	-0.64 **	-0.19 **	0.44 **	0.15	-0.29
11.	Non-Traded	3.61 **	2.30 **	-1.30 **	-0.96 **	0.35	0.64 **	0.19 **	-0.44 **	-0.15	0.29
	Memo:										
12.	Current Account Balance						-1.13 **	-0.31 **	0.81 **	1.57 **	0.75
13.	Trade Balance						-0.35 **	1.01 **	1.36 **	1.29 **	-0.07
14.	GDP Gap /2	0.03	-1.07 **	-1.10 **	2.05 **	3.15 **					
15.	Change in GDP Gap /2	0.45 **	-0.49 **	-0.94 **	-1.01	-0.07					

Note: Foreign countries include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland,

Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

* Denotes significance at the 10 percent level.

** Denotes significance at the 5 percent level.

/1 The regressions for this variable in real terms are expressed as percentage point contributions to real GDP growth.

/2 The GDP gap is defined as (actual - potential)/potential, in percent.

Table 6: Other Foreign Variables -- Adjustment Minus Deterioration (percentage points, a.r.)

		Benchmark Model			Time Trend		
		Foreign	U.S.	Difference	Foreign	U.S.	Difference
		(1)	(2)	(3)	(4)	(5)	(6)
	Domestic Prices						
1.	CPI Inflation	0.33	3.05 **	2.72 *	0.29	2.66 **	2.37 *
2.	Core CPI Inflation	0.45 *	2.64 **	2.18 *	0.45 **	2.25 **	1.81 *
3.	Traded Inflation	0.89 **	2.95 **	2.06	0.94 **	2.58 **	1.64
4.	Non-Traded Inflation	-0.13	0.97 *	1.11	-0.08	0.54	0.62
5.	Percent Change in Non-traded Prices Relative to Traded	-1.03 **	-2.04 **	-1.01	-1.03 **	-2.10 **	-1.07
	Multilateral Exchange Rates						
6.	Real Exchange Rate (Level)	-3.16 **	-13.52 **	-10.36 **	-3.17 **	-15.16 **	-11.99 **
7.	Real Exchange Rate (Percent Change)	-0.64	-2.00	-1.35	-0.64	-1.75	-1.11
	Trade Prices						
8.	Import Price Inflation	-2.08 **	6.64 **	8.72 **	-2.14 **	5.76 **	7.90 **
9.	Export Price Inflation	0.26	3.62 **	3.36	0.20	3.04 **	2.84
	Interest Rates						
10.	Nominal Long Rate	1.16 **	1.16 **	0.00	1.17 **	0.92 *	-0.25
11.	Real Long Rate /1	0.55 **	-1.58 **	-2.13 **	0.53 **	-1.42 **	-1.95 **
12.	Nominal Policy/Short Rate	1.32 **	2.20 **	0.89	1.31 **	1.76 **	0.45
13.	Real Policy/Short Rate /2	0.41 **	-0.53	-0.94	0.43 **	-0.57	-1.00

Note: Foreign countries include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland,

Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

* Denotes significance at the 10 percent level.

** Denotes significance at the 5 percent level.

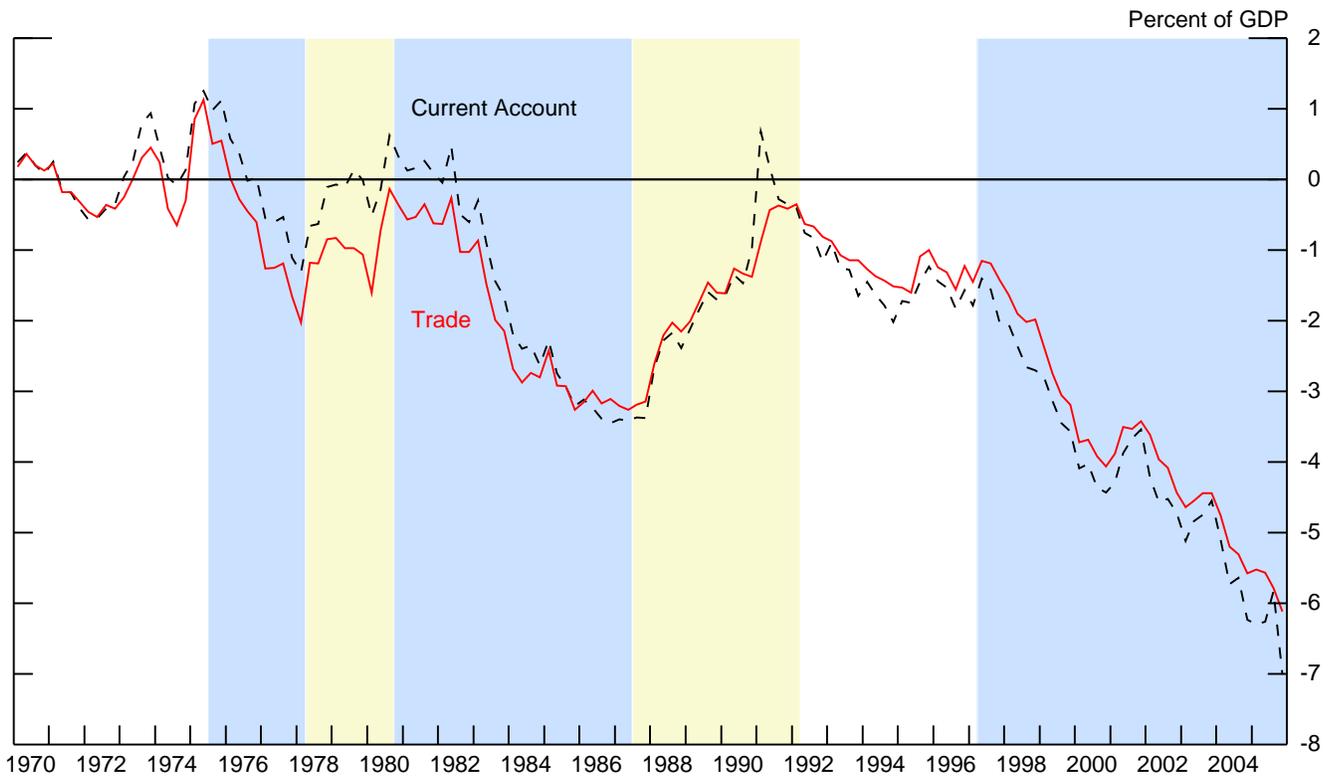/1 Real rate is defined as the nominal rate minus the 4-quarter percent change in the CPI.

/2 Real rate is defined as the nominal rate minus the annualized quarterly percent change in the CPI.

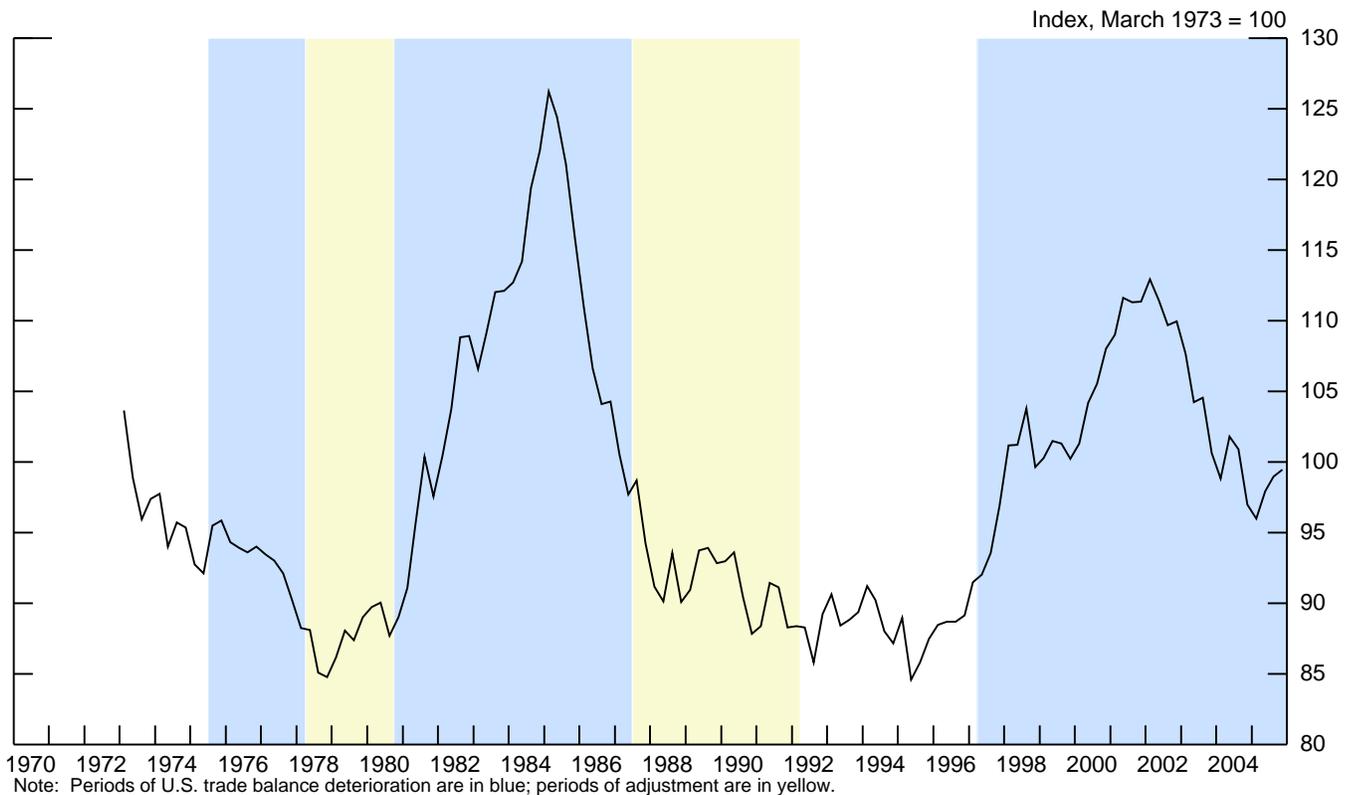**Table 7: Foreign GDP Components during U.S. Deterioration and Adjustment Periods**

		Real Growth Rates (percent, a.r.)			Change in Nominal Shares (percentage pts., a.r.)		
		Trade Balance Deterioration	Trade Balance Adjustment	Adjustment Minus Deterioration	Trade Balance Deterioration	Trade Balance Adjustment	Adjustment Minus Deterioration
		(1)	(2)	(3)	(4)	(5)	(6)
1.	**GDP**	2.38 **	3.24 **	0.87 *			
2.	Domestic Demand	2.38 **	3.46 **	1.08 *	-0.16	0.33	0.49 *
3.	Consumption	2.36 **	3.20 **	0.84 *	-0.01	0.00	0.00
4.	Investment	4.61 **	6.92 **	2.31	-0.15	0.28	0.43
	of which:						
5.	Residential	2.36 **	2.95 *	0.59	-0.10 *	-0.14 *	-0.04
6.	Government	2.26 **	3.03 **	0.78	-0.01	0.09	0.10
7.	Exports	5.54 **	6.10 **	0.56	0.26	0.20	-0.06
8.	Imports	5.19 **	7.62 **	2.43	0.12	0.52	0.41
9.	Net Exports /1	0.07	-0.13	-0.20	0.15	-0.32	-0.46 **
10.	Traded	2.23 **	3.17 **	0.94	-0.40 **	-0.59 **	-0.19
11.	Non-Traded	2.52 **	3.40 **	0.89 **	0.40 **	0.59 **	0.19
	Memo:						
12.	Current Account Balance				0.65 **	-0.03	-0.68 **
13.	Trade Balance				1.17 **	0.44 **	-0.72 **
14.	GDP Gap (Actual-Potential/Potential, %)	-1.16 **	1.13 **	2.29 **			
15.	Change in GDP Gap	-0.05	0.54	0.58			

Note: Foreign aggregates are constructed as GDP-weighted averages of Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland,

Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

* Denotes significance at the 10 percent level.

** Denotes significance at the 5 percent level.

/1 The regressions for this variable in real terms are expressed as percentage point contributions to real GDP growth.

Table 8: Other Foreign Variables -- U.S. Adjustment Minus U.S. Deterioration (percentage points, a.r.)

	Benchmark Model (1)	Data Through 1992:Q1 (2)	Time Trend (3)	Deviation from 20-Quarter Moving Average (4)
Domestic Prices				
1. CPI Inflation	1.62 *	-0.93	0.94	1.03 **
2. Core CPI Inflation	1.48 *	-1.10	0.86	0.59
3. Traded Inflation	0.85	-1.69 **	0.24	0.60
4. Non-Traded Inflation	1.66 *	-0.78	1.01 *	0.73 **
5. Percent Change in Non-traded Prices Relative to Traded	0.77 **	0.91 **	0.75 **	0.12
Multilateral Exchange Rates				
6. Real Exchange Rate (Level)	2.99 **	3.77 **	3.25 **	2.27 **
7. Real Exchange Rate (Percent Change)	-0.49	-1.11	-0.61	-2.13
Trade Prices				
8. Import Price Inflation	4.12	2.95	3.31	6.88 **
9. Export Price Inflation	2.25	0.61	1.53	3.22 **
Interest Rates				
10. Nominal Long Rate	1.99 **	-1.08 **	1.61 **	0.62 **
11. Real Long Rate /1	0.93 *	0.60	1.21 **	0.18
12. Nominal Policy/Short Rate	2.99 **	-0.28	2.56 **	1.18 **
13. Real Policy/Short Rate /2	1.87 **	1.38 **	2.09 **	0.73 **

Note: Foreign aggregates are constructed as GDP-weighted averages of Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland,

Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

* Denotes significance at the 10 percent level.

** Denotes significance at the 5 percent level.

/1 Real rate is defined as the nominal rate minus the 4-quarter percent change in the CPI.

/2 Real rate is defined as the nominal rate minus the annualized quarterly percent change in the CPI.

Table 9: Foreign Trade Balance Adjustment and Deterioration Dates

	Adjustment	Deterioration		Adjustment	Deterioration
Australia	1970q1-1972q4	1973q1-1975q1	Japan	1974q4-1977q4	1972q1-1974q3
	1985q4-1987q4	1976q2-1977q4		1980q2-1986q2	1978q1-1980q1
	1989q3-1992q1	1980q2-1982q2			1986q3-1990q2
	1994q4-1996q4	1992q2-1994q3			1993q2-1996q3
	1999q3-2001q3	1997q1-1999q2			
	2004q2-2005q4	2001q4-2004q1	Netherlands	1970q1-1973q3	1975q1-1979q2
				1979q3-1985q2	1985q3-1987q3
Austria	1977q2-1979q1	1975q1-1977q1		1992q2-1994q4	
	1981q1-1983q1	1979q2-1980q4		1999q4-2005q4	
	1995q4-2005q4	1983q2-1985q1			
			Norway	1971q1-1973q1	1970q1-1970q4
Belgium	1981q1-1988q4	1972q4-1980q4		1977q1-1981q1	1973q2-1976q4
	1991q1-1994q3	1998q4-2000q3		1982q4-1984q2	1984q3-1987q2
	2000q4-2002q4	2003q1-2005q4		1987q3-1991q3	1991q4-1994q4
				1995q1-1996q4	1997q1-1998q2
Canada	1970q1-1971q1	1971q2-1975q4		1998q3-2001q1	2001q2-2003q1
	1976q1-1983q2	1983q3-1991q4		2003q2-2005q4	
	1992q1-1996q1	1996q2-1997q4			
	1998q1-2001q1	2001q2-2004q2	New Zealand	1970q2-1972q2	1972q3-1975q1
				1975q2-1978q4	1979q1-1981q4
Denmark	1970q1-1972q2	1972q3-1974q1		1985q2-1988q2	1984q2-1985q1
	1977q2-1984q1	1975q1-1977q1		1990q2-1992q2	1988q3-1990q1
	1986q1-1992q4	1984q2-1985q4		1999q3-2001q4	1992q3-1999q2
	1998q1-2001q3	1993q1-1997q4			2002q1-2005q4
		2001q4-2005q4			
			Portugal	1970q4-1972q3	1972q4-1975q1
Finland	1970q4-1972q4	1970q1-1970q3		1977q3-1979q1	1979q2-1981q4
	1975q2-1978q3	1973q1-1975q1		1982q1-1986q1	1986q2-1988q4
	1982q4-1984q3	1978q4-1980q3		2000q4-2003q2	1995q3-2000q3
	1990q3-1999q2	1984q4-1990q2			2003q3-2005q4
		2000q3-2005q4			
			Sweden	1970q1-1972q4	1973q1-1976q3
France	1977q1-1978q3	1972q2-1973q4		1976q4-1978q4	1979q1-1980q2
	1982q2-1985q3	1978q4-1982q1		1980q3-1985q1	1986q4-1990q1
	1990q3-1998q1	1998q2-2001q1		1990q2-1996q4	
		2002q4-2005q4		2000q3-2005q1	
Germany	1972q1-1974q2	1974q3-1976q3	Spain	1970q1-1971q4	1972q1-1975q2
	1980q3-1988q4	1977q4-1980q2		1975q3-1978q4	1979q1-1981q1
	2000q2-2004q4			1981q2-1985q1	1985q2-1990q3
				1990q4-1996q4	1997q1-2000q2
Greece	1973q3-1980q3	1980q4-1983q1			2002q4-2005q4
	1985q1-1987q3	1987q4-1991q1			
	1991q2-1995q1	1995q2-2001q1	Switzerland	1973q4-1976q2	1976q3-1980q3
	2001q2-2005q4			1980q4-1982q4	1987q2-1989q2
				1989q3-1993q4	
Ireland	1970q1-1972q3	1972q4-1974q2		2001q1-2004q3	
	1974q3-1976q1	1976q2-1980q1			
	1980q2-1988q4	1989q1-1990q3	United Kingdom	1974q4-1981q3	1971q1-1974q3
	1990q4-2003q1	2003q2-2005q4		1989q3-1997q2	1981q4-1989q2
					1997q3-2005q4
Italy	1974q1-1978q3	1971q3-1973q4			
	1981q2-1984q1	1978q4-1981q1	Total episodes:	79	78
	1985q1-1987q1	1996q3-2005q4			
	1991q4-1996q2				

Figure 1

U.S. External Balances

Percent of GDP
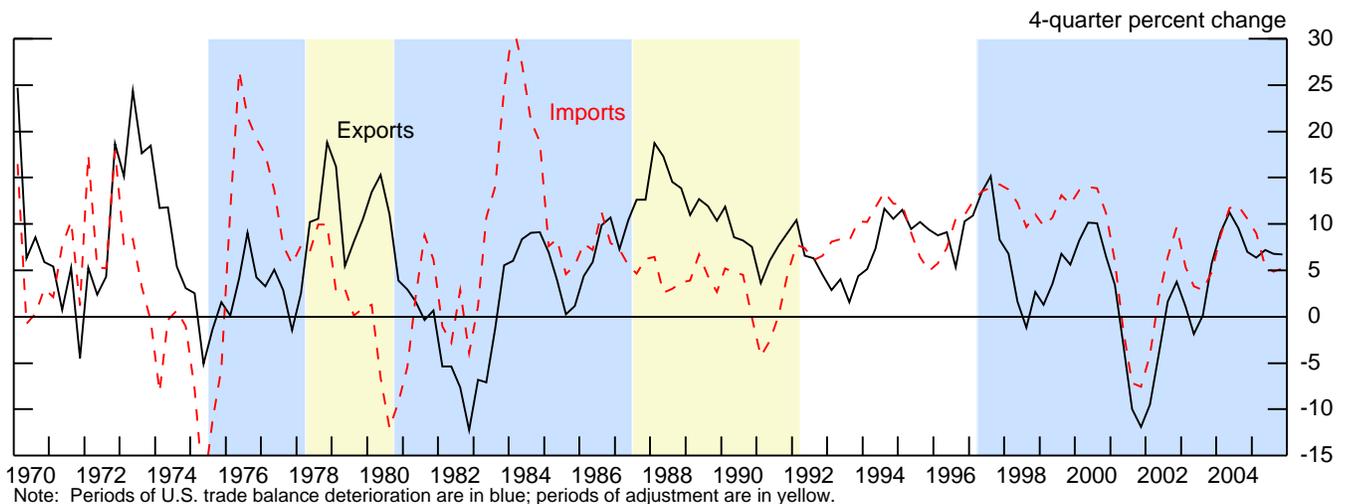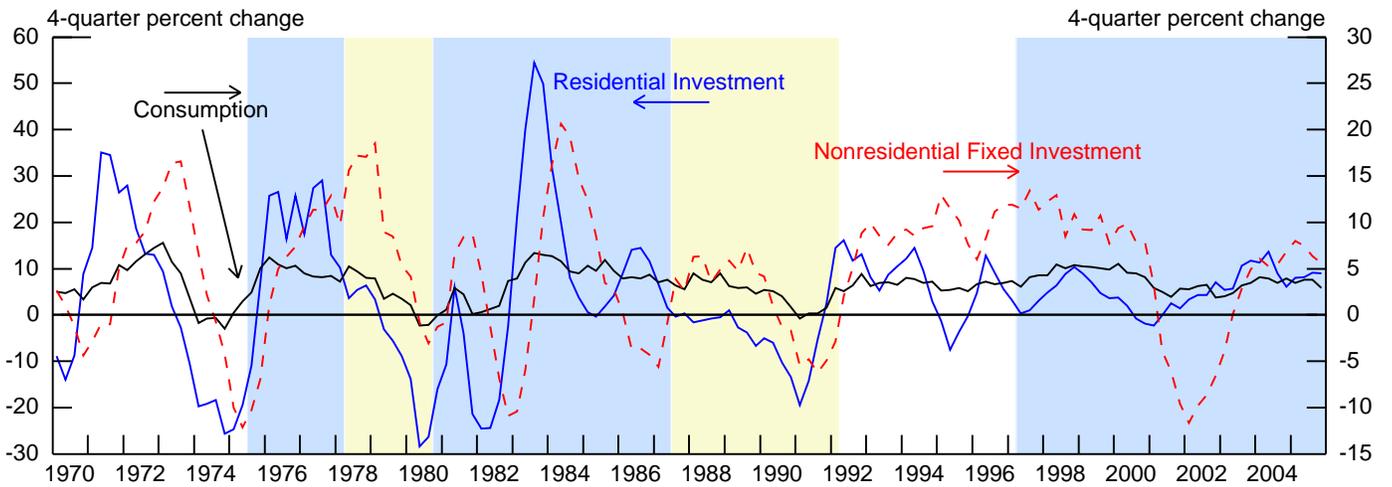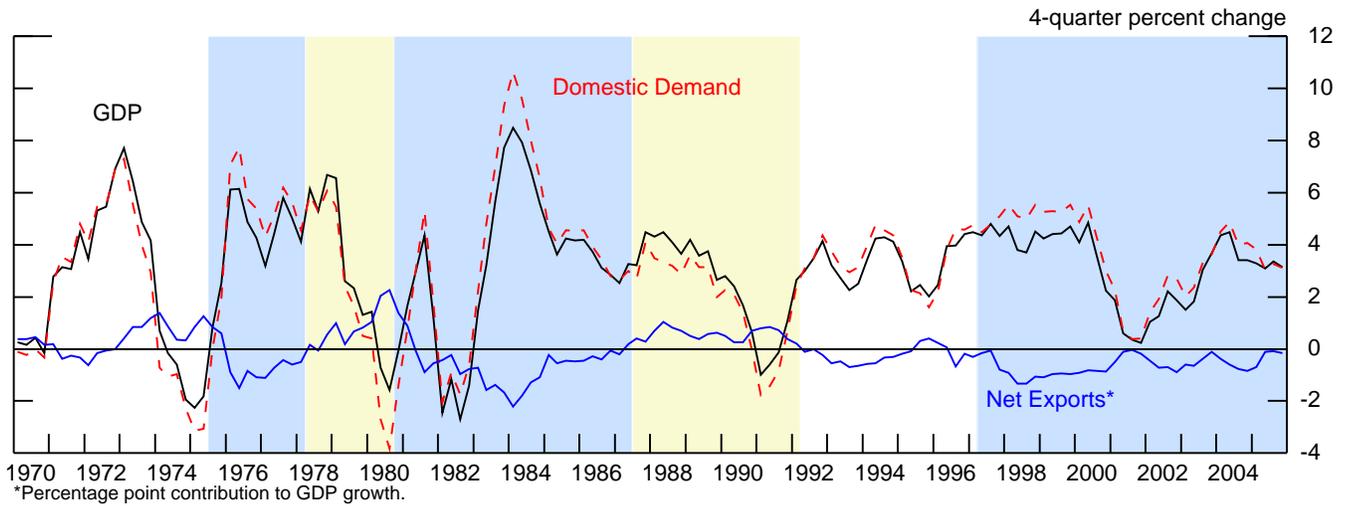
Current Account

Trade

Broad Real Dollar Index

Index, March 1973 = 100
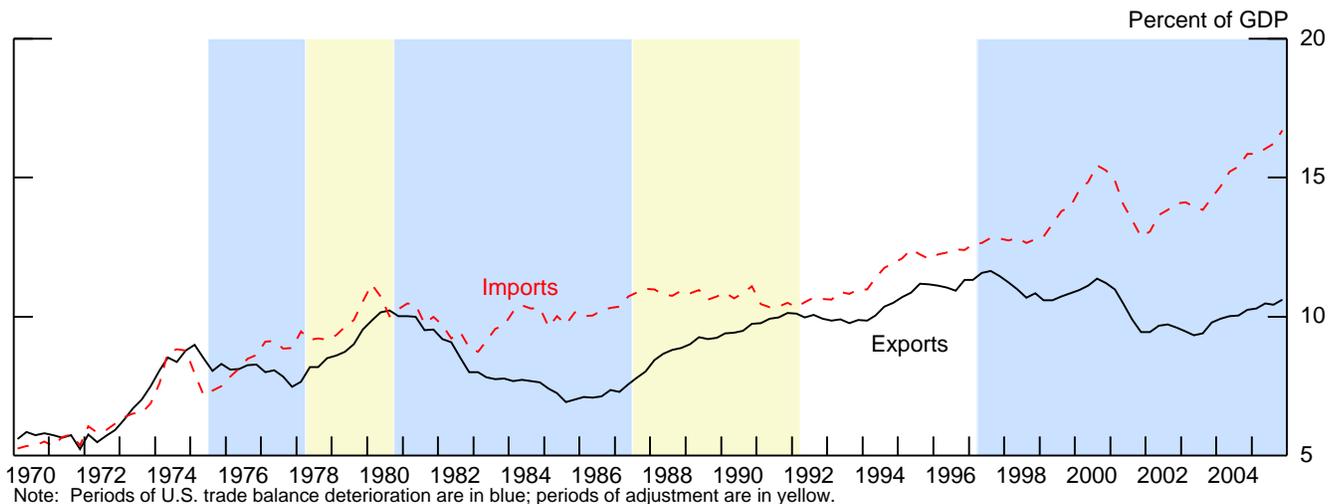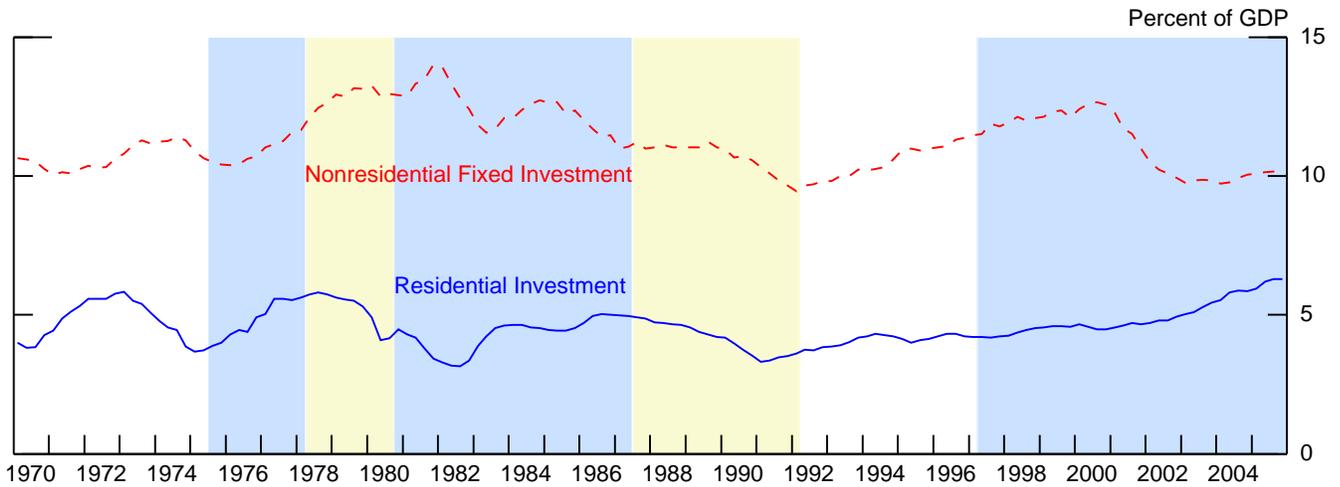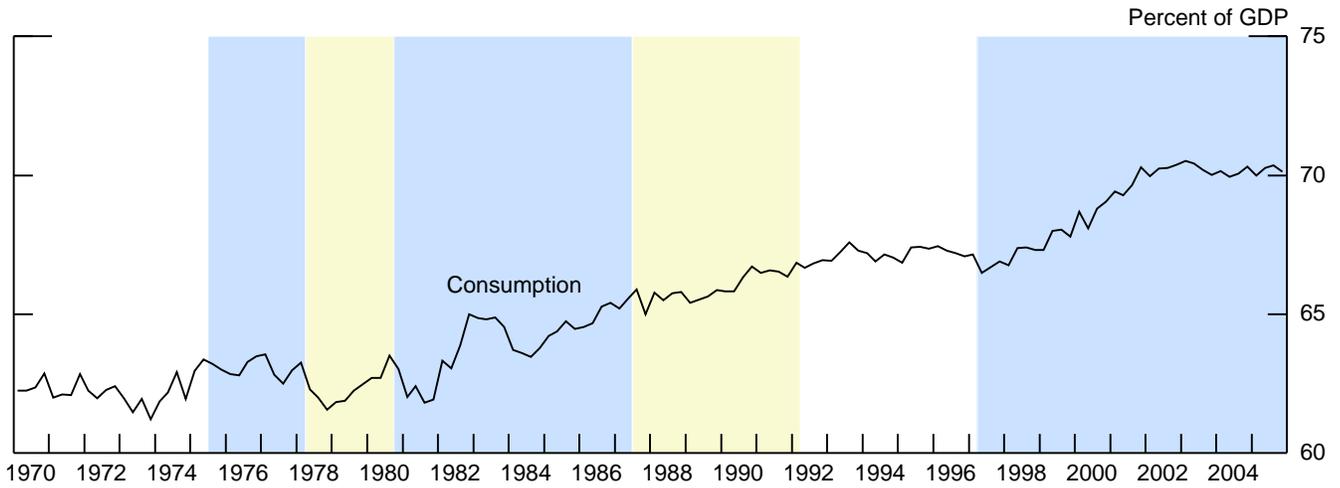
Note: Periods of U.S. trade balance deterioration are in blue; periods of adjustment are in yellow.

Figure 2

Components of U.S. Real GDP

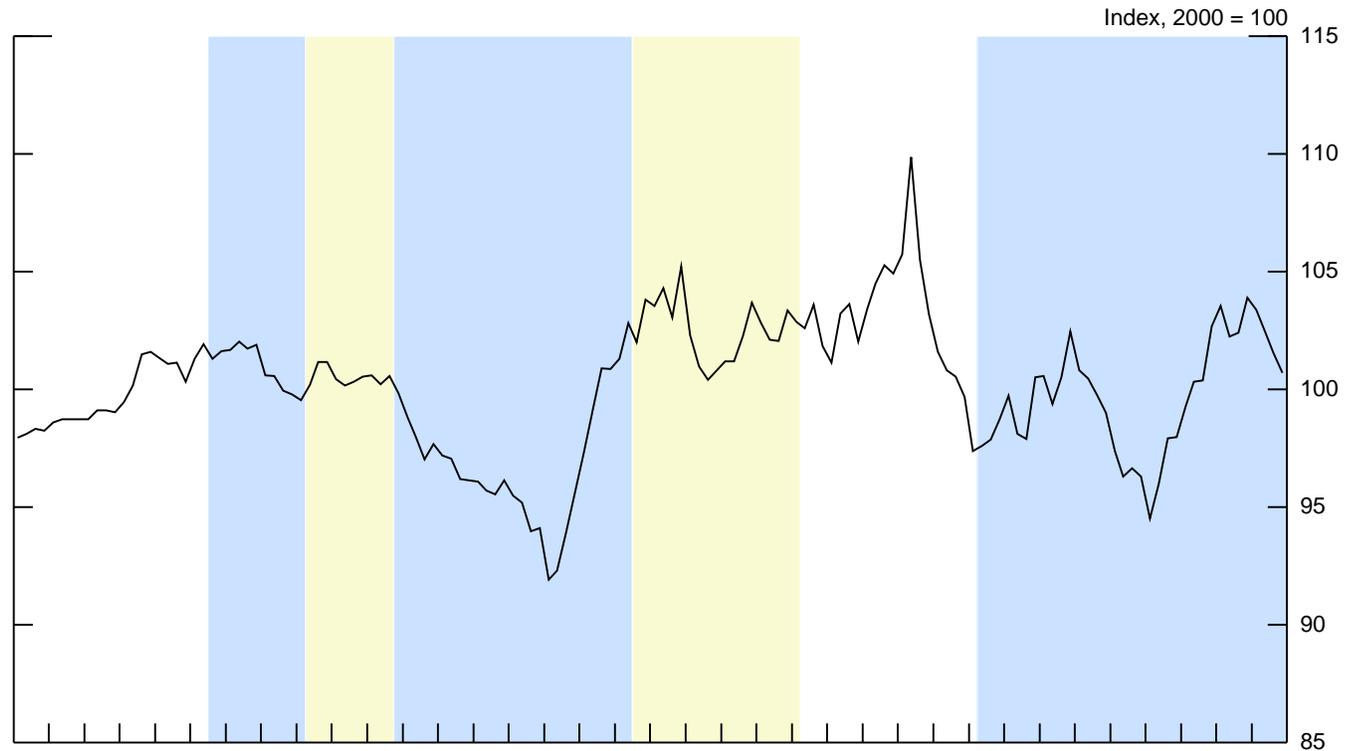4-quarter percent change

GDP

Domestic Demand

Net Exports*

*Percentage point contribution to GDP growth.

4-quarter percent change

4-quarter percent change

Consumption
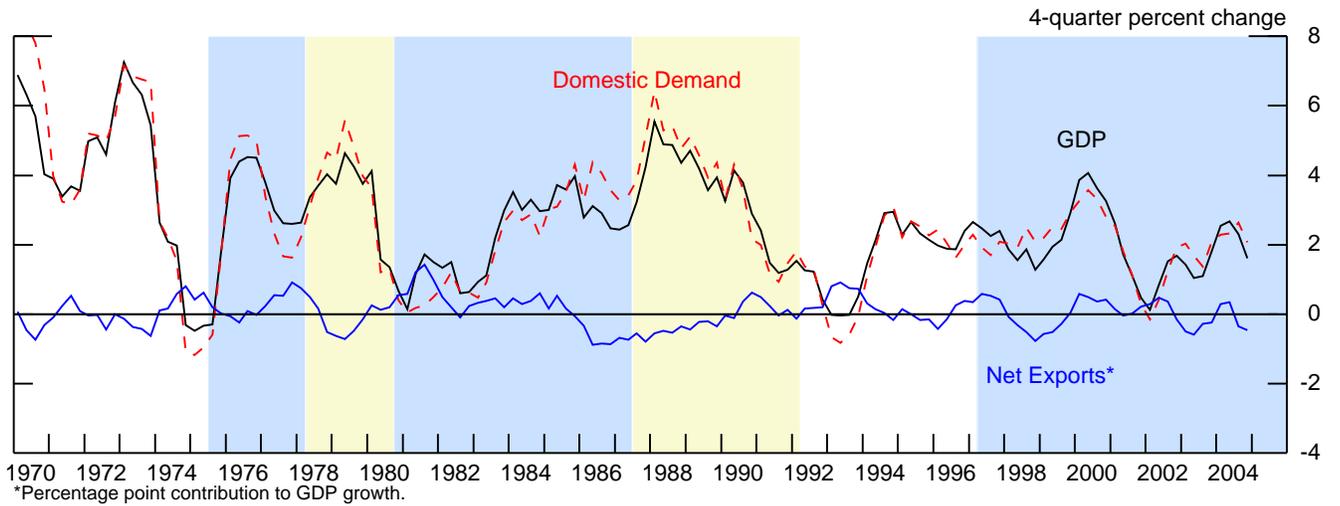
Residential Investment

Nonresidential Fixed Investment

4-quarter percent change

Exports

Imports

Note: Periods of U.S. trade balance deterioration are in blue; periods of adjustment are in yellow.

Figure 3

Components of U.S. Nominal GDP

Percent of GDP

Consumption

Percent of GDP

Nonresidential Fixed Investment

Residential Investment

Percent of GDP

Imports

Exports

Note: Periods of U.S. trade balance deterioration are in blue; periods of adjustment are in yellow.

Figure 4

Prices and Interest Rates

4-quarter percent change

CPI

Ratio

Nontraded Prices/Traded Prices

Services & Structures Prices/Goods Prices

Percent

Nominal 10-year yield

Real 10-year* yield
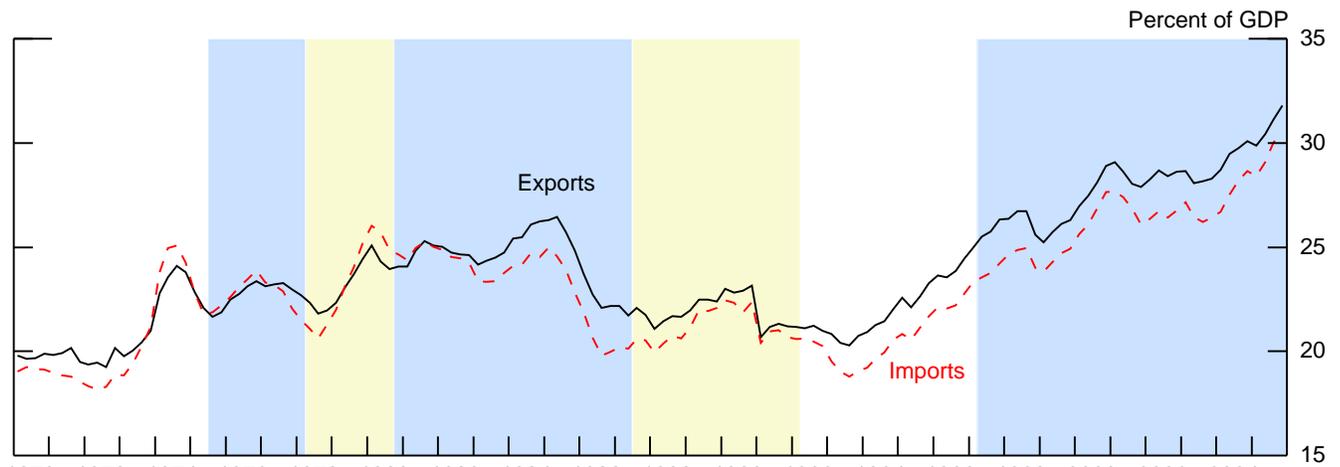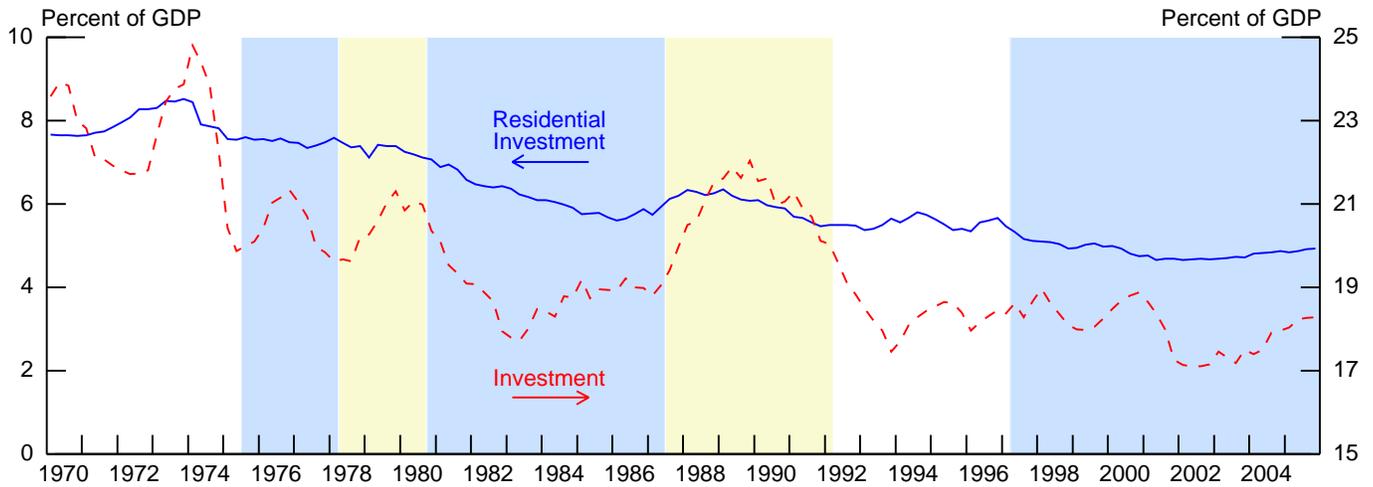
Note: Periods of U.S. trade balance deterioration are in blue; periods of adjustment are in yellow.
*Real rate is defined as the nominal rate minus the 4-quarter percent change in the CPI.

Figure 5

Foreign External Balances*

Percent of GDP

Trade

Current Account

Multilateral Real Exchange Rate Index

Index, 2000 = 100

Note: Periods of U.S. trade balance deterioration are in blue; periods of adjustment are in yellow.
*Foreign aggregates are constructed as GDP-weighted averages of Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, Norway,New Zealand, Portugal, Sweden, Spain, Switzerland, and the United Kingdom.
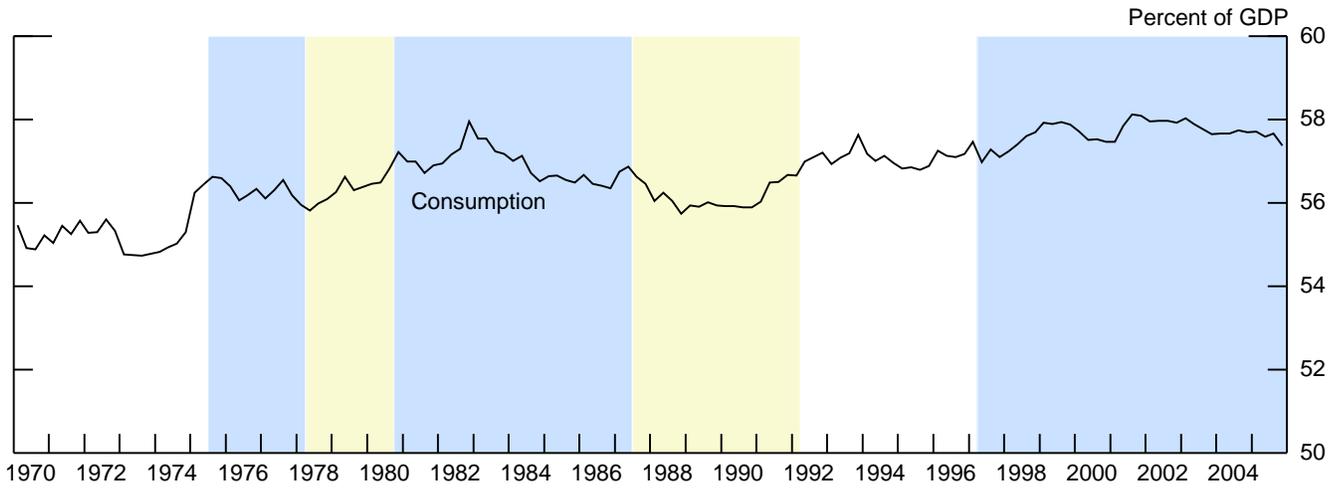
Figure 6

Components of Foreign Real GDP*

4-quarter percent change

Domestic Demand

GDP

Net Exports*

*Percentage point contribution to GDP growth.

4-quarter percent change

Residential Investment

Investment

Consumption

4-quarter percent change

Imports

Exports

Note: Periods of U.S. trade balance deterioration are in blue; periods of adjustment are in yellow.
*Foreign aggregates are constructed as GDP-weighted averages of Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, Norway,New Zealand, Portugal, Sweden, Spain, Switzerland, and the United Kingdom.
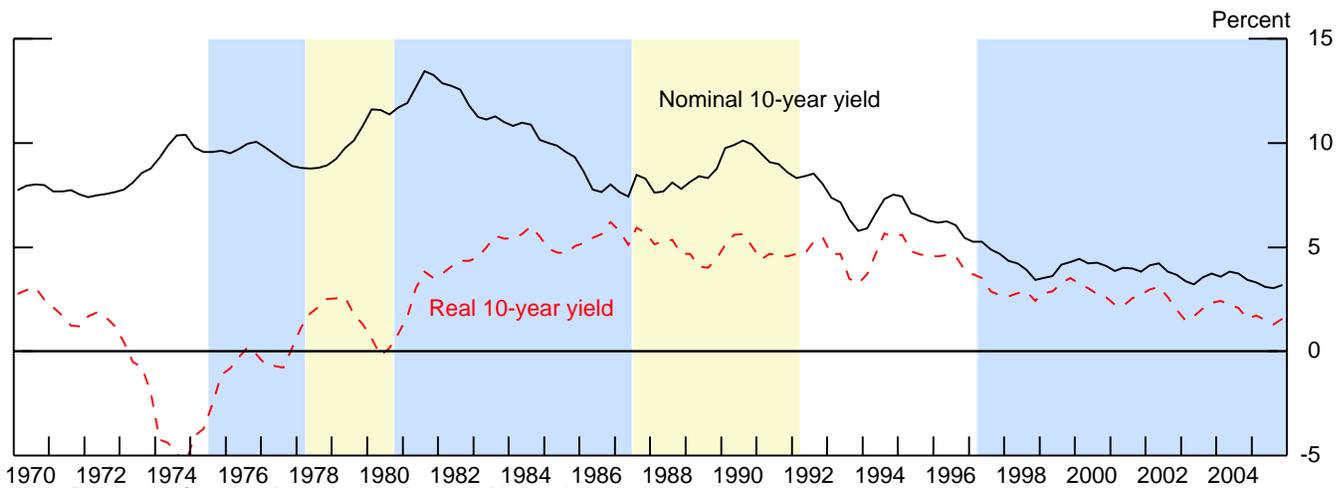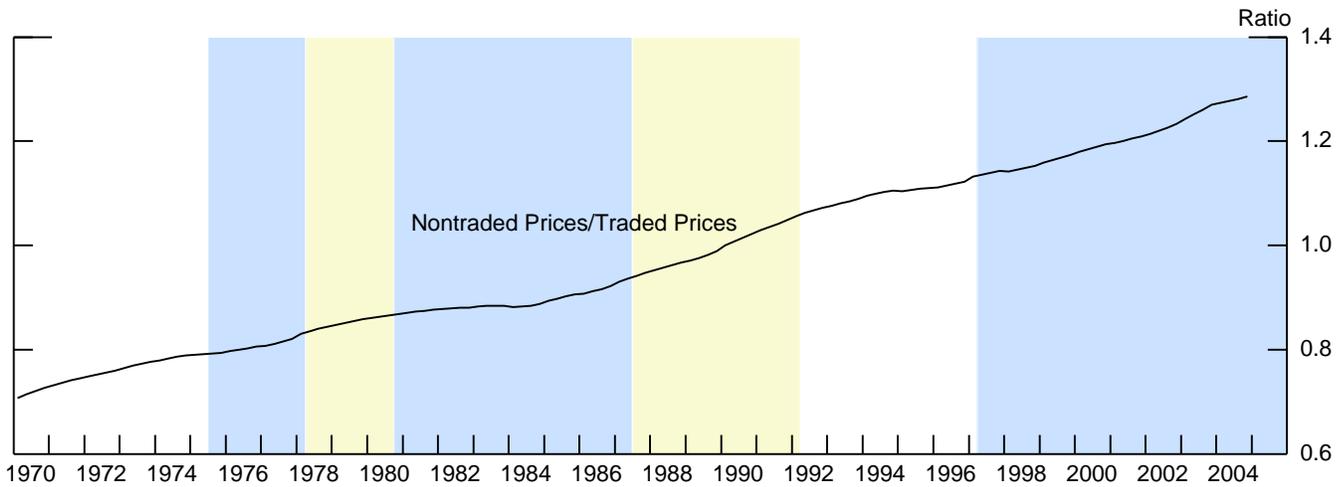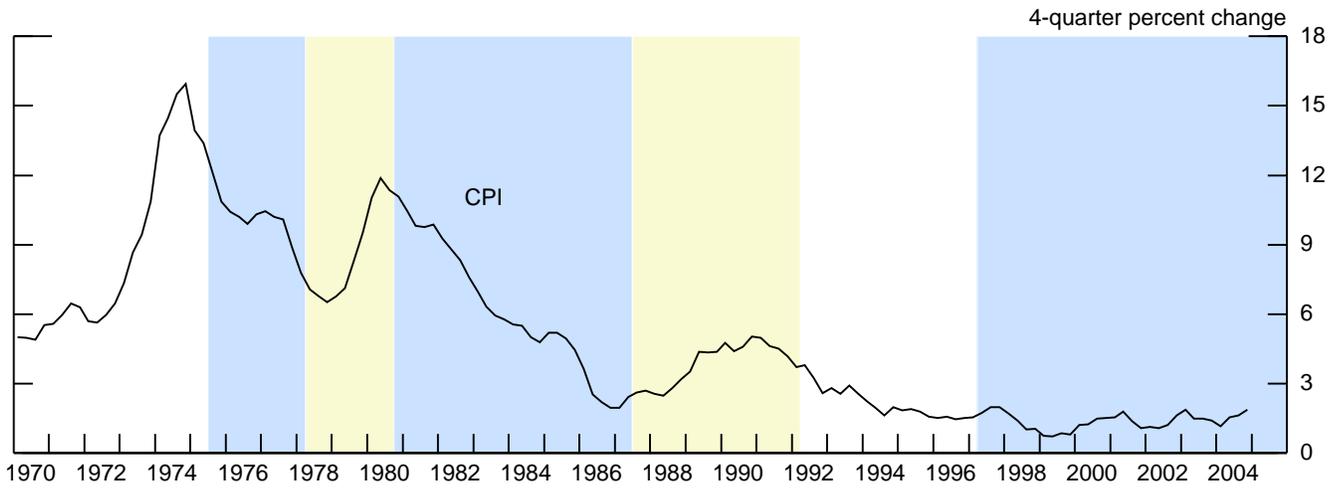
Figure 7

Components of Foreign Nominal GDP*

Note: Periods of U.S. trade balance deterioration are in blue; periods of adjustment are in yellow.
*Foreign aggregates are constructed as GDP-weighted averages of Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, Norway, New Zealand, Portugal, Sweden, Spain, Switzerland, and the United Kingdom.

Figure 8

Foreign Prices and Interest Rates

Note: Periods of U.S. trade balance deterioration are in blue; periods of adjustment are in yellow.
*Foreign aggregates are constructed as GDP-weighted averages of Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece,
  Ireland, Italy, Japan, Netherlands, Norway,New Zealand, Portugal, Sweden, Spain, Switzerland, and the United Kingdom.