

THE IMPACT OF CYCLICAL FACTORS ON THE U. S. BALANCE OF PAYMENTS

Magda Kandil
Joshua Greene

ABSTRACT

Real GDP growth and real effective exchange rate (REER) appreciation appear co-integrated with the current and financial accounts of the U.S. balance of payments. On this basis, we estimate reduced form equations showing that expected changes and shocks to real GDP, the REER, energy prices, and growth in emerging market economies and other industrial countries explain much of the short-term variation in the U.S. current account balance, with the balance worsening as real GDP, the REER, and to a lesser extent, energy prices increase. In addition, the financial balance improves with real growth and an increase in the oil price, while stock market prices affect the composition of capital inflows.

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I. INTRODUCTION*

The United States has experienced current account deficits exceeding 1 percent of GDP during all but two of the years since 1981 (Table 1). In 2000, the current account deficit reached 4.2 percent of GDP. Although it declined in 2001 to 3.8 percent of GDP, reflecting the economic slowdown, the ratio has since increased to 4.5 percent in 2002, 4.8 percent in 2003, and even higher deficit to GDP in 2004, 5.4 percent. More recently, the current account balance in the U.S. further deteriorated in the period leading to the global financial crisis. The sustainability of the widening deficit in the current account deficit was a function of financial inflows to the United States. Major trading partners, led by China, took interest in financing the widening deficit in the United States to sustain American imports of their products as they sought to depreciate their domestic currencies relative to the US dollar to maintain export competitiveness. Other partners, particularly oil producing countries, have sought financial investments in the United States to mobilize the increased wealth of financial resources that have become available, beyond their absorptive capacity, as the oil price continued to surge. Under both scenarios, strong fundamentals of the US economy have attracted interest for growing financial investments in the United States that enabled sustainability of a widening current account deficit.

The global financial crisis has drawn attention to problems attached to global imbalances attributed to the above scenario. While the United States enjoyed growing and spending beyond its domestic resources, excessive leveraging and financing had adverse global effects in the absence of adequate prudential oversight to ensure sustainability of financing. In the aftermath of the global crisis, all partners, particular major global powers, have agreed that restructuring is necessary to sustain global demand going forward. At the core of this restructuring agenda is the need for trading partners to reconsider their external balances. The United States cannot maintain excessive current account deficit financed by external sources. Hence, there is a need to contain domestic spending and mobilize export demand. On the other hand, countries like China would need to mobilize domestic spending to continue to grow without excessive dependency on export orientation, particularly in one or a few major partners. Indeed, in the aftermath of the global financial crisis both sides have stepped up efforts for restricting their economies along these directions. More recently, ending quantitative easing of monetary policy in the U.S. presents a real risk of a slowdown in emerging markets that could risk the momentum of sustaining global growth and require further coordination of policies to address associated imbalances, both domestic and external.

To inform the economic agenda of restructuring and reflect on the type of imbalances leading to the global financial crisis, the research of this paper aims at taking a closer look at the current account deficit in the United States and sources of financing. As researchers drew attention to concerns about inadequate sources of sustainability, some projections in the early part of the last decade (Mann, 2001) showed the current account deficit averaging above 4.5 percent. Although these levels are not large compared to those experienced by some industrial countries, such as Australia and New Zealand, and many developing countries, they are high compared to the current account balances of the larger industrial countries (Table 2). Thus, questions have arisen about the sustainability of current account deficits exceeding 4 percent of GDP over the medium to long term in the sense of Milesi-Ferretti and

Razin (1996), meaning that they can be maintained without the need for drastic changes in domestic macroeconomic policy.¹ For example, Obstfeld and Rogoff (2000), writing before the start of the 2001 recession in the United States, argued that the U.S. current account balance was quite likely to reverse by 2010, predicting that a rapid adjustment could lead to a real depreciation of the dollar by more than 20 percent.²

Contemporary economic theory views current account sustainability as a medium-term issue, turning on the ability of countries to generate sufficient current account surpluses in future years to offset present deficits (Chinn and Prasad, 2000; Debelle and Faruquee, 2000; and Arora, Dunaway, and Faruquee, 2001). More recently, the liberalization of capital flows has broadened the scope of current account sustainability to include the ability to generate a stable and sustainable external net foreign asset position to finance a widening current account deficit over time. Nevertheless, economists have found that the current account position of industrial countries varies with the state of the business cycle. Faruquee and Debelle (1996), for example, have observed that the business cycle, as measured by the output gap and the real exchange rate, had significant short-term effects on the current account balance for a number of industrial countries during the 1971–93 periods. Freund (2000) has noted that, in industrial countries, a common pattern during the 1980–97 periods was for the current account deficit to begin reversing after reaching a level of about 5 percent of GDP and to continue improving over a period of several years.

Data for the United States also suggest a strong cyclical influence on the balance of payments. As Chart 1 indicates, the current account balance has often recorded surpluses during recessions, such as 1974–75, 1980, and 1991, and deficits during periods of strong economic growth (e.g., 1994–99). However, the relationship is not exact, since some boom years (e.g., 1973) have recorded surpluses, while some recession years (e.g., 1982) have recorded deficits. Similarly, the financial account of the balance of payments and foreign direct investment has also varied over the business cycle. For example, both grew strongly during the last half of the 1990s, when U.S. economic growth began to exceed that of other industrial countries, arguably triggering capital inflows to the United States.

Because cyclical factors seem to have a major impact on the US balance of payments, it seems worthwhile analyzing the effect of these variables in a more systematic way.³ This includes studying the impact of these variables not only on the external current account, but also on the capital and financial accounts, which have been instrumental in financing the country's large current account deficits. This may be consistent with the lower capital-output ratios and higher returns to capital observed in the United States than in most other industrial countries during the last half of the 1990s (see Arora, Dunaway, and Faruquee, 2001; Cooper, 2001, and McKinnon, 2001). Since the growth in productivity often mirrors business cycles, analysis may show that cyclical factors also have an impact on the capital and financial accounts of the balance of payments.

This paper follows a two-step procedure. First, co-integration analysis is used to confirm that cyclical factors bear a long-term relationship to the current account and the financial account (the main element of the capital and financial account) of the U.S. balance of payments. Second, the paper estimates a series of reduced form equations in differenced form, using annual data, for the current account balance, the financial account balance, and important components of each balance, using a number of macroeconomic indicators reflecting the state of the business cycle as explanatory variables. These include not only a measure of economic growth, but also other factors that vary cyclically, such as inflation, energy prices, and returns on financial assets. In addition, following work by Kandil (2000) on other macroeconomic indicators, the paper examines the effect of positive and negative shocks to these and other cyclical variables on components of the balance of payments.

To anticipate the results, the empirical work confirms that cyclical factors have a significant impact on the current account balance, with higher real growth, a more appreciated real exchange rate, and higher energy prices having the expected negative impact on the current account balance.⁴ In addition, shocks to certain variables have asymmetric effects on the current account balance. Co-

¹ The IMF's Executive Board, for example, questioned the sustainability of the U.S. external current account deficit over the longer term during the IMF's 2001 Article IV Consultation with the United States (International Monetary Fund, 2001b). Subsequently, the IMF has raised concerns about the deficit as part of a broader concern over global macroeconomic imbalances that threaten world prosperity (see, for example, International Monetary Fund, 2005).

² Between 2001 and 2004, the dollar depreciated relative to the euro by 24 percent, in real terms, and by 27.5 percent, in nominal terms. More recently, the United States has been pursuing a quantitative easing policy to stimulate the economy and depreciate the US dollar with an aim to mobilize exports, which has been reversed in the context of the Fed's recent announcement of tapering its expansionary stance till it ended the quantitative easing program in November 2014.

³ For related literature, see Cheung, Fungceri and Rusticelli (2010).

⁴ The positive relationship between key variables and the financial balance could result to cover deficits in the current account. The positive relationships could reflect the need for the financial balance to offset movements in the current account, since reserves are finite.

integration indicates a negative long-term relationship between the current account and each of real GDP, the real effective exchange rate and the oil price. Consistently, there is a positive long-term relationship between the financial account balance and each of real GDP, the real exchange rate, and the oil price. In addition, reduced form equations suggest that domestic real GDP growth and oil price inflation are important factors that support improvement in the financial balance in the U.S. The composition of net financial flows between various financial assets is highly dependent on variation in stock prices in the U.S.

The rest of the paper is organized as follows. Following a theoretical discussion of the models in section II, section III reports the co-integration analysis of the current and financial accounts. Section IV reports the results of the reduced form equations. Section V summarizes the main findings in the paper.

II. MODELING CYCLICAL EFFECTS ON THE U. S. BALANCE OF PAYMENTS

The literature suggests that the main components of the balance of payments, in particular the current account balance, are sensitive to cyclical economic factors. To test this hypothesis, we use the following procedure. First, we test for cointegration between key cyclical factors and the main elements of the balance of payments, to examine the long-term correlations between these two sets of variables. Next, we estimate a series of reduced form equations relating the current account balance, its main components, and the main components of the capital and financial account balance to a series of macroeconomic variables that are cyclically sensitive. To track business cycles, these models are estimated on a short-term basis. Because data on foreign economic growth are available only on an annual basis, and the results are stronger, we prefer models based on annual data, although we also examine models using quarterly data.

Equations are estimated both for the current and financial account balances and their main components. As explanatory variables, we use cyclically sensitive macroeconomic indicators reflecting the following analysis.

A. Procedures, Variables, and Data

To examine the different hypotheses regarding the current and the capital and financial accounts, reduced form equations were estimated for both the aggregate balances and for important components of each account.

For the current account, equations were estimated for the current account balance, exports and imports of goods, and exports and imports of services. For the capital and financial account, equations were estimated for the financial account balance, total financial inflows, total financial outflows, total inflows by foreign parties other than governments, inflows for foreign direct investment, inflows for holdings of government securities, inflows for holdings of non-government securities, and inflows for liabilities of banks and other financial institutions, the latter representing mostly accumulations of deposits and certificates of deposit at U.S. banks. Because amounts in the capital account were small, no equations were estimated for the combined capital and financial account.⁵

Tests (see, for example, Dickey (1976), Fuller (1976), and Nelson and Plosser (1982)), which included both a constant and a time trend, indicated that the external sector balances and the different explanatory variables had unit roots in levels but not in first differences, so the equations were estimated using first differences⁶. Because the current and financial account balances could take negative values, they were estimated as changes in levels. The components of these balances were estimated as changes in logarithms, however. A list of the dependent variables and data sources appear in Appendix I.⁷

To isolate the effects of key variables, a basic set of reduced form equations was estimated using the changes in the following as explanatory variables: real GDP, the GDP deflator, an index of energy prices, the real effective exchange rate of the U.S. dollar, and

⁵ In the US balance of payments, the capital account includes estimates of debt forgiveness by the U.S. government, transfers of assets by immigrants to the United States (comparable transfers by emigrants are excluded, because of insufficient data), and sales and acquisitions of some nonproduced, nonfinancial assets (transactions in natural resources and a few large transactions in other types of such assets). See IMF (2001a, p. 365). Because the relevant items are small, the capital account in the U.S. balance of payments is also small.

⁶ Tests were conducted for the null hypothesis of non-stationarity and proved robust, using the test suggested by Kwiatkowski *et al.* (1992) for the null hypothesis of stationarity. Results are available upon request.

⁷ For the financial account, we consider data for inflows and outflows, net. Given our interest to explain cyclicity in financial inflows, which are necessary to finance the current account deficit, we consider several types of inflows, as listed in Appendix I.

weighted averages of real GDP in emerging market economies and of industrial countries other than the United States.^{8 9 10} To illustrate asymmetries in the effects of positive and negative shocks to individual variables, actual changes for certain variables were replaced by expected values and positive and negative shocks. The technique for deriving expected changes in variables is described in Appendix II. Positive and negative shocks were calculated as the excess or shortfall of actual from expected values of the variables. One benefit from examining separately the impact of macroeconomic shocks and forecastable events on the balance of payments is that the two phenomena may affect the same variable over different time periods. Shocks are random components of an observed variable that have, by construction, a zero mean. Thus, they should have only temporary effects on a variable that cancel out over time. Forecastable events, by comparison, are more likely to have longer lasting effects on a variable. Decomposing a variable into forecasted and shock elements allow testing whether an observed relationship between two variables reflects mainly temporary, or also longer lasting, effects. Several equations also tested for the impact of U.S. stock market prices, as measured by Standard & Poor's index of 500 stocks listed on the New York Stock Exchange. Appendix I also include a list of the explanatory variables used in the equations.

The various equations were estimated using both annual and quarterly data, because quarterly data for the relevant variables were not available for some industrial and many emerging market countries. The annual equations were estimated over the period 1970–2010, while those with quarterly data were estimated over the 1980–2009 periods and for the 1980–1990, 1990–2000 and 2000–2009 periods, to see if new trends in the data appeared more recently.¹¹ Appendix II describes in detail the econometric methodology. The sample period ends before the global financial crisis to establish evidence on global imbalances and underlying factors, widely believed to be a major contributor to the crisis, and establish robust evidence that is not specific to the episode of the crisis.

The annual equations had the following form, sometimes including a stock price variable, with one set of explanatory variables entered as actual changes (shown below with the subscript “i”) and a second set (shown with the subscript “j”) decomposed into expected changes and positive and negative shocks (positive and negative differences from the expected changes):

$$DY_t = b_0 + \sum_{i,t} b_i DX_{i,t} + \sum_{j,t} c_j E(DZ_{j,t}) + \sum_j d_{j,t} \text{Pos}Z_{j,t} + \sum_j h_{j,t} \text{Neg}Z_{j,t} + u_t$$

Where:

DY_t represents the first difference in one of the dependent variables (the current account balance, financial account balance, or the log of one of their major components);

⁸ To determine whether trade liberalization affected the results, the equations were also estimated using dummies for each of the three major postwar rounds of tariff negotiations—the Kennedy, Tokyo, and Uruguay rounds. Only the Kennedy round dummy (years from 1969 onward) had a significant coefficient in any of the equations, and then only for exports and imports of goods. Accordingly, the equations reported include no trade round dummies.

⁹ We relate the nominal values measured in the balance of payments to real variables and price indices (such as changes in real GDP and in the GDP deflator) rather than just nominal variables (such as nominal GDP), to shed more light on the sources of cyclical fluctuations in the dependent variables. The real effective exchange rate captures relative competitiveness, as measured by bilateral movements in the exchange rate and relative CPI inflation with respect to major trading partners.

¹⁰ The list of industrial countries includes Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. The set of emerging market economies was chosen based on data availability and relevance of the U.S. balance of payments. The economies included are Argentina, Brazil, Chile, Colombia, Cyprus, Hong Kong SAR, Hungary, Israel, Korea, Mexico, Oman, Saudi Arabia, Singapore, South Africa, Thailand, Turkey, Uruguay, and Venezuela. For both industrial and emerging market groups, the index was constructed as a geometric weighted average of real output in each economy, such that the log of the average equals a weighted sum of the log of real output in each economy. The weights were determined by the ratio of each economy's output to total output in the group.

¹¹ Regressions with quarterly data were estimated using, as explanatory variables, two- or four-quarter distributed lags of those variables available on a quarterly basis: changes in real GDP, the GDP deflator, energy prices, and the real effective exchange rate. In one variant a four-quarter distributed lag of stock market prices was also included. The results of the regressions (available upon request) differed somewhat, depending on the observation period. In addition, the quarterly regressions for the entire period yielded somewhat different results from those using annual data. Nevertheless, the broad trends emerging from the quarterly regressions, in general, confirm those using annual data.

$DX_{i,t}$ represents the change in the i -th explanatory variable X , entered as a difference in its actual value from the previous year, without decomposition;

$E(DZ_{j,t})$ represents the expected value of the change in the decomposed j -th explanatory variable Z ;

$PosZ_{j,t}$ represents positive shocks to the j -th explanatory variable Z ;

$NegZ_{j,t}$ represents negative shocks to the j -th explanatory variable Z ; and u_t is a disturbance term.¹²

Depending on the equation, one or more sets of explanatory variables were decomposed into expected values and positive and negative shocks from these values. In some versions of the equations the two external variables (EMERG—the index of real GDP in emerging market economies, and OTHERIND—the index of real GDP in other industrial countries) were decomposed.¹³ This specification is the basic model. In others, the four domestic variables (GDPR—real GDP, GDPDEF—the GDP deflator, ENERGY—the index of energy prices, and REER—the real effective exchange rate of the U.S. dollar) were decomposed.

Before undertaking this analysis, however, the endogeneity of potential explanatory variables must be addressed. The reduced form equations explaining the current and financial accounts are estimated jointly with equations that approximate agents' forecasts of decomposed variables in the model, using three stage least squares (3SLS). Instrumental variables are used to proxy the endogenous variables in the model, including the real effective exchange rate of the U.S. dollar during the current period (see Appendix II for details). In this way the problem of simultaneity between certain variables, such as the current account balance and GDP, is addressed.¹⁴ Instruments include the *lagged* value of the first-difference of the logarithms of real output, the price level, broad money supply, federal government expenditure, and the real exchange rate of the U.S. dollar.

B. Current Account

Both economic theory and the work of other researchers suggest that the current account of the U.S. balance of payments should be sensitive to domestic economic conditions. As noted earlier, Freund (2000) has commented that the current account balances of most industrial countries have responded to changes in real GDP growth rates, with deficits typically widening during the expansionary part of a business cycle and contracting or becoming surpluses as real GDP growth declines. Thorough discussion of the theory that links current accounts to the business cycle can be found in Baxter (1995) and Prasad (1999), for example. To summarize, different types of macroeconomic shocks influence the cyclical dynamics of the trade (current) account balance. The two main determinants of the trade balance are assumed to be relative output and the real exchange rate. The short-run equilibrium in the presence of sluggish price adjustment indicates the following. The effects of supply shocks and nominal shocks on the trade balance are ambiguous and depend, *inter alia*, on the elasticities of the trade balance with respect to relative output and the real exchange rate. On the other hand, permanent demand shocks, which result in an appreciation of the real exchange rate concomitantly with a transitory increase in relative output, produce an unambiguous trade balance response.

Having reviewed existing theoretical modeling, we would expect real growth to have a negative impact on the current account balance, raising imports of goods and services. Higher inflation should also worsen the current account balance, raising imports and reducing exports as competitiveness declines. The same should apply to higher energy prices, since the United States is a net energy importer.¹⁵ Various foreign variables should also be expected to affect the current account balance. Higher foreign growth rates should spur U.S. exports of goods and services, other things being equal. Variables affecting the real prices of tradables should also

¹² Co-integration tests indicate that there is a common trend between each of the current account balance and the financial account balance and *selected* explanatory variables in the model. Nonetheless, there is no co-integration vector that combines each dependent variable and *all* explanatory variables in any of the estimated models. Hence, it was not necessary to account for an error correction term in the model specification of the reduced-form equations.

¹³ The introduction of emerging and industrial countries growth proxies are in line with the evidence in Stock and Watson (2009).

¹⁴ In the U.S. the sum of exports and imports of goods and nonfactor services only equals about 25 percent of GDP.

¹⁵ There are several other cyclical business indicators in economic theory, including the index of consumer confidence, money growth rates, new orders for plant and equipment, hours of labor in the manufacturing sector, index of industrial production, among others, that are likely to impact cyclicalities in the current account balance and supporting finance. These factors are not modeled explicitly due to data limitation and insufficient degrees of freedom. However, they are highly correlated with the composite real growth variable included in the model.

affect the external current account balance. Thus, the real effective exchange rate of the dollar should have an impact, with a real appreciation eventually worsening the current account balance (by reducing exports and increasing imports) and a real depreciation improving it. In the short run, however, if the economy is highly dependent on imports, the effects may be opposite (indicating a “J-curve” effect of changes in the real effective exchange rate). Interest rates may also affect the current account balance by changing net interest payments.

Besides these variables, we also examine the effects of shocks to government spending as a way of testing the impact of fiscal policy on the current account of the balance of payments. To the extent that policy variables affect domestic performance (real growth, price inflation, the interest rate, and the exchange rate), it would be interesting to study the effect of policy changes on the current account and its underlying components.

C. The Capital and Financial Account

The impact of cyclical factors on the capital and financial account of the balance of payments may be harder to predict than the current account, for a variety of reasons. U.S. financial institutions play a key role in providing financing to other countries and attracting financial investors from other countries. Thus, *net* financial inflows to the United States also reflect, to a significant degree, the financial circumstances of other economies. In this connection, a few exogenous factors are often relevant. For example, dollar assets have historically provided a safe haven for investors seeking to diversify financial assets and hedge against currency fluctuations. Further, many central banks have historically intervened in the foreign exchange market to buy dollar-dominated assets in an effort to stem domestic currency appreciation and boost export competitiveness.

Nevertheless, one might expect the capital and financial account to respond positively both to current and expected real economic growth in the United States. This reflects the importance of both direct investment and financial investments by foreigners from abroad to the United States. Similarly, the capital and financial account might also depend on real growth in the United States *relative* to that in other economies. This could be incorporated by including measures of real GDP growth in other country groups, such as non-U.S. industrial countries and selected emerging market economies. In addition, the actual and predicted performance of the stock market in the United States may affect the financial account as higher stock prices may trigger net capital inflows.

Finally, since official reserves and the ability to expand the Fed’s balance sheet are limited, there might be an inverse relationship between the current account and the capital and financial account, with the latter becoming more positive as the former deteriorates. One implication might be that net inflows in the capital and financial accounts essentially finance current account deficits. In addition, an inverse relation could result if capital inflows lead to a real appreciation of the U.S. dollar that worsens the current account balance.

III. CO-INTEGRATION RESULTS

Before estimating the reduced form equations described above, we tested for co-integration between the main domestic economic variables and the current and financial account balances. This test indicates whether our cyclical variables bear a long-term relationship to these key balances. The results are summarized in Table 3.

For both the current and financial account balances, two combinations of variables were tested: one including the current or financial account balance, real GDP, the real effective exchange rate (REER), the index of energy prices, and the GDP deflator; and one with the first four of these variables, i.e., excluding the GDP deflator. In the case of the current account balance, chi-square statistics suggested that only the current account balance and real GDP were co-integrated, with the expected negative relationship, when all five explanatory variables were included. However, when only the first four variables were included, chi-square statistics indicated that all four variables belonged in the co-integrating vector, with real GDP, energy prices, and the REER all bearing a negative and significant relationship with the current account balance. For the financial account balance, the combination with five variables showed only the GDP deflator and energy prices as co-integrated, with a positive relationship. The test with four variables, however, showed that the financial account balance, real GDP, and the REER were co-integrated, with real GDP and the REER positively related to the financial account balance.

As the financial account is the mirror image of the current account, the co-integration results suggest that real GDP, energy prices, and the REER have a negative long-term relationship with the current account balance, while real GDP, with the energy price and/or the REER have a positive long-term relationship with the financial account balance. The co-integration results indicate that the relations between variables are long lasting. Hence, domestic conditions have long-run implications for the current account deficit and its sustainability. Real GDP growth and dollar appreciation seem necessary for the sustainability of the current account deficit. The inflow of financial assets to finance the current account deficit, attracted by strong fundamentals, supports real growth and strengthens the dollar value against the depreciating pressure implied by a widening current account deficit. The significance of the error correction term indicates the importance of cyclical fluctuations between variables in the short run. Hence, understanding the relation between the financial and current accounts in the long run requires a thorough investigation of cyclical fluctuations in the short run.

IV. RESULTS FROM REDUCED FORM EQUATIONS

A. Basic Model with Decompositions

The basic model includes domestic variables and two indices of output growth in selected emerging markets and other industrial countries. All domestic variables enter the model in first-difference form. Each index of output growth in other countries is decomposed into three components: an anticipated growth component, a positive shock, and a negative shock. Results appear in Table 4, which reports regressions for the balances and key components of the current account.¹⁶

Table 4 shows that, in this specification, changes in real GDP and the real effective exchange rate both have negative and significant coefficients. These results imply that growth in real GDP and a more appreciated real exchange rate correspond to a weaker current account balance, as expected. Surprisingly, however, positive movements in real GDP in emerging market economies and other industrial countries do not correspond to a stronger U.S. current account. The coefficients for the expected values of these variables and positive shocks to them are all negative, although significant only for positive shocks to GDP in emerging economies. That is, the growth in emerging markets' output is consistent with an increase in U.S. imports relative to exports. This result may mean that GDP growth in other economies is less important as a determinant of the U.S. current account balance than real growth or real exchange rate movements in the United States for these other groups of economies. Most other variables have insignificant effects on the current account balance.

The equations for exports and imports of goods, and to a lesser extent, exports of services, help explain the results of the equation for the current account balance. The equations for exports of goods and of services both have negative and significant coefficients for changes in the real effective exchange rate (DREER), suggesting that an appreciation of the real exchange rate worsens the current account balance by depressing exports. The equation for imports of goods has a positive and significant coefficient on changes in real GDP (DGDPR), implying that higher real GDP growth worsens the current account balance by raising imports. Both sets of results conform to theoretical predictions.¹⁷ In general, fluctuations in real GDP growth and the real effective exchange rate seem to be the primary determinants of cyclical fluctuations in the current account balance of the U.S.

The basic equations, with EMERG and OTHERIND decomposed, do a poor job of explaining the financial account and its most important components (results are available upon request). Most coefficients are insignificant, and the R^2 statistics for the equations are low. Thus, the macroeconomic variables and decompositions here do little to explain movements in the financial account, which appear to be mostly random and unsystematic.

Table 5 reports the results of equations for the current account balance and its main components in which the four main domestic economic variables—GDPR, GDPDEF, ENERGY, and REER—are decomposed, while EMERG and OTHERIND are entered as changes in "actual" (instrumented) values. We report this specification to demonstrate the robustness of our previous findings with respect to model specification. Further, we seek to investigate possible asymmetry in the effects of domestic variables on components of the current and financial accounts. This specification does a better job at explaining variations in the current account balance and key components.

Compared to the results of Table 4, all the equations in Table 5 have noticeably higher R^2 statistics, and many of the new variables are significant at the 10 percent level or better. In the equation for changes in the current account balance, the expected value of changes in real GDP has the anticipated negative sign and is again quite significant. This reflects positive and highly significant coefficients on expected changes in real GDP in the equations for imports of goods and of services. This result is consistent with a long-lasting effect of domestic real conditions on imports and the current account balance. Positive shocks to real GDP growth in the United States have a positive significant effect on changes in both exports and imports of goods. In contrast, negative shocks improve the current account balance significantly. The reduction in imports exceeds that of exports during economic downturns. Thus, there is clear asymmetry in the effects of fluctuations in real GDP growth on the current account balance of the U.S. While both exports and imports improve during cyclical upturns, the reduction in imports during downturns improves the current account balance. Overall,

¹⁶ Because the current and financial account balances are entered as first differences in levels, coefficients in these regressions cannot be interpreted as elasticities, unlike the case for the other dependent variables. For illustrative purposes, we also re-estimated these equations reported in Table 4, including two randomly-chosen error-correction terms: one combines the dependent variable with real GDP, the GDP deflator, and the energy price; the other combining the dependent variable with the exchange rate, index of output in other industrial countries, and index of output in selected emerging market countries. Adding these terms improved the fit of several equations, confirming the robustness of the underlying approach. The results are available upon request.

¹⁷ The greater effect of own GDP on U.S. imports than foreign GDP on U.S. exports is the well-known result of Houthakker and Maggee (1969) that the income elasticity of U.S. import demand is about double the income elasticity of foreign demand for U.S. goods.

the results indicate that the inverse relationship between the current account and the business cycle in the U.S. is particularly evident during recessions.

Table 5 also shows that expected appreciations in the real exchange rate have a negative effect on the current account balance, consistent with theoretical expectations and the result in Table 4. On the other hand, higher expected energy prices have a positive but insignificant effect on changes in the current account balance. This is consistent with a significant increase in exports when anticipated energy prices rise, as the equation for exports of goods suggests. However, positive shocks to energy prices have a significant negative effect on the current account balance, reflecting a greater impact on imports than on exports. Since the United States is a net energy importer, higher-than-expected energy prices should coincide with a weaker current account balance. This is consistent with a larger positive coefficient on imports compared to exports in response to higher-than-expected energy prices. The quantity demanded of energy imports is inelastic with respect to the rise in prices. Hence, the value of imports is rising. Surprisingly, unexpectedly low energy prices also worsen the current account, as evident by the positive and statistically significant coefficient. Both exports and imports behave asymmetrically in the face of energy price shocks. U.S. exports do not decline with the reduction in energy prices. Moreover, imports do not decrease, despite the reduction in energy prices. There appears to be a tendency for the quantity of energy imports demanded to rise in response to an unexpected reduction in prices. Further, imports may increase because lower energy prices are accompanied by higher economic activity.

The model specification in Table 5 also demonstrates that positive changes to real GDP in emerging markets are significantly related to a weaker current account balance. Higher real GDP growth in other industrial countries is positively and significantly related both to higher goods exports and to higher goods imports. However, the coefficient in the equation for exports of goods is noticeably larger than that on imports, suggesting that the main effect of higher growth in other industrial countries is to raise U.S. exports, despite the results in Table 4.

Estimating the financial balance with the specification that decomposes domestic variables yields no better results. The results are available on request.

B. Effect of Stock Market Prices

As a way of improving the results for the financial balance, Table 6 reports the effect of adding a variable for U.S. stock market prices to the previously estimated model. As the equation already accounts for relative growth in the US, compared to major advanced and emerging countries, we seek to test the performance of the stock market in the US, regardless of developments in other major stock markets. The stock market variable has a powerful impact on a number of these equations, sharply increasing the R^2 statistics, particularly for certain equations in the financial account.¹⁸

We analyze data in the financial balance and underlying net flows that determine the stock of foreign holdings of financial assets in the United States. Table 6 shows changes in the financial balance and underlying changes in net flows of financial assets. The strongest effects of stock market prices appear in equations for certain components of the financial account, for which the R^2 statistics increase noticeably. Moreover, there is evidence that stock prices affect the composition of net capital flows to the United States. Adding the stock market variable has a negative effect, significant at the 10 percent level or better, on the change in foreign flows to hold U.S. official assets, foreign direct investment, and other financial liabilities of the United States. In addition, it has a positive and highly significant effect on the change in net foreign flows to hold nonofficial U.S. securities, which include stocks.¹⁹ Thus, higher stock prices appear to increase the rate of flows into foreign acquisitions of private U.S. securities at the expense of net flows for official securities, foreign direct investment, and deposits or certificates of deposit in U.S. financial institutions.

¹⁸ Adding the stock market variable to the estimated model for the current account in Table 4 (results are available upon request) does not affect the impact of changes in real GDP, for which the coefficient remains negative and significant at the five percent level. The coefficients for the change in stock market prices are negative and significant at the 10 percent level in the export and import equations. The negative sign in the export equation could reflect the role of higher stock prices in appreciating the real exchange rate, thus reducing the competitiveness of exports. The negative sign in the import equation may reflect, for example, a shift from consumption to financial investment activity when stock prices are higher. Mercereau (2001) also finds that the stock market affects current account performance. In his model, expectations of higher future stock prices raise present-period consumption because of consumption smoothing, weakening the current account balance in the present.

¹⁹ If stock prices go up and quantities remain unchanged, by definition, foreign holdings (values) of U.S. stocks will increase. Nonetheless, the reduction in holdings of other financial assets indicates that the positive effect on stock holding includes quantity plus price effects.

In addition to the decomposition effects it is worth noting the cyclical effects on the financial balance in two directions. Domestic conditions, in particular, higher growth in the U.S., improves the financial balance, on net, in the United States. This provides a clear support to the notion that a widening current account deficit in the United States is less worrisome if underlying fundamentals support sustained growth that guarantees adequacy of financial resources.

It is also interesting to note the positive effect of the increase in oil price on the financial balance in the United States. This evidence ties to the recent debate regarding the effect of higher oil price on global imbalances. As oil-producing countries accumulate additional savings in the wake of a sharp increase in the oil price, they increase net flows into financial assets in the U.S., given the limited capacity to spend and invest in origin countries. Such inflows have provided a natural way of supporting a widening current account deficit in the U.S. and are likely to continue to do so in the near future.

C. Regressions with Policy Variables

In theory, the current account deficit corresponds to a shortfall in the saving/investment gap. Cyclical developments indicate that higher growth corresponds to a faster growth in investment relative to savings, and vice versa. To the extent that policy variables induce cyclical effects, current account imbalances may be affected by policy variables.

In addition to the above regressions, we also estimated several equations using such policy variables as short-term interest rates and government expenditure.²⁰ Adding the change in the interest rate on 91-day U.S. Treasury bills, for example, had no significant impact on equations for the current account balance, although a change in the interest rate had a small but positive and significant impact on changes in exports (Table 7a). An increase in the interest rate corresponds to a booming economic condition, which appears to be driven by a higher external demand. Decomposing the interest rate into expected values and shocks had a similar impact. Exports rise when interest rates are higher, which usually occurs during expansions.

Although equations for the financial account that included interest rates had low R^2 statistics, the interest rate variable had a negative impact on changes in the financial balance, with the coefficient on expected interest rates (when decomposed into expected values and positive and negative shocks) significant at the 5 percent level (Table 7b). Evidently, higher short-term interest rates do not stimulate demand for U.S. financial assets. In contrast, changes in real GDP are positively related to the financial account balance. Changes in foreign direct investment (FDI) are also positively and significantly related to changes in actual and expected interest rates, implying higher FDI when interest rates are higher and economic conditions are stronger. Similarly, the positive and significant coefficient for negative shocks to interest rates suggests that FDI is lower when interest rates are unexpectedly low. In these cases higher interest rates may signal a strong economy, while unexpectedly low interest rates signal a weaker economy.

Including government expenditure in the equations had no significant effect on the current account balance, although shocks to government expenditure were positively and significantly related to imports, in line with the findings for real GDP (Tables are available on request.). This finding supports the twin deficit hypothesis. An increase in government spending increases the budget deficit and stimulates demand for imports.

While shocks to government spending had no significant impact on the overall financial balance, positive shocks had a positive and significant relationship with foreign capital inflows, while negative shocks were significantly related to higher foreign outflows. The former observation is consistent with the view that higher government spending, as part of higher real GDP and possibly higher interest rates, weakens the current account balance, thus requiring more capital inflows. The evidence indicates that the increase in capital inflows provides a natural source of financing a widening current account deficit. Similarly, capital outflow increases as government spending falls unexpectedly. The reduction in government spending reduces pressure on the interest rate, a natural source of attracting foreign capital inflows. The duration of the cycle of widening current account deficit is highly dependent on the ability to maintain foreign sources of financing the growing deficit, as the current phase of the U.S. cycle demonstrates.

V. CONCLUSIONS

The goal of this paper has been to assess the cyclical sensitivity of key components of the U.S. balance of payments, using short-term models relating these components to such variables as real GDP growth, the inflation rate, the real exchange rate, energy prices, and real growth in various trading partners. Theory and past research suggest that the current account balance responds to the business cycle. To the extent that the U.S. draws capital inflows that respond to the state of the U.S. economy and its financial markets, the capital and financial accounts may also be cyclically sensitive.

²⁰ We examined the effect of government expenditure, rather than the fiscal balance, because outlays are more discretionary than the overall balance, which incorporates revenues and thus is more endogenous to the business cycle (because most taxes are revised infrequently and are thus more heavily determined by cyclical conditions).

To address these issues, we have tested whether key domestic macroeconomic variables are co-integrated with the current and financial account balances, to see whether significant long-term relationships exist between these balances and the different explanatory variables. In addition, we have estimated a variety of short-term, reduced form equations for the current account balance, the balance of the financial account, and their main components, relating each of these items to cyclically sensitive macroeconomic aggregates and indices, including indices of real economic growth in other countries. To test for asymmetrical responses to shocks, some equations have included the decomposition of certain variables into expected changes and positive and negative deviations from these expected values.

Co-integration results confirm long-term relationships between domestic and external factors on the one hand and the current and financial accounts, on the other. Over the long run, real GDP, energy prices, and the real effective exchange rate (REER) are each negatively and significantly related to the current account balance. In addition, real GDP, energy prices and the REER are positively and significantly related to the financial account. Because official reserves are finite, the positive effect of real GDP on net financial flows provides a natural resource of financing the current account deficit, attesting to investors' confidence in the strong fundamentals underlying the U.S. economy. Net financial flows support a higher exchange rate against the depreciating pressure implied by the current account deficit. Moreover, savings accumulated in oil-producing countries seek investment opportunities in the U.S. in light of limited capacity to spend and invest in origin countries.

While our findings do not indicate the direction of causality, they point to a negative long-run correlation between the current and financial accounts in the face of changes in real GDP, the REER and the oil price. This is consistent with the ability of the U.S. economy to sustain a significant current account deficit over a long period, although the magnitude of that deficit cannot be directly determined.

The reduced-form regressions indicate that cyclical factors, particularly real GDP growth, have strong effects on short-term fluctuations in the current and financial accounts in the United States. This reflects a stronger positive response of imports than exports to increases in real GDP. Moreover, the increase in net financial flows provides additional resources to finance a widening current account deficit during an economic expansion.

In line with earlier studies, our analysis of short-term fluctuation shows that the current account balance is negatively and significantly related to increases in the real effective exchange rate (REER) of the U.S. dollar. Exchange rate appreciation decreases competitiveness and net exports, deteriorating the current account balance. Actual and expected changes in energy prices do not bear so robust a relationship with the current account balance. While positive shocks to energy prices tend to weaken the current account, the account does not improve in the face of negative shocks. The former result is consistent with the U.S. being a net energy importer. Growth in selected emerging market economies and in other industrial countries also appears relevant, although less important, compared to domestic conditions, in determining cyclical fluctuations in the current account. In general, the current account improves with the growth in other industrial countries and deteriorates with the growth in selected emerging market economies. The latter result could reflect reverse causality.

The empirical work in this paper has been less successful in explaining cyclical movements in components of the financial account. The main result from the regressions is to corroborate that gain in stock market prices coincide with a change in the decomposition of foreign financial investment in the U.S. More specifically, higher stock prices appear to increase the rate of flows into foreign acquisitions of private U.S. securities at the expense of net flows for official securities, foreign direct investment, and deposits or certificates of deposit in US financial institutions.

Our evidence supports concerns underlying the recent debate regarding the effect of higher oil price on global imbalances. Excess savings in low investment countries finance investment in low saving countries. Indeed, a cyclical increase in the oil price has a positive effect on the financial balance in the United States. Financial inflows from oil producing countries have provided a natural resource to finance a widening current account deficit in the U.S. and are likely to continue to do so in the near future.

While the evidence indicates the ability of domestic policies to influence the current account balance, developments in the financial balance require coordinated global efforts. High savings economies need to address structural impediments hampering the growth of domestic spending to reduce excessive dependency on export orientation to sustain growth and increase their domestic absorptive capacity. On the other hand, low savings economies need to contain domestic spending, particularly on consumption, to reduce excessive dependency on external financing and diversify sources of growth. Restructuring to address sources of major imbalances leading to the global crisis is key to sustaining robust growth of the world economy and mitigating the adverse effects of over leveraging that has proven to be unsustainable beyond any doubt.

Table 1. United States Current Account Balance, 1981-2009
(in percent of GDP)

Year	Current Account Balance
1981	0.2
1982	-0.2
1983	-1.1
1984	-2.4
1985	-2.8
1986	-3.3
1987	-3.4
1988	-2.4
1989	-1.8
1990	-1.4
1991	0.1
1992	-0.8
1993	-1.2
1994	-1.7
1995	-1.4
1996	-1.5
1997	-1.6
1998	-2.4
1999	-3.2
2000	-4.2
2001	-3.8
2002	-4.5
2003	-4.8
2004	-5.4
2005	-5.9
2006	-6.0
2007	-5.2
2008	-4.9
2009	-2.9

Source: International Monetary Fund, *World Economic Outlook Database*, April 2010.

Table 2. Current Account Deficits in the United States and Selected Other Countries, 1990-2009 (in percent of GDP)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
United States	-1.4	0.1	-0.8	-1.2	-1.7	-1.4	-1.5	-1.6	-2.4	-3.2	-4.2	-3.8	-4.5	-4.8	-5.4	-5.9	-6.0	-5.2	-4.9	-2.9
Japan	1.4	2.0	3.0	3.0	2.7	2.1	1.4	2.2	3.0	2.6	2.5	2.1	2.8	3.2	3.4	3.6	3.9	4.8	3.2	1.9
Germany	2.9	-1.2	-1.0	-0.7	-1.4	-1.1	-0.6	-0.4	-0.5	-1.1	-1.4	0.1	2.2	2.2	4.4	5.2	6.1	7.5	6.4	2.9
United Kingdom	-4.0	-1.8	-2.1	-1.9	-1.0	-1.3	-0.9	-0.1	-0.5	-2.7	-2.5	-2.3	-1.7	-1.9	-2.0	-2.6	-3.3	-2.7	-1.7	-2.0
France	-0.8	-0.5	0.3	0.7	0.5	0.7	1.3	2.8	2.7	2.9	1.4	1.6	1.0	0.3	-0.6	-0.4	-0.5	-1.0	-2.3	-1.2
Italy	-1.5	-2.1	-2.4	0.8	1.3	2.3	3.2	2.8	1.7	0.7	-0.5	-0.1	-0.6	-1.5	-1.1	-1.7	-2.6	-2.4	-3.4	-2.5
Canada	-3.4	-3.7	-3.6	-3.9	-2.3	-0.8	0.5	-1.3	-1.2	0.3	2.7	2.3	2.0	2.0	2.9	1.9	1.4	1.0	0.5	-2.6
Australia	-5.2	-3.6	-3.6	-3.2	-5.0	-5.3	-3.9	-3.1	-5.0	-5.7	-4.0	-2.4	-4.4	-5.9	-5.3	-5.8	-5.3	-6.3	-4.6	-3.3
New Zealand	-3.2	-2.8	-4.2	-4.0	-3.9	-5.1	-5.9	-6.5	-4.0	-6.2	-4.8	-2.4	-3.1	-4.2	-4.4	-8.5	-8.7	-8.2	-8.9	-7.1
Switzerland	3.7	4.4	6.1	8.0	6.5	6.8	7.3	9.7	9.7	11.5	12.5	8.5	8.5	10.2	10.3	13.6	14.4	9.9	2.4	6.1

Source: International Monetary Fund, *World Economic Outlook Database*, April 2010.

Table 3: Results from Cointegration Tests

I. Estimates of Cointegrating Vectors

Curr. Acct. Bal.	<i>Cbal</i>	<i>GDPR</i>	<i>GDPdefl</i>	<i>Energy Pr</i>	<i>REER</i>
Vector	-1.00*	-0.27*	-341.9	0.82	-0.78
Chi-sq. stat.	9.76	11.03	0.31	0.57	0.11
Vector	-1.00*	-0.22*		-1.09*	-3.05*
Chi-sq. stat.	13.18	14.24		4.95	10.16
Fin. Acct. Bal.	<i>Fbal</i>	<i>GDPR</i>	<i>GDPdefl</i>	<i>Energy Pr</i>	<i>REER</i>
Vector	-1.00	0.44	7097.70*	-29.18*	5.57
Chi-sq. stat.	0.41	1.72	8.16	8.05	0.44
Vector	-1.00*	0.13*		0.14	1.72*
Chi-sq. stat.	13.74	7.99		0.17	8.47

II. Estimates of Error-Correction Models

	<i>dCbal</i>	<i>dCbal</i>	<i>dFbal</i>	<i>dFbal</i>
EC(-1)	54.30*	-56.43*	155.66*	101.80*
	(2.43)	(-2.58)	(4.89)	(2.63)
dCbal(-1)	0.33 [^]	0.49*		
	(1.80)	(2.52)		
dCbal(-2)		0.14		
		(0.76)		
dFbal(-1)			-0.96*	-0.01
			(-5.93)	(-0.03)
dFbal(-2)				0.22
				(0.76)
dGDPR(-1)	-0.01	0.02	-0.19*	-9.18
	(-0.34)	(0.48)	(-2.91)	(-0.12)
dGDPR(-2)		0.04		-29.24
		(0.79)		(-0.40)
dGDPdef(-1)	-2117.4*		-7623.60*	
	(-3.09)		(-4.37)	
dEnergy(-1)	4.51*	2.92*	1.91	-1.71
	(4.81)	(3.72)	(1.37)	(-0.99)
dEnergy(-2)		-2.28*		-1.40
		(-2.61)		(-0.90)
dReer(-1)	-2.19*	-0.60	-0.32	-0.05
	(-4.16)	(-0.76)	(-0.39)	(-0.04)
dReer(-2)		2.06*		-0.38
		(2.44)		(-0.23)
Intercept	166.05*	445.48*	163.11*	-588.79*
	(2.43)	(2.56)	(4.62)	(-2.50)
R ²	0.60	0.66	0.63	0.52
F statistic	7.79*	6.00*	8.70*	3.23*

* denotes significance at the 5 percent level

[^] denotes significance at the 10 percent level

EC(-1) denotes vector of lagged residuals from the cointegrating vector

dX(-1) denotes the lagged first difference in X, i.e., X(-1) - X(-2)

dX(-2) denotes the lagged second difference in X, i.e., X(-2) - X(-3)

**Table 4. Regressions of the Current Account Balance and Its Main Components:
Decompositions of Changes in Real GDP for Emerging Markets and Other Industrial Countries 1/**

Dep. Var.	Constant	DGDPR	DGDPdefl	Denergy	Dreer	E(Demerg)	E(Dothind)	Pos Emerg	Neg Emerg	Pos Othind	Neg Othind	R2
Dcbal	41.08 (1.59)	-922.42* (-2.48)	70.81 (0.18)	8.58 (0.12)	-193.49* (-2.11)	-473.47 (-1.50)	-21.15 (-0.83)	-861.28* (-2.29)	477.27 (1.55)	13.18 (0.86)	-1.23 (-0.08)	0.45
Dexport	0.037 (0.64)	0.897 (1.07)	0.170 (0.19)	0.506* (3.19)	-0.530* (-2.56)	0.556 (0.78)	0.006 (0.11)	-0.032 (-0.04)	-0.040 (-0.06)	-0.001 (-0.03)	0.046 (1.37)	0.67
Dimport	0.015 (0.31)	1.66* (2.44)	0.322 (0.45)	0.463* (3.61)	-0.290^ (-1.73)	0.504 (0.88)	0.038 (0.81)	0.196 (0.28)	-0.469 (-0.83)	0.017 (0.61)	0.067* (2.44)	0.75
Dsexport	0.055 (1.47)	-0.123 (-0.23)	0.914 (1.64)	0.038 (0.38)	-0.225 (-1.71)	0.147 (0.33)	-0.014 (-0.38)	0.342 (0.63)	-0.160 (-0.36)	-0.008 (-0.38)	0.004 (0.18)	0.46
Dsimport	-0.001 (-0.03)	0.642 (1.26)	1.021^ (1.93)	0.044 (0.46)	-0.015 (-0.12)	0.710 (1.65)	-0.024 (-0.69)	0.141 (0.28)	-0.893* (-2.12)	0.014 (0.66)	0.040^ (1.97)	0.55

1/ For definitions of variables, see Table 3. E(X) denotes expected change in the variable X. Pos and Neg entries represent shocks to the indicated variables. Figures in parentheses are t-statistics.

* denotes significance at 5 percent level.

^ denotes significance at the 10 percent level.

All dependent variables are in log first difference, except for Dcbal, which measures the change in current account balance.

**Table 5. Regressions of the Current Account Balance and Its Main Components:
Model with Decomposition of Changes in Real GDP, GDP deflator, Energy prices, and Real Eff. Exch. Rate 1/**

Dep. Var.	Constant	E(DGDPR)	E(DGDPdefl)	Pos GDPR	Neg GDPR	Pos Defl	Neg Defl	E(Denergy)	E(Dreer)	Pos energ
Dcbal	44.16 (1.84)	-1332.19* (-3.77)	-655.24 (-1.68)	1002.32 (1.47)	-1786.10* (-2.87)	1800.58 (1.14)	-2299.98 (-1.23)	122.04 (1.58)	-359.55* (-2.70)	-289.08* (-2.48)
Dexport	0.0062 (0.10)	0.40 (0.45)	-0.47 (-0.48)	3.16^ (1.84)	0.0055 (0.00)	0.42 (0.11)	5.68 (1.21)	0.53* (2.73)	-0.58^ (-1.73)	0.67* (2.30)
Dimport	-0.11* (-2.37)	2.68* (3.77)	0.82 (1.05)	3.64* (2.65)	1.71 (1.37)	0.52 (0.33)	4.69 (1.24)	0.22 (1.41)	0.037 (0.14)	1.22* (5.19)
Dsexport	0.072 (1.64)	0.0063 (0.01)	0.39 (0.55)	1.14 (0.92)	-0.69 (-0.61)	1.22 (0.42)	2.57 (0.75)	0.14 (0.99)	-0.095 (-0.39)	-0.027 (-0.12)
Dsimport	-0.072 (-1.46)	2.12* (2.91)	1.47^ (1.83)	1.72 (1.22)	-0.79 (-0.62)	-4.82 (-1.48)	7.42^ (1.93)	0.047 (0.30)	0.37 (1.36)	0.40 (1.66)

1/ For definitions of variables, see Table 3. E(X) denotes the expected value of variable X. Pos X represents the excess of X over its expected value, while Neg X represents the shortfall from figures in parentheses are t-statistics.

* denotes significance at the 5 percent level.

^ denotes significance at the 10 percent level.

All dependent variables are in log first difference, except for Dcbal, which measures the first difference of the current account balance.

Table 6. Regressions of the Financial Account Balance and Important Components, with Stock Market Variable: Decompositions of Changes in Real GDP for Emerging Markets and Other Industrial Countries 1/

Dep. Var.	Constant	DGDPR	DGDPdefl	Denergy	Dreer	E(Demerg)	E(Dothind)	Dstock	Pos Emerg	Neg Emerg	Pos Othind	Neg Othind	R2
Dfbal	135.98 (1.42)	1334.30* (2.14)	-1503.05 (1.70)	368.79^ (1.94)	-323.50 (-1.50)	-9.71 (-1.70)	-3683.12 (-1.48)	10.14 (0.11)	7.09 (0.86)	-11.87 (-1.67)	-2320.88 (-1.39)	-1883.75 (-0.95)	0.57
Dinflow	0.17 (0.13)	0.50 (0.05)	5.21 (0.39)	-0.49 (-0.16)	1.81 (0.55)	0.011 (0.13)	-9.81 (-0.28)	-1.16 (-1.01)	0.11 (0.92)	-0.015 (-0.14)	-1.09 (-0.05)	25.09 (0.87)	0.30
Doutflow	-2.22^ (-1.87)	-7.98 (-0.84)	22.57 (1.84)	-3.52 (-1.24)	1.44 (0.48)	0.039 (0.51)	48.39 (1.54)	0.089 (0.08)	0.12 (1.11)	0.027 (0.27)	35.06 (1.70)	15.94 (0.60)	0.54
Dofasset	-0.61 (-0.71)	-1.94 (-0.28)	19.64* (2.22)	-2.33 (-1.14)	4.22^ (1.94)	0.013 (0.23)	3.84 (0.17)	-1.58* (-2.08)	0.21* (2.67)	0.012 (0.17)	6.70 (0.45)	54.56* (2.86)	0.75
Dinv	-0.75 (-0.93)	1.00 (0.15)	18.90* (2.27)	-1.98 (-1.02)	1.53 (0.75)	-0.016 (-0.30)	15.69 (0.73)	-1.38^ (-1.94)	0.084 (1.13)	0.083 (1.24)	15.18 (1.09)	45.12* (2.51)	0.85
Dofussec	-7.72* (-3.04)	12.51 (0.61)	39.13 (1.49)	-7.31 (-1.20)	8.18 (1.27)	-0.08 (-0.48)	191.56* (2.84)	6.93* (3.09)	0.38 (1.63)	0.045 (0.21)	39.22 (0.89)	-85.36 (-1.51)	0.78
Dofusliab	2.58 (0.76)	-17.45 (0.67)	16.93 (0.55)	-3.19 (-0.45)	8.28 (1.05)	0.14 (0.77)	-89.11 (-1.03)	-6.12* (-2.38)	0.36 (1.17)	0.041 (0.16)	20.58 (0.39)	141.06* (2.32)	0.75

1/ For definitions of variables, see Table 3. E(X) denotes expected change in the variable X. Pos and Neg entries represent shocks to the indicated variables.

Figures in parentheses are t-statistics.

* denotes significance at 5 percent level.

^ denotes significance at the 10 percent level.

All dependent variables are in log first difference, except for Dfbal, which measures the change in the financial balance.

Table 7a. Regressions of the Current Account Balance and Its Main Components: Basic Model with Decomposition of Interest Rate 1/

Dep. Var.	Constant	DGDPR	DGDPdefl	Denergy	Dreer	Demerg	Dothind	Dr	E(Dr)	Pos r	Neg r	R2
Dcbal	14.58 (0.70)	-595.22* (-2.27)	-146.48 (-0.50)	50.92 (0.84)	-145.07^ (-1.89)	-2.69^ (-1.81)	226.31 (0.71)	4.26 (1.04)				0.34
Dcbal	5.24 (0.23)	-555.46^ (-1.97)	-337.14 (-0.97)	108.52 (1.47)	-207.70* (-2.35)	-2.53 (-1.64)	419.30 (1.19)		-6.22 (-0.83)	13.23 (1.57)	-1.23 (-0.15)	0.41
Dexport	0.062^ (1.86)	-0.17 (-0.42)	0.16 (0.34)	0.26* (2.71)	-0.46* (-3.75)	-0.00061 (-0.26)	0.60 (1.17)	0.03* (4.55)				0.80
Dexport	0.072^ (1.95)	-0.27 (-0.59)	-0.057 (-0.10)	0.29* (2.40)	-0.46* (-3.20)	-0.001 (-0.41)	0.76 (1.33)		0.028* (2.33)	0.029^ (2.11)	0.031^ (2.26)	0.82
Dimport	-0.0016 (-0.04)	1.77* (3.20)	0.61 (1.00)	0.31* (2.41)	-0.26 (1.61)	-0.00038 (-0.12)	0.28 (0.42)	0.011 (1.22)				0.63
Dimport	0.036 (0.78)	1.43* (2.51)	0.82 (1.16)	0.22 (1.46)	-0.13 (-0.73)	-0.0013 (-0.40)	0.16 (0.23)		0.022 (1.48)	-0.014 (-0.84)	0.034^ (1.98)	0.68
Dsexport	0.086* (2.84)	-0.15 (-0.38)	0.76^ (1.79)	0.021 (0.24)	-0.28* (-2.52)	-0.00062 (-0.29)	-0.48 (-1.03)	0.0062 (1.03)				0.46
Dsimport	0.038 (1.00)	0.60 (1.28)	0.97^ (1.85)	-0.033 (-0.31)	-0.069 (-0.50)	-0.0027 (-1.03)	-0.24 (-0.41)	0.0067 (0.91)				0.29

1/ For definitions of variables, see Table 3. E(X) denotes the expected value of variable X. Pos X represents the excess of X over its expected value, while Neg X represents the shortfall from its expected value. Figures in parentheses are t-statistics.

* denotes significance at the 5 percent level.

^ denotes significance at the 10 percent level.

All dependent variables are in log first difference, except for Dcbal, which measures the change in the current account balance.

Table 7b. Regressions of the Financial Account Balance and Important Components: Basic Model with Interest Rate 1/

Dep. Var.	Constant	DGDPR	DGDPrdefl	Denergy	Dreer	Demerg	Dothind	Dr	E(Dr)	Pos r	Neg r	R2
Dfbal	-18.34 (-0.55)	694.89 [^] (1.66)	-210.31 (-0.45)	125.05 (1.30)	-15.27 (-0.12)	2.20 (0.92)	-52.71 (-0.10)	-12.73 [^] (-1.94)				0.16
Dfbal	-34.22 (-0.94)	816.45 [^] (1.82)	-637.96 (-1.15)	237.68* (2.02)	-128.12 (-0.91)	2.25 (0.92)	287.54 (0.51)		-29.72* (-2.50)	4.65 (0.35)	-25.24 [^] (-1.87)	0.26
Dinflow	0.071 (0.14)	5.65 (0.87)	-0.86 (-0.12)	0.86 (0.58)	-0.26 (-0.14)	-0.001 (-0.03)	-3.71 (-0.47)	-0.047 (-0.47)				0.03
Doutflow	0.43 (1.20)	-5.17 (-1.14)	-0.99 (-0.20)	-0.48 (-0.46)	-1.33 (-1.00)	-0.0022 (-0.08)	-2.76 (-0.50)	0.10 (1.43)				0.12
Dofasset	-0.12 (-0.21)	-0.93 (-0.12)	4.07 (0.51)	-1.23 (-0.74)	1.98 (0.94)	0.031 (0.77)	5.44 (0.52)	0.092 (0.75)				0.10
Dinv	0.021 (0.05)	4.35 (0.91)	1.28 (0.24)	-0.60 (-0.55)	-0.42 (-0.30)	0.014 (0.52)	-1.89 (-0.33)	0.19* (2.55)				0.39
Dinv	0.27 (0.65)	2.59 (0.50)	5.85 (0.92)	-1.70 (-1.26)	0.71 (0.45)	0.0084 (0.30)	-5.21 (-0.81)		0.31* (2.25)	-0.037 (-0.24)	0.42* (2.71)	0.45
Dofussec	0.037 (0.04)	-4.58 (-0.37)	16.01 (1.21)	-5.34 [^] (-1.94)	3.97 (1.15)	0.047 (0.71)	-7.20 (-0.49)	0.019 (0.10)				0.18
Dofusliab	-1.045 (-0.84)	6.73 (0.42)	10.19 (0.63)	-1.82 (-0.53)	5.00 (1.14)	0.11 (1.33)	15.19 (0.72)	0.00035 (0.00)				0.12

1/ For definitions of variables, see Table 3. E(X) denotes the expected value of variable X. Pos X represents the excess of X over its expected value, while Neg X represents the shortfall from its expected value. Figures in parentheses are t-statistics.

* denotes significance at 5 percent level.

[^] denotes significance at the 10 percent level.

All dependent variables are in log first difference, except for Dfbal, which measures the change in the financial account balance.

Chart 1: Current Account Deficit, Financial Account Balance, and Direct Investment

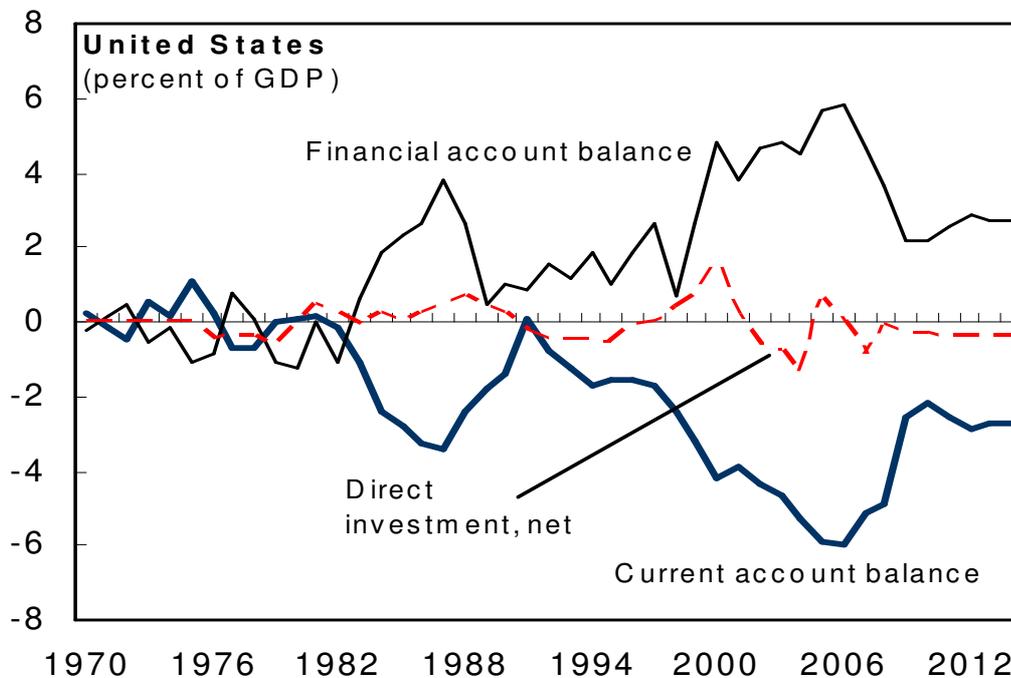


Table A1. Variables Used in Regressions

Dependent Variables²¹

Dcbal	Change in the U.S. external current account balance
Dexport	Change in U.S. exports of goods
Dimport	Change in U.S. imports of goods
Dsexport	Change in U.S. exports of services
Dsimport	Change in U.S. imports of services
Dfbal	Change in the U.S. external financial account balance
Doutflow	Change in outflows in the U.S. external financial account, U.S. owned assets abroad, including direct investment, net.
Dinflow	Change in inflows in the U.S. external financial account, foreign-owned assets in the United States, net.
Dofasset	Change in non-official foreign holdings of U.S. official assets
Dinv	Change in foreign direct investment in the United States
Dofussec	Change in non-official foreign holdings of U.S. securities other than U.S. Treasury securities
Dofusliab	Change in non-official foreign holdings of U.S. liabilities reported by U.S. banks

Table A2. Explanatory Variables

DGDPR	Change in real GDP, in percent (first difference of log of real GDP)
DGDPdefl	First difference in the percent change of the U.S. GDP deflator.
Denergy	Change in the index of prices of crude oil exports of petroleum exporting countries
Dr	Change in the nominal interest rate on 91-day U.S. Treasury securities
Dreer	Change in the real effective exchange rate (trade weighted) of the U.S. dollar
Demerg	Change in the index of real GDP growth in 15 emerging market countries
Dothind	Change in the index of real GDP growth in non U.S. industrial countries
Dstock	Change in value of Standard & Poor's composite 500 stock indexes

²¹ Except where indicated otherwise, variables are in current U.S. dollars. Changes represent the first difference of the indicated variable.

Table A3. Data Description and Sources

The following U.S. data come from the *International Financial Statistics* (IFS) data base:

Exchange rate for the U.S. dollar: real effective exchange rate.
Government spending: federal (central) government expenditure and investment.
Private investment: private fixed capital formation.
Consumption: private consumption.
Aggregate demand: gross domestic product.
Output: GDP at 1996 prices.
Interest rate: Average interest rate on 91-day (13-week) U.S. Treasury securities.
Money supply: Value of broad money (M2) at year end.

Other series from the IFS data base include real output, as measured by real GDP, for other industrial countries and selected emerging economies.

Balance of payments data for the U.S. come from Table 1, *U.S. International Transactions*, Bureau of Economic Analysis, and U.S. Department of Commerce. All data are in millions of dollars and seasonally adjusted. Details are as follows:

Exports of goods and services and income receipts, line 1.
Exports of goods and services, line 2.
Goods exports, line 3.
Services exports, line 4.
Income receipts, line 12.
Imports of goods and services and income payments, line 18.
Imports of goods and services, line 19.
Goods imports, line 20.
Services imports, line 21.
Income payments, line 29.
U.S.-owned assets abroad, net (increase/financial outflow (-)), line 40.
Foreign-owned assets in the U.S., net (increase/financial inflow (+)), line 55.
Non-official foreign assets in the U.S., net, line 63.
Direct investment, line 64.
Non-official holdings of U.S. securities, other than U.S. Treasury securities, line 66.
Non-official holdings of U.S. liabilities reported by U.S. banks, line 69.
Financial account balance, lines 40+55.
Balance on goods, line 71.
Balance on services, line 72.
Balance on goods and services, line 73.
Balance on income, line 74.
Balance on current account, line 76.

Stock market prices are measured by Standard & Poor's composite index of 500 stocks listed on the New York Stock Exchange, as provided through the Data Stream database.

Econometric Methodology

To estimate the empirical models, we form proxies for forecasted growth in real GDP, the GDP deflator, the interest rate (3-month U.S. Treasury bill rate), the exchange rate (real effective exchange rate of the U.S. dollar), an index of U.S. stock market prices (the Standard & Poor's index of 500 stock prices), an index of real output in selected emerging market countries, and an index of output in industrial countries other than the United States.

Following the endogeneity test suggested by Engle (1982), anticipated changes are generated by taking the fitted values of reduced form equations in which the explanatory variables include a constant and lagged values of the first-difference of the log value of each of the money stock, real output, the price level, the nominal wage, an index of energy prices, government spending, the interest rate, the exchange rate, and the indices of real output in emerging market economies and non-U.S. industrial countries. Shocks to each of the forecasted variables are generated by subtracting these forecasts from the actual values of these variables.

The index of energy prices is exogenous, according to the results of Engle's (1982) test. Obtaining a proxy for ex ante forecasts of energy price inflation is complicated by the assumption that the generating process experienced a structural change between 1973 and 1974, which is supported by the results of a formal test suggested by Dufour (1982). For both the period 1969–73 and the period 1974–2009, the generating process is modeled as an autoregressive process. Shocks to the change in the energy price index are then formed by subtracting these forecasts from the actual change.

The maintained hypothesis for estimation is that agents are rational and that the information set used to specify the proxy for expectation is the same as the set used by agents. Given these assumptions, Pagan (1984, 1986) showed that the use of regression proxies requires an adjustment of the covariance matrix of estimators of the parameters of the model containing expectation variables. A simple alternative, given the availability of sufficient degrees of freedom over the long sample period, is to estimate the expectation equations jointly with the rest of the model, thus avoiding the first-stage regression proxies. Therefore, it becomes necessary to estimate the model using 3SLS. The instrument list for estimation includes *lagged* values of the first-difference of the short-term interest rate; and *lagged* values of the first-difference of the log of each of real output, the price level, the money supply, government spending, the real exchange rate, and the current as well as lagged values of the energy price index. The paper's evidence is robust with respect to variation in variables and lags in the forecast equations or the list of instruments.

The number of lags in the forecast equations and list of instruments varies with the frequency of the data for model estimation. For annual estimation, the number of lags is two. For quarterly estimation, the number of lags is four. The results are robust with respect to changes in the lag length or list of variables.

The results of Engle's (1982) test for serial correlation are consistent with the hypothesis that the error term in the estimated empirical models is serially correlated in some cases. To filter out serial correlation, the empirical models using annual data are multiplied through by the filter $(1-\rho L)$, where ρ is the serial correlation parameter and L is the lag operator. For quarterly estimation, the error term is assumed to follow an autoregressive process of order four. Hence, the empirical models are transformed through the filter $(1 - \rho_1 L - \rho_2 L^2 - \rho_3 L^3 - \rho_4 L^4)$, where ρ is the estimate of the serial correlation parameter and L^i is the lag operator such that $L^i x_t = x_{t-i}$. Reported estimates are after transformation, to eliminate serial correlation. The error terms in the transformed models are serially uncorrelated, according to the results of Engle's (1982) test.

The positive and negative shocks are defined for joint estimation, following the suggestions of Cover (1992), as follows:

$$\text{Neg } Z_t = \frac{1}{2} \{ \text{abs}(\text{Shock}_t) - \text{Shock}_t \}$$

$$\text{Pos } Z_t = \frac{1}{2} \{ \text{abs}(\text{Shock}_t) + \text{Shock}_t \}$$

Where Shock_t is a randomly distributed event, i.e., i.i.d, uncorrelated with and orthogonal to variables in the information set, and $\text{Neg } Z_t$ and $\text{Pos } Z_t$ are its negative and positive components. Shocks are distributed symmetrically with a zero mean, indicating an equal probability of observing positive and negative shocks over the sample period.

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