A Forensic Analysis of Global Imbalances

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Abstract

We investigate whether the determinants of current account balances changed in the run-up to the 2009 financial crisis. We find that 2006-08 marks a structural break in the current-account behavior of emerging market economies and less markedly of the advanced countries. The main factors responsible for the anomalous behavior of immediate-pre-crisis current accounts are equity and real estate prices together with rising household leverage. Our projections suggest that, without drastic policy changes, the imbalances of the United States and China are unlikely to disappear.

Keywords: capital flows, current account balance, budget deficit, global imbalances, financial liberalization

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1. Introduction

In the years leading up to the financial crisis of 2009, a large literature developed on the determinants and dynamics of current account imbalances. With the outbreak of the crisis, attention then turned to the role of those imbalances in the financial upheaval. At some level, however, the initial question – what explains the emergence and persistence of such large imbalances? – remains answered. Nor is there a consensus on how the dynamics of global imbalances and the prospects for rebalancing have been affected, if at all, by the crisis. In this paper, we seek to address these unanswered questions.

First, we reexamine the determinants of current account balances using a variant of the model developed by Chinn and Ito. To begin with, we use the model to investigate whether there is a structural break in the relationship between global imbalances and their proximate determinants around the time of the crisis. Next we use our estimates to forecast the development of global imbalances over the coming five years. We consider a number of familiar hypotheses. These include the twin deficit hypothesis that current account deficits are driven by budget deficits (Chinn 2005), the savings-glut hypothesis that high savings in rapidly-growing emerging markets are responsible for their current account surpluses (Greenspan, 2005a,b, and Bernanke, 2005), the demographic hypothesis that population structure and life-cycle savings dynamics are responsible for observed imbalances (Cooper, 2008), the asset bubble explanation that wealth effects are the main force behind saving-investment imbalances (Aizenman and Jinjarak, 2009; Fratzscher and Straub, 2009), and the financial-development argument that countries with better-developed financial markets have a comparative advantage in producing and exporting low-risk financial assets (Caballero et al. 2008).[1]

We find that the 2006-08 period marks a structural break in the current-account behavior of emerging market economies and, less obviously, the advanced countries. The main factors responsible for the anomalous behavior of immediate-pre-crisis current accounts are equity and real estate prices together with rising household leverage. Our projections suggest that, without drastic policy changes, the imbalances of the United States and China are unlikely to disappear.

2. Basic Estimates

[1] For more on competing hypotheses for the causes of the global imbalances, refer to section 2 of the working paper version of this article (Chinn, et al. 2011).

Building on the work of Chinn and Ito (2007), we estimate the following model.

$$
\begin{aligned}
y_{i,t} = \alpha &+ \beta_1 BB_{i,t} \\
&+ \beta_2 FD_{i,t} + \beta_3 LEGAL_i + \beta_3 KAOPEN_{i,t} \\
&+ \beta_4 \left(FD_{i,t} \times LEGAL_{i,t}\right) + \beta_5 \left(LEGAL_{i,t} \times KAOPEN_{i,t}\right) + \beta_6 \left(KAOPEN_{i,t} \times FD_{i,t}\right) \\
&+ X_{i,t}\Gamma + u_{i,t} \,. \qquad (1)
\end{aligned}
$$

$y_{i,t}$ refers to three dependent variables: the current account balance, national saving, and national investment, all expressed as shares of GDP. *BB* is the government budget balance, *FD* is a measure of financial development, for which the ratio of private credit to GDP (*PCGDP*) is usually used; *KAOPEN*, the Chinn-Ito (2006) measure of financial openness; and *LEGAL* a measure of legal/institutional development – the first principal component of law and order (*LAO*), bureaucratic quality (*BQ*), and anti-corruption measures (*CORRUPT*).[2] $\boldsymbol{X}_{i,t}$ is a vector of macroeconomic and policy control variables that includes familiar determinants of current account balances: net foreign assets as a ratio to GDP (from Lane and Milesi-Ferretti, 2007); relative income (to the U.S.); its quadratic term; relative dependency ratios of young and old population; terms of trade volatility; the output growth rate; trade openness (exports plus imports as a share of GDP); a dummy variable for oil exporting countries; and time fixed effects.

Using panel data estimation and an extensive dataset that covers 23 industrial and 86 developing countries between 1970 and 2008, we characterize the main determinants of current account across countries and over time. Estimating a panel that contains non-overlapping 5-year averages of the data allows us to focus on medium-term variations in current account, national saving, and investment, rather than characterizing their short-term, cyclical variations or long-term, equilibrium relationship. All the variables, except for net foreign assets to GDP, are converted into the deviations from their GDP-weighted world mean prior to the calculation of five year averages while net foreign asset ratios are sampled from the first year of each five-year panel as the initial conditions.[4] The use of demeaned series controls for rest-of-world effects. In other words, a country's current account balance is determined by developments at home relative

[2] *LAO*, *BQ*, and *CORRUPT* are extracted from the ICRG database. Higher values of these variables indicate better conditions.

[4] The variables for ToT volatility (*TOT*), trade openness (*OPN*), and legal development (*LEGAL*) are averaged for each country, i.e., they are time-invariant. The five year panels are 1971-75, 1976-1980, etc. However, the last panel is composed of only three years: 2006-08.

to the rest-of-the-world. Most of the data are from publicly available sources such as the *World Development Indicators*, *International Financial Statistics*, and *World Economic Outlook*.

A large literature focuses on the contrasting saving, investment and current-account-balance behavior of industrial and developing countries, often disaggregating further between emerging markets (middle-income countries with relatively extensive access to international capital markets) and other developing countries, pointing out that potential determinants of these outcomes –growth rates, financial development, demographic structure, for example – differ importantly across these groupings. In addition, a number of studies have suggested that the impact of these variables and not only their values may different systematically across these country groupings (Alfaro, et al. 2008; Chinn and Ito, 2007; Ito and Chinn, 2009).[7] We therefore regress current account balances, national saving, and investment on the same set of regressors separately for industrialized countries (IDC), developing countries (LDC) and emerging market economies (EMG).[8]

The first result in the baseline estimates in Table 1 is that budget and current account surpluses move together, other things equal, consistent with the twin deficits hypothesis. A coefficient of less than one suggests that they move together less than proportionately.[9] The results of the national saving and investment estimations (not reported) indicate that government budget deficits affect both national saving and investment while the magnitude of its impact is larger on the former than the latter, thus making the net impact on the current account balance positive.[10] Larger net foreign asset positions, which tend to generate a stronger income account, affect the current account balance positively, as anticipated. The relative income terms, which tend to be jointly if not always individually significant, indicate that higher income countries generally have more positive current account balances (capital tends to flow from richer to

[7] Based on the Solow growth model, the level of development affects the rates of return across countries, which determine the direction of capital flows in open financial markets. On the recent situation of global imbalances, where capital flows from developing to developed world contrary to the prediction of the Solow growth model (the "Lucas paradox"), Alfaro, et al. (2008) argue that institutional development affects the direction of capital flows. In either case, it makes sense to assume countries with similar GDP per capita have similar behavior in current accounts.

[8] Emerging market economies are those classified as either emerging or frontier in 1980–1997 by the International Financial Corporation, plus Hong Kong and Singapore. We report the results for current accounts and omit those for saving and investment to conserve space.

[9] These estimates are very similar to those in Abbas et al. (2010) and Erceg et al. (2005).

[10] The Ricardian hypothesis predicts that any change in public saving would be offset by the exact same change but with the opposite sign in private saving, thus making the estimated coefficient of budget balances zero in the national saving estimation. The Ricardian framework can be extended to predict public dissaving would not crowd out private investment, thus making public saving and investment uncorrelated.

poorer countries, as suggested by the standard neoclassical growth model – see e.g. Lucas 1990). Developing countries with higher dependency ratios (and, by the life-cycle hypothesis, lower savings rates) generally have weaker current account balances. Oil exporting countries have stronger current account balances, other things equal.

We also find evidence supportive for the Caballero-Farhi-Gourinchas (2008) hypothesis that countries with more developed financial markets have weaker current account balances. For the full sample and the IDC and EMG subsamples, financial development is negatively and significantly related to the current account balance. Among emerging markets, those with better developed financial markets have weaker current account balances, as if they are on the receiving end of inflows (or experience the least tendency for capital to flow out). Such a negative impact of financial development on the current account balance is even more pronounced when it is coupled with a stronger rule of law or more open capital accounts, all of which are consistent with the saving glut hypothesis.[11,12]

Figure 1 illustrates, for selected countries, the contributions of these factors to current account balances using the estimates from the regressions in Table 1. We group the variables into 1) the government budget balance variable; 2) a "saving glut" group composed of the estimated contributions of financial development, legal development, and financial openness (along with their three interaction term s), 3) a "demography" group composed of the contributions of young and old dependency ratios, and 4) other factors.[13] The figures in the left column illustrate the contributions of these factors to the levels of current account balances, while those in the right column illustrate the contributions to changes in the current account balances of changes in the

[11] The results are consistent with those of the saving regressions, indicating that the Caballero, et al. effect goes through the saving channel instead of investment as the saving glut proponents argue.

[12] In this sort of exercise, the issue of endogeneity can be raised and make it suspicious that the estimated coefficients are biased and with low efficiency. The GMM estimation is often suggested to deal with this issue. However, in our context, because our estimation is not based on a dynamic model and also because our use of five-year panels (instead of annual data) helps avoid serial correlation, the GMM estimation is not appropriate. One simpler way to control for endogeneity is to use lagged five-year panels. However, such a lagging method, involves variables' dynamics over a longer time period, may interfere with our empirical focus on the medium-term dynamics. Chinn and Ito (2007) implement the same estimation model as we do here and test its robustness by employing different estimation techniques such as two-stage least squares and generalized least squares estimations and using detrended data. These robustness checks show that the estimation results based on equation (1) are robust.

[13] The contributions of the three groups of variables are calculated as $\sum_{k=1}^{p} \hat{\beta}_i x_{it}$ where x_{it} refers to the variables included in each of the four variable groups.

factors or groups.[14] Comparing these bars with actual current account balances, or changes in current account balances (the solid line with diamond nodes) allows us to infer the contribution of these different factors to the level and change in the current account. By comparing the estimated contributions of these different variable groups, we can see the development of the impacts of competing hypotheses.

A number of interesting patterns emerge.

- While the contributions of budget balances vary over time, the contributions of the "saving glut" and "demography" variables tend to be relatively stable.
- The contribution of the demographical factors tends to be large for industrialized countries but not for emerging markets.
- For the United States and the United Kingdom, although the level of budget balances does not seem to be a big contributor, changes in the budget are correlated with changes in the current account balances, supporting the notion that changes in budget balances contribute to guiding the direction of current account balances.
- While the "saving glut" variables have contributed to improving current accounts for emerging market countries, i.e., the lack of financial development, legal development, financial openness, and their combinations have contributed positively to current accounts, their effect has been relatively stable; this is not just a recent phenomenon as the saving glut proponents have argued.

Our baseline model does not exhaust the list of plausible determinants of global imbalances. As discussed earlier, another potential candidate is booming financial markets in the mid-2000s. In the period prior to the financial crisis of 2008-09, when households in the United States and a number of European countries borrowed heavily, fueling domestic absorption. We can investigate whether and to what extent this behavior had an impact on current account balances by incorporating into our analysis the level of leverage by households. We define household leverage as the ratio of household debt to disposable income. Using the OECD database, we construct *HH-Leverage 1* as the growth rate of the ratio of household debt (general loans) to disposable income as a general measure for the growth in household leverage. Alternatively, *HH-Leverage 2* is the growth rate of the ratio of household mortgage debt to

[14] By construction, the sum of all the four bars should add up to the predicted values, or changes in the predicted values (the dotted line with the square nodes).

disposable income, and *G-Leverage* is the growth rate of the ratio of government debt to government revenue as the measure of government leverage. While *G-Leverage* is available for most OECD countries since the early 1970s, *HH-Leverage 1* and *HH-Leverage 2* are available for a smaller number of countries only from 1995.[15]

Many countries experienced rapid growth of leverage in the years leading up to the crisis. That growth rate is especially high when we measure leverage using mortgage loan debt. There is no obvious trend in government leverage, which rises for a period before declining for several years in the run-up to the crisis.

The results when we include these variables are reported in Table 2. Due to data-availability limitations, the regressions are now run only for the OECD countries.[16] Considering the housing boom prior to the global financial crisis concentrated on advanced economies, this data limitation still may allow this estimation exercise to yield interesting results on the link between the asset market behavior and current account balances (like Aizenman and Jinjarak (2009) and Fratzscher and Straub (2009)).

Those where we include *HH-Leverage 1* and *HH-Leverage 2* use data for 1996 on, i.e., the last three five-year panels, 1996-2000, 2001-05, and 2006-08. The regressions with *G-Leverage* start in 1971, although the sample is limited in earlier years.[17]

Table 2 shows that faster growth in household leverage leads to worsening of the current account as expected. A one percentage point increase in the growth rate of household leverage leads to a 0.19 percentage point *decrease* in the current account balance (Model (4)). When we focus on home mortgage debt, we do not see any significant negative impact on the current account. Column (3) suggests that more government leverage leads to worsening current account balances, again consistent with theoretical prediction. When we include both *HH-Leverage 1* and *G-Leverage*, however, the impact of *G-Leverage* becomes positive. Given that the coefficient of *HH-Leverage 1* remains negative with larger size and greater statistical significance, and also that the simple correlation between *HH-Leverage 1* and *G-Leverage* is quite low, the positive coefficient of *G-Leverage* is not plausibly attributable to multicollinearity. We interpret the

[15] *G-Leverage*, *HH-Leverage 1*, and *HH-Leverage 2* are available for the maximal of 30, 27, and 16 countries, respectively, though the availabilities are mostly concentrated in recent years.
[16] The sample mostly includes industrialized countries, but also includes several emerging market countries that are not included in our IDC sample but are OECD members, such as Chile, Korea, Hungary, and Poland.
[17] Since Japan appears to be an outlier for its high growth in public leverage (*G-Leverage*), we remove the country's effect by interacting *G-Leverage* with a dummy for Japan. But we do not report the estimate in the table, which is often found significantly positive.

result as statistical artifact driven by greater government debt accumulation in the slowdown, reflecting countercyclical fiscal policy.[18]

When we include interaction terms between the fixed effect for the 2006-08 period and the leverage variables (on the right-hand side of Table 2), we see some evidence that the growth in household leverage had a higher impact on current accounts in 2006-08, though the effect is not statistically significant. The impact of government leverage is particularly high in the 2006-08 period as well, confirming the point that the positive effect of government's leveraging is primarily a period-specific phenomenon.

Special economic and political factors – a strategy of export led growth, or a desire to accumulate foreign reserves as insurance against shocks – are sometimes cited as explanations for the large and persistent current account surpluses of East Asian countries, just as special factors (the dollar's status as an international currency, or the overall composition of its external balance sheet) are often cited for the United States. When we include dummies for China, other East Asian emerging market countries and the United States in our basic model, these are consistently significant.[19] The dummy for the United States is found to be -3.5% whereas the dummies for China and ex-China East Asian emerging countries are +3.3% and +2.4%, respectively.[20]

We then investigate whether these country- or country-group- specific factors are stable over time by allowing the dummies for the U.S. and East Asian emerging markets to vary between 5-year periods. Figure 2 shows the estimates of interaction terms between the dummies for the U.S., China, and ex-China East Asian emerging countries and fixed effects for the five-year panels in the full sample. In the figure, we report insignificant estimates as zeros.[21] The "U.S. effect" is relatively stable, ranging from -2 to -6%. This is consistent with the view that the U.S. possesses special characteristics allowing it to run persistent current account deficits of

[18] When we use the government leverage variable calculated using the data on government debt and revenue from IMF's *World Economic Outlook*, the results are unchanged although the number of observations increases significantly. In the context of the Ricardian equivalence, the government's leverage should not affect current accounts at all, i.e., the estimate on the variable should be insignificant.
[19] "Ex-China East Asian emerging market countries" include Indonesia, Korea, Malaysia, and Thailand.
[20] Results not reported to conserve space.
[21] We interact the dummies for either the U.S., China, and ex-China East Asian EMG with the time fixed effects for each of the five-year panels, and include them in the estimation model in addition to the regular fixed effects. These interaction terms are supposed to capture the additional effect of the countries or group.

some 3 per cent of GDP on average, consistent with Gourinchas and Rey's (2007) emphasis on the country's "exorbitant privilege."

The "ex-China East Asian" or "China" effect is unstable over time. A distinctive effect for the East Asian emerging market countries is evident only after the Asian crisis of 1997-98, reflecting the investment drought in the post-crisis period (Chinn and Ito, 2007). Given that "excess" current surplus is more of a recent phenomenon (notwithstanding the long-term focus on export-led industrial policy), it is difficult to argue that the main cause for these countries' persistent current account surpluses is mercantilist policy. More plausible is less emphasis on investment promotion and a greater desire to accumulate foreign reserves.

The same conclusion follows for China. While there are some time periods when China's current account balances are higher than predicted by the baseline model, there are others when it is not. It is noteworthy that its current account surplus is especially high in the global imbalances period, marking the level of excess surplus as high as 7% of GDP.

While a number of researchers have explored the determinants of current account balances, our findings are consistent with the findings from a collection of articles. Our estimates of 0.09 through 0.30 for the fiscal impact on current accounts are similar to the findings in Erceg et al. (2005), Bussiere (2010), Corsetti and Muller (2006), and Gruber and Kamin (2007). As for the saving glut variables, Chinn and Ito (2007) and Ito and Chinn (2009) find evidence for the interactive effects between financial development, financial openness, and legal development, which may help reduce the level of current account balances through reducing national saving. Alfaro, et al. (2008) and Gruber and Kamin (2007) also find that better quality of government institutions and regulatory environment tends to attract capital inflow (i.e., worsen current account balances). Blanchard and Giavazzi (2002) and Abiad, et al. (2007) find evidence for financial integration leading to current account deterioration in the experience of the European integration. Although we are not aware of any other papers that empirically look into the effect of leveraging on current account balances, from a similar but different angle, Aizenman and Jinjarak (2009) and Fratzscher and Straub (2009) show that asset market booms can worsen current account balances. After all, some portion of current account imbalances are left as country-specific factors, but this finding is also shared by other papers such as Gruber and Kamin (2007).

3. Were the 2006-08 Current Account Balances Atypical?

We now ask whether current accounts behaved atypically in the 2006-08 period, just prior to the global crisis. When we make in-sample forecasts of current account balances using the parameter estimates shown in Table 1, we find that the U.S. current account deviated from the predicted path significantly in 1996-2000 and 2001-05 before returning to the 95 per cent confidence interval in the most recent period.[22] The current account imbalances of two large surplus countries, Germany and China, are both well outside the confidence interval.

Figure 4 shows the kernel density estimates of the prediction error distribution from our baseline model in Table 1, illustrating how well the estimated model explains variations in current account balances in different sample groups and time periods. For both the full sample and the LDC and EMG subsamples, the distribution of prediction errors from the baseline model becomes significantly wider in the 2006-08 period. For the advanced countries, the prediction errors are more skewed to the left and more disperse in 2006-08. These results suggest a possibility of a regime shift in the last period.

3.1 Identifying Structural Breaks

To investigate the presence of a structural break in current account behavior in the pre-crisis period, we conduct out-of-sample predictions retroactively and recursively and estimate the probabilities of actual current account balances compared to the distributions of predicted levels. That is, we first forecast current account balances for the 2006-08 period using data through 2005. We then calculate the confidence intervals of the retrospective forecasts, which we denote the "pseudo-confidence intervals of the forecast."[23] These pseudo-confidence intervals allow us

[22] Results not reported to conserve space. The figures showing the in-sample predictions can be found in the working paper version of this paper (Chinn, et al., 2011).

[23] Note the distinction between the "confidence intervals of predictions" and the "confidence intervals of forecasts." The former is literally the confidence intervals of predicted values, or the conditional mean of y (i.e., $\hat{y}$) given a set of regressors x_i's. The confidence interval of predictions reflects the uncertainty of the estimated coefficients (captured by the confidence intervals of $\hat{b}$ in $X'\hat{b}$). The "confidence intervals of forecasts" are the confidence intervals for the unknown values of y for a known set of x_i's. Hence, this type of confidence intervals reflect not only the uncertainty of the estimated coefficients, but also the distribution of prediction errors (i.e., $\mathrm{var}(y_i) = \mathrm{var}(\hat{y}_i) + \mathrm{var}(\varepsilon_i)$). For the variance of the errors, the standard errors of regressions (SER) are normally used in the estimation that assumes homoskedasticity. In our estimation, however, we allow for heteroskedasticity. Hence, instead of SER, we use the standard deviations of the prediction errors from the last five-year period before the forecasted period. Because we make forecasts retroactively for the past periods and because we make modifications for the variance of the prediction errors, we call our confidence intervals of forecast the "pseudo-confidence intervals of forecast."

to estimate the probability of an actual, or realized, value of current accounts by calculating how many standard deviations the realized value of the current account is away from its forecast. The number of standard deviations can be interpreted as a *t*-statistic (adjusted for the degrees of freedom), and gives us the *p*-value of the realized current account balance. We then recursively extend the out-of-sample predictions back to 1991-95 and estimate the probabilities for realized current account balances in the same way, as shown in Table 3.[24]

For the United States, the probability of the level of current account balance in the 2006-08 period is 18.4% based on estimates with data up to 2005, while the probability of the level of current account balance in 2001-05 is 19.4% based on the estimates with data up to 2000. These *p*-values can be interpreted as the extent of "surprise." The smaller the *p*-value, the greater the extent that the realized current account balance is as a surprise.[25] In the table, the *p*-values in bold are those below 5%. These low *p*-values indicate the "most surprising" current account balances. If many countries experience the "most surprising" current accounts in one period, that period can be interpreted as a structural break.

The average probabilities indicate that the level of current account balances was most surprising in 1996-2000 for IDC and in 2006-08 for EMG. The number of individual countries with the *p*-values below 5% (with "surprises") is highest in 1996-2000 for IDC (six countries) and 2006-08 for EMG (10). Furthermore, eight industrial countries which have the lowest *p*-values ("most surprising") in 2006-08 while 14 EMGs also have the lowest *p*-values in the same period. Given the lowest subsample average of the *p*-values, and that a large number of countries have the surprising level of *p*-values, we conclude that emerging market economies experienced a structural break in 2000-06. For the industrialized countries, there is some sign that a structural break might have occurred in the 1996-2000 period, but given the low level of *p*-values, the 2006-08 period may not be ruled out as a second structural break point.

3.2 What Happened in 2006-08?

[24] One could argue that as the out-of-sample predictions are extended to earlier periods, the degrees of freedom would decline, so could the accuracy of the predictions. However, the pseudo-confidence intervals should reflect the decline in the accuracy of the predictions with greater standard deviations of prediction errors prior to the forecasted period and thereby with wider pseudo-confidence intervals. Hence, the *p*-values are still comparable across different time periods.

[25] Because the prediction must either over- or under-predict the actual current account balance, the highest probability is 50%.

We focus on 2006-08 as the structural break point for emerging market countries and to a lesser degree for industrialized countries and search for additional factors not captured by the baseline model that may have contributed to the unexplained component of the current account balances in this period. “Irrational exuberance” about future asset valuations which increased consumption and investment spending is one possibility. The desire to accumulate international reserves, which led governments to boost savings relative to investment, is another (Aizenman and Marion 2007). Monetary policy may have contributed to observed imbalances by stimulating absorption. Some researchers (such as Taylor, 2009) argue that the Fed maintained lax monetary policy for too long, thereby keeping the cost of capital too low and feeding speculative investment in real assets. Although Chinn and Wei (2009) show that the exchange rate regime does not affect the current account adjustment, it has been argued that the exchange rate regime affects the behavior of current account balances.

Lastly, we investigate whether the performance of housing markets affected current account balances. One needs to be careful about including this factor in the baseline model since it is the least plausibly exogenous of our candidate variables, as it is the outcome of a complex interaction of monetary policy, financial regulations, and other macroeconomic and institutional factors. Moreover, we have already investigated the impact of mortgage leveraging on current account balances in a previous section (without finding much effect). Here we consider the possibility that rising housing prices may have created a wealth effect and consequently contributed to increasing domestic absorption particularly in this period. Many researchers have focused on the impact of the housing markets on current account balances (such as Aizenman and Jinjarak, 2009 and Fratzscher and Straub, 2009), highlighting how asset market booms can attract capital inflows, thus worsening current account balances, through increasing perceived levels of wealth.

Figure 4 shows scatter plots for the prediction errors and several variables of interest. It appears that both the real rate of increase of home values and the growth rate of private bond market capitalization in the pre-crisis period of 2002-06 were negatively correlated with the prediction errors of current account balances. However, we cannot discern any (unconditional) correlations for stock market total values or public bond market capitalization.

We clearly need to control for other conditions. Hence, we estimate the following equation:

$$\hat{u}_{it} = \varphi W_{it} + \theta D_i + \varepsilon_t \ . \qquad (2)$$

$\hat{u}_{it}$ is the out-of-sample prediction errors from the estimation for the 2006-08 period for different subsamples. W_{it} is a vector of candidate variables that may explain the unexplained component of current account balances. That vector includes:

- Average changes in stock market total value (*SMTV*), public bond market capitalization (*PBBM*), and private bond market capitalization (*PBBM*) in 2002-06;
- Fiscal procyclicality – the correlations between Hodrick-Prescott (HP)-detrended government spending series and HP-detrended real GDP series in 2006-08 (*FIS_PRO*);
- Dummy for the fixed exchange rate regime (FIX) in 2006-08 based on the Reinhart - Rogoff exchange rate regime index (2008);[26]
- International reserves as a ratio to GDP (*IR*) as of 2005;
- Real interest rate (*Real_Int*) as of 2005;
- Average of the real (i.e., CPI-inflation-adjusted) housing appreciation in 2002-06. [27]

We report estimates of equation (2) in Table 4. Since the number of observations is small – the availability of data on both private/public bond market capitalization variables and the housing price indexes is limited, especially for non-industrial countries, we combine the observations for both industrialized and emerging market countries.

Better performance of equity, private bond and public bond prices worsens current account balances in the global imbalances period as one would expect, though statistical significance varies across models. Unfortunately, the small sample size does not allow us to determine which financial variable has the greatest effect on current account balances in this period.

While fiscal procyclicality does not seem to affect the unexplained component of current account balances, monetary policy does, especially when the housing index is included in the

[26] If the most frequent type of the exchange rate regime for the 2006-08 period is fixed exchange rate regime (in the "coarse version" of the index), we assign the value of one, and zero otherwise.

[27] We collected housing indexes for 47 countries from the CEIC database, government statistical agencies, private organizations that keep track on housing prices, and Joshua Aizenman and Yothin Jinjarak's dataset. The choice of the 2002-06 period for the average real growth rate of the indexes is driven by the facts that the last world recession occurred in 2001; and that the housing bubble peaked in 2006.

specification. Real interest rates as of 2005 are found to be a negative contributor to the unexplained part of current account balances despite the significant entry of the real housing appreciation variable. As was shown in Figure 3, real home price appreciation negatively affects the unexplained component of current account balances. Despite much attention paid to the recent, rapid accumulation of international reserves, reserves do not seem to contribute to the unexplained component of current account balances.[28]

Note finally that there still remains a large unexplained component for several countries with large current account imbalances: the United States, China, Greece, and Iceland.

4. Forecasts and Counterfactuals

Our estimates allow us to make some predictions regarding the evolution of global imbalances over the 2012-16 period contingent upon the evolution of the empirical determinants we have identified. We make two types of forecasts: one uses data through 2008, the other data only through 2005 (given the possibility of a structural break in 2006).[29]

For the United States, forecasts based on data through 2008 indicate the current account deficit stabilizing at around 4% of GDP (in contrast, the latest IMF forecast at time of writing shows it narrowing significantly to 2%). The forecast with data through 2005 also points to a similar size of the U.S. deficit. The forecast for the UK also suggests persistent current account deficits regardless of the data used..

Our forecasts suggest that Japanese and Germany surpluses will remain stable or even rise further absent additional policy changes. In contrast, the IMF again projects more rebalancing by these countries.[30] Our model predicts the European debt crisis countries will continue to run current account deficits, albeit smaller ones except for Greece, as demand and growth weaken and the deleveraging associated with the debt crisis continues. The impact of this last channel is noticeable: our results suggest that one percentage *decrease* in the growth rate of household leverage should lead to a 0.2 percentage point improvement in current account balances as the share of GDP.

[28] We also repeat the same exercise, but in a panel context, by using the retroactive prediction errors from Table 2 as the dependent variables and having the explanatory variables of equation 2 as the five-year averages. The results from this exercise (not reported) yield consistent results with those reported in Table 4. For a contrasting view, see Gagnon (2012).

[29] Details regarding the assumptions and forecast construction are reported in the working paper version.

[30] Japan's rebalancing can be due to the earthquake/nuclear crisis in March 2011 which the IMF must incorporate in its projection.

The results of our model suggests the current account surpluses of Asian countries rising slightly or remain constant, suggesting the "East Asian effect" in Figure 2 will persist.

One interpretation is that the circle will be squared by other countries that will run smaller surpluses and offset America's smaller deficits. That conjecture could also apply to China, but even a significant reduction in the China's surplus, like that projected by the IMF, will still leave the country with an elevated imbalance. A less reassuring interpretation is that the parts do not add up under current forecasts and that even partial rebalancing will require further policy changes.[31] Either way, it seems clear that imbalances will persist.

Do our conclusions change when taking into account fiscal consolidation and deleveraging? The short answer is no. For instance, a three percentage point change in the fiscal balance relative to the baseline scenario would improve the current account balance by a mere 70 basis points, suggesting that rebalancing cannot be accomplished through fiscal policy alone. Furthermore, given our estimates, even if U.S. household continue to deleverage relatively rapidly, the U.S. will continue to run significant current account deficits unless other policy adjustments are also undertaken.

Finally, we consider alternative scenarios for financial development and capital account liberalization in China. If China's level of capital account openness rises moderately, to the level of Thailand in 2008, then the current account surplus falls significantly, in line with the predictions of the saving glut argument, and even more if financial openness increases further, to Mexican levels – almost 3 percentage points relative to the baseline.[32,33]

When we conduct a similar exercise for financial development, we find that different levels of financial development *alone* have minimal impact on the predicted level of the current account. This suggests that financial liberalization (relaxing restrictions on capital account transactions) is likely to have a bigger impact on the current account than financial development – at least in terms of the way we have measured financial development.[34]

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[31] On the impact of sectorial reforms on current accounts, refer to Ito and Volz (2013).

[32] The countries are ranked as Mexico (69.2 in the 100 scale), Brazil (58.8), Thailand (40.3), and China (16.1) in terms of the level of financial openness as of 2008. The average of KAOPEN for the LDC group as of 2008 is 50.2 whereas that for the EMG group is 60.9.

[33] If capital account opening occurs while exchange rates are allowed to adjust more flexibly, the current account balance could also deteriorate through the price channel.

[34] There are several problems using our measure of financial development in China; first is the fact that the banks are either state owned or highly controlled by the state. Second, peculiarities in Chinese corporate governance induce large amounts of corporate saving. See Ma and Yi (2010) and Prasad (2011) for a discussion.

5. Conclusion

We have re-examined global current account balances in order to ascertain whether their behavior changed during the run-up to the global crisis of 2009. Our results suggest that changes in budget balances were an important determinant of changes in current account balances for advanced countries like the United States and United Kingdom, while "saving glut variables" were particularly important for emerging market economies. We also identified the 2006-08 period as a structural break for emerging market countries and, to a lesser extent, industrialized countries. The otherwise anomalous behavior of current account balances in this period is attributable, according to our analysis, to the performance of stock and bond markets and real housing appreciation.

Extrapolating to the future, this analysis suggests that it is unlikely that U.S. fiscal consolidation alone can induce a significant reduction in the U.S. current account deficit. For China, financial development might help to shrink the current account surplus but only if coupled with financial liberalization. On balance (as it were), these findings suggest that unless a number of countries jointly implement substantial policy changes, global imbalances are unlikely to disappear.

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Table 1: Baseline Current Account Regressions

	Current Account			
	(1) Full	(2) Industrial Countries (IDC)	(3) Less Developed (LDC)	(4) EMG
Government budget balance	0.295	0.289	0.279	0.094
	[0.058]***	[0.086]***	[0.063]***	[0.054]*
Net foreign assets (initial)	0.037	0.078	0.028	0.026
	[0.006]***	[0.008]***	[0.007]***	[0.012]**
Relative income	0.09	0.018	0.135	0.284
	[0.018]***	[0.022]	[0.022]***	[0.093]***
Relative income squared	0.055	0.02	0.046	0.16
	[0.018]***	[0.094]	[0.017]***	[0.081]*
Dependency ratio (young)	-0.033	0.004	-0.029	-0.029
	[0.015]**	[0.025]	[0.017]*	[0.019]
Dependency ratio (old)	-0.019	0.057	-0.022	-0.068
	[0.010]**	[0.021]***	[0.011]**	[0.020]***
Financial Develop. (PCGDP)	-0.027	-0.02	0	-0.117
	[0.014]*	[0.010]*	[0.029]	[0.038]***
Legal development (LEGAL)	-0.008	0.015	-0.015	-0.018
	[0.005]*	[0.005]***	[0.007]**	[0.012]
PCGDP x LEGAL	-0.011	-0.014	-0.007	-0.032
	[0.008]	[0.012]	[0.008]	[0.014]**
Financial open. (KAOPEN)	0.002	0.008	-0.009	-0.008
	[0.005]	[0.004]*	[0.008]	[0.009]
KAOPEN x LEGAL	0.003	0.012	-0.001	0.004
	[0.001]***	[0.003]***	[0.002]	[0.003]
KAOPEN x PCGDP	0.002	0.028	0.003	-0.02
	[0.007]	[0.010]***	[0.008]	[0.010]*
TOT volatility	0.000	0.028	-0.01	0.023
	[0.023]	[0.047]	[0.024]	[0.025]
Avg. GDP growth	-0.097	0.178	-0.09	0.072
	[0.091]	[0.178]	[0.099]	[0.117]
Trade openness	-0.001	-0.001	-0.005	0
	[0.006]	[0.011]	[0.010]	[0.012]
Oil exporting countries	0.028	–	0.025	0.045
	[0.013]**	–	[0.012]**	[0.016]***
Dummy for 2001-05	0.025	0.015	0.033	0.041
	[0.009]***	[0.009]*	[0.015]**	[0.017]**
Dummy for 2006-08	0.017	0.002	0.032	0.019
	[0.011]	[0.010]	[0.018]*	[0.022]
Observations	621	174	447	250
Adjusted R-squared	0.5	0.63	0.52	0.46
# of countries in the sample	101	23	78	38

Note: Time fixed effects are included in the estimation, but only those for the 2001-05 and 2006-08 periods are reported in the table.

Table 2: Impacts of "Leveraging" on Current Account Balances, OECD Countries

	HH-leverage1 (1)	HH-leverage2 (2)	Gov't-leverage (3)	HH lev.1 & G-leverage (4)	HH lev.2 & G-leverage (5)	HH-lev.1 w/ int. (6)	HH-lev.2 w/ int. (7)	G-lev. w/ int. (8)	HH & G-lev.1 w/ int. (9)	HH & G-lev.2 w/ int. (10)
Gov't budget balance	0.399	0.405	0.331	0.540	0.741	0.403	0.390	0.337	0.563	0.651
	(0.113)***	(0.313)	(0.088)***	(0.123)***	(0.510)	(0.116)***	(0.276)	(0.087)***	(0.125)***	(0.394)
Net foreign asset	0.049	0.006	0.084	0.050	0.007	0.048	-0.003	0.076	0.048	-0.007
(initial cond.)	(0.010)***	(0.025)	(0.009)***	(0.009)***	(0.023)	(0.010)***	(0.024)	(0.010)***	(0.010)***	(0.019)
Relative income	0.049	0.103	0.030	0.017	0.098	0.049	0.107	0.043	0.016	0.104
	(0.038)	(0.054)*	(0.022)	(0.036)	(0.049)*	(0.038)	(0.049)**	(0.023)*	(0.038)	(0.040)**
Relative income sq.	-0.008	-0.150	-0.011	-0.068	-0.146	-0.010	-0.215	0.017	-0.076	-0.151
	(0.088)	(0.192)	(0.071)	(0.085)	(0.202)	(0.089)	(0.198)	(0.066)	(0.099)	(0.171)
Young dependency	-0.071	-0.001	-0.041	-0.062	0.001	-0.072	0.003	-0.025	-0.061	-0.003
ratio	(0.041)*	(0.062)	(0.026)	(0.039)	(0.062)	(0.042)*	(0.060)	(0.024)	(0.040)	(0.061)
Old dependency ratio	0.047	0.187	0.003	0.052	0.192	0.046	0.153	0.006	0.047	0.215
	(0.030)	(0.056)***	(0.020)	(0.031)	(0.056)***	(0.031)	(0.052)***	(0.018)	(0.032)	(0.043)***
Fin Dev. - PCGDP	-0.026	-0.024	-0.016	-0.036	-0.024	-0.027	-0.026	-0.010	-0.040	-0.012
	(0.013)**	(0.029)	(0.011)	(0.013)***	(0.029)	(0.013)**	(0.027)	(0.011)	(0.013)***	(0.024)
Legal/Institutional	0.020	0.034	0.006	0.026	0.033	0.020	0.026	0.004	0.025	0.026
variable	(0.005)***	(0.011)***	(0.006)	(0.007)***	(0.013)**	(0.005)***	(0.014)*	(0.005)	(0.007)***	(0.013)*
pcgdp x legal	0.030	0.045	-0.019	0.043	0.049	0.031	0.045	-0.013	0.045	0.051
	(0.014)**	(0.015)***	(0.013)	(0.012)***	(0.015)***	(0.014)**	(0.015)***	(0.010)	(0.012)***	(0.014)***
Financial Openness	0.007	-0.020	0.004	0.004	-0.024	0.008	-0.023	0.002	0.005	-0.039
(KAOPEN)	(0.012)	(0.024)	(0.004)	(0.011)	(0.025)	(0.012)	(0.024)	(0.003)	(0.012)	(0.022)*
KAOPEN x legal	0.034	0.025	0.016	0.025	0.019	0.034	0.023	0.015	0.024	0.027
	(0.006)***	(0.015)	(0.004)***	(0.007)***	(0.017)	(0.006)***	(0.015)	(0.003)***	(0.007)***	(0.016)*
KAOPEN x pcgdp	-0.020	-0.015	0.004	-0.023	-0.018	-0.020	-0.021	-0.000	-0.022	-0.045
	(0.011)*	(0.038)	(0.011)	(0.010)**	(0.040)	(0.011)*	(0.041)	(0.008)	(0.012)*	(0.034)
Dummy-2005	0.009	0.001	0.010	0.008	-0.008	0.009	0.002	0.007	0.007	-0.001
	(0.009)	(0.011)	(0.008)	(0.009)	(0.015)	(0.009)	(0.010)	(0.007)	(0.010)	(0.014)
Dummy-2008	-0.001	-0.009	0.002	0.004	-0.013	0.000	0.006	-0.001	0.009	0.006
	(0.010)	(0.013)	(0.010)	(0.009)	(0.014)	(0.011)	(0.015)	(0.010)	(0.010)	(0.015)
HH's leverage 1	-0.112			-0.191		-0.105			-0.180	
	(0.102)			(0.088)**		(0.102)			(0.089)**	
HH's leverage 2 (mortgage)		0.041			0.016		0.024			0.008
		(0.050)			(0.058)		(0.059)			(0.059)
Govt's leverage			-0.097	0.187	0.263			-0.009	0.204	0.030
			(0.050)*	(0.080)**	(0.232)			(0.042)	(0.102)*	(0.213)
HH-lev1 x d2008						-0.043			-0.104	
						(0.084)			(0.084)	
HH-lev2 x d2008							-0.212			-0.135
							(0.156)			(0.115)
Gov't-lev x d2008								-0.354	-0.012	0.538
								(0.120)***	(0.131)	(0.222)**
R^2	0.89	0.91	0.72	0.91	0.92	0.89	0.92	0.75	0.91	0.94
N	65	40	148	65	40	65	40	148	65	40

Notes: * $p<0.1$; ** $p<0.05$; *** $p<0.01$. The estimates for GDP growth, TOT volatility, and trade openness are omitted to conserve space.

Table 3: Out-of-sample Predictions Errors and Probabilities

(a) Industrialized countries

	1991-95		1996-2000		2001-05		2006-08	
	Pred. errors	p-values	Pred. errors	p-values	Pred. errors	p-values	Pred. errors	p-values
Euro countries								
Austria	-1.0%	0.347	-1.6%	0.269	2.6%	0.246	2.7%	0.218
Belgium	4.0%	**0.045**	4.0%	0.063	0.5%	0.448	-2.9%	0.208
Finland	2.2%	0.194	8.8%	**0.001**	10.1%	**0.005**	1.1%	0.384
France	2.3%	0.159	3.8%	0.070	0.9%	0.407	-0.7%	0.421
Germany	-3.1%	0.102	-1.4%	0.292	2.1%	0.285	5.0%	0.076
Greece	0.0%	0.496	-4.6%	0.085	-3.3%	0.215	-5.9%	0.057
Ireland	5.2%	**0.040**	1.4%	0.335	-1.0%	0.395	-2.7%	0.239
Italy	-1.0%	0.380	0.7%	0.418	0.0%	0.498	-0.1%	0.490
Malta	-5.2%	**0.032**	-7.8%	**0.012**	-1.9%	0.330	-6.6%	**0.046**
Netherlands	1.4%	0.311	2.5%	0.230	5.5%	0.077	6.9%	**0.027**
Portugal	-0.7%	0.418	-8.3%	**0.005**	-5.6%	0.090	-4.5%	0.126
Spain	-1.6%	0.286	-2.3%	0.237	-3.7%	0.177	-6.0%	0.059
Subsample average	*0.21%*	*0.234*	*-0.40%*	*0.168*	*0.52%*	*0.264*	*-1.14%*	*0.196*
Non-Euro European countries								
Denmark	4.9%	**0.029**	2.9%	0.145	3.2%	0.198	0.2%	0.482
Iceland	3.9%	0.053	-1.8%	0.245	-1.9%	0.314	-17.2%	**0.001**
Norway	3.3%	0.116	5.5%	**0.036**	9.5%	**0.011**	5.6%	0.102
Sweden	1.8%	0.233	5.1%	**0.027**	3.6%	0.172	6.1%	**0.040**
Switzerland	--	--	5.2%	**0.045**	4.6%	0.123	0.2%	0.473
United Kingdom	-1.0%	0.338	-0.4%	0.436	-1.8%	0.310	-1.7%	0.313
Subsample average	*2.58%*	*0.154*	*2.75%*	*0.156*	*2.87%*	*0.188*	*-1.13%*	*0.235*
Others								
Australia	0.2%	0.463	-0.5%	0.433	-2.1%	0.293	-1.6%	0.328
Canada	0.4%	0.433	2.2%	0.204	2.0%	0.302	1.6%	0.330
Japan	-0.5%	0.413	0.5%	0.427	1.4%	0.361	1.3%	0.362
New Zealand	1.5%	0.279	0.6%	0.419	-1.4%	0.354	-2.7%	0.225
United States	0.3%	0.454	-2.2%	0.209	-3.4%	0.194	-3.4%	0.184
Subsample average	*0.38%*	*0.408*	*0.12%*	*0.338*	*-0.70%*	*0.301*	*-0.96%*	*0.286*
Subsample average	0.8%	0.255	0.5%	0.202	0.9%	0.252	-1.1%	0.226
# of countries w. $p < 0.05$		4		6		2		4
# of countries w. lowest p.		5		7		4		8

Notes: The current balances in a five year period is predicted using the data up to the previous five-year period using model (2) in Table 1. The prediction errors are estimated as the difference between an actual, or realized, value of current accounts and the out-of-sample prediction. Based on the confidence intervals (or the "pseudo-confidence intervals") of the prediction errors, the probability of an actual, or realized, value of current accounts can be estimated by calculating how many standard deviations the realized value of the current account is away from its forecast, which can be interpreted as a *t*-statistic (adjusted for the degrees of freedom) and yield the *p*-value of the realized current account balance.

Table 3 (continued): Out-of-sample Predictions Errors and Probabilities

(b) Emerging market countries

	1991-95		1996-2000		2001-05		2006-08	
	Pred. errors	p-values	Pred. errors	p-values	Pred. errors	p-values	Pred. errors	p-values
Asia								
Bangladesh	--	--	--	--	2.10%	0.314	2.50%	0.260
China	1.9%	0.326	4.5%	0.122	4.1%	0.158	10.2%	**0.003**
Hong Kong, China	-1.5%	0.426	1.2%	0.406	2.9%	0.279	-2.7%	0.301
India	1.9%	0.324	1.0%	0.399	2.8%	0.245	-0.3%	0.468
Indonesia	7.1%	0.116	5.7%	0.084	8.7%	**0.028**	6.4%	0.059
Korea, Rep.	-2.6%	0.271	2.0%	0.317	0.2%	0.478	-1.9%	0.308
Malaysia	-5.2%	0.097	10.1%	**0.007**	12.6%	**0.002**	16.2%	**0.000**
Pakistan	-0.5%	0.446	1.8%	0.320	5.5%	0.096	-4.1%	0.134
Philippines	-0.9%	0.419	0.4%	0.464	4.2%	0.164	7.2%	**0.032**
Singapore	10.4%	0.058	11.6%	**0.028**	9.1%	**0.049**	3.5%	0.289
Sri Lanka	-1.7%	0.364	-0.2%	0.480	2.7%	0.269	-2.0%	0.302
Thailand	-5.0%	0.113	8.9%	**0.017**	4.4%	0.144	4.2%	0.132
Subsample average	*0.35%*	*0.269*	*4.27%*	*0.240*	*4.94%*	*0.186*	*3.27%*	*0.191*
Latin America								
Argentina	-2.5%	0.299	-5.4%	0.118	7.5%	**0.038**	--	--
Brazil	5.3%	0.114	-1.3%	0.370	2.5%	0.276	3.2%	0.198
Chile	0.6%	0.448	0.6%	0.437	1.7%	0.337	3.3%	0.191
Colombia	1.8%	0.327	-0.1%	0.488	1.8%	0.332	0.0%	0.497
Ecuador	-0.5%	0.458	3.3%	0.198	3.0%	0.242	8.4%	**0.017**
Jamaica	2.8%	0.272	0.4%	0.461	-2.1%	0.321	--	--
Mexico	-4.6%	0.147	-1.5%	0.362	1.7%	0.340	1.9%	0.307
Peru	-4.2%	0.192	-1.3%	0.388	5.1%	0.127	5.1%	0.109
Trinidad & Tobago	8.1%	0.070	-1.7%	0.369	10.4%	**0.022**	29.2%	**0.000**
Venezuela, RB	1.9%	0.356	2.4%	0.318	12.9%	**0.002**	--	--
Subsample average	*0.87%*	*0.268*	*-0.46%*	*0.351*	*4.45%*	*0.204*	*7.3%*	*0.188*
Middle-East and Africa								
Botswana	8.9%	0.057	5.5%	0.139	3.9%	0.214	10.2%	**0.010**
Cote d'Ivoire	0.8%	0.441	3.7%	0.194	7.3%	**0.043**	--	--
Egypt	8.6%	**0.019**	1.1%	0.386	5.7%	0.080	3.6%	0.170
Ghana	-1.6%	0.356	-2.1%	0.302	2.8%	0.262	-10.1%	**0.004**
Israel	-1.0%	0.412	-1.1%	0.401	2.7%	0.256	4.2%	0.140
Jordan	-4.4%	0.205	3.5%	0.195	2.9%	0.240	-10.9%	**0.002**
Kenya	0.8%	0.433	-11.6%	**0.005**	1.6%	0.358	-2.1%	0.294
Morocco	1.0%	0.400	2.3%	0.277	5.3%	0.101	-0.5%	0.450
Nigeria	4.7%	0.202	11.3%	**0.008**	16.7%	**0.000**	--	--
South Africa	3.5%	0.204	2.5%	0.280	0.0%	0.496	-7.4%	**0.028**
Tunisia	-0.1%	0.491	2.3%	0.282	1.2%	0.393	0.3%	0.471
Zimbabwe	-1.4%	0.362	0.7%	0.429	--	--	--	--
Subsample average	*1.65%*	*0.299*	*1.51%*	*0.242*	*4.55%*	*0.222*	*-1.41%*	*0.174*
Europe								
Bulgaria	7.0%	0.083	3.4%	0.218	-1.9%	0.335	-17.8%	**0.000**
Hungary	5.4%	0.135	-6.1%	0.094	-6.1%	0.115	-2.2%	0.316
Poland	7.8%	**0.041**	-2.5%	0.276	0.1%	0.492	-1.0%	0.397
Turkey	0.6%	0.446	1.1%	0.393	3.4%	0.219	--	--
Subsample average	*5.20%*	*0.176*	*-1.03%*	*0.245*	*-1.13%*	*0.290*	*-7.00%*	*0.238*
Sample average	1.44%	0.268	1.52%	0.271	4.04%	0.213	1.83%	0.19
# of countries w. p < 0.05		2		5		8		10
# of countries w. lowest p.		8		5		11		14

Notes: The current balances in a five year period is predicted using the data up to the previous five-year period using model (4) in Table 1. The prediction errors are estimated as the difference between an actual, or realized, value of current accounts and the out-of-sample prediction. Based on the confidence intervals (or the "pseudo-confidence intervals") of the prediction errors, the probability of an actual, or realized, value of current accounts can be estimated by calculating how many standard deviations the realized value of the current account is away from its forecast, which can be interpreted as a *t*-statistic (adjusted for the degrees of freedom) and yield the *p*-value of the realized current account balance.

Table 4: Determinants of the Out-of-Sample Prediction Errors of CAB

Dependent variable = Out-of-sample Prediction errors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Average Change in Stock market development (SMTV) in 2002-06	-0.319 [0.133]**	-0.295 [0.130]**	-0.128 [0.101]	-0.225 [0.132]*	-0.117 (0.092)	-0.102 (0.080)	-0.168 (0.100)	-0.060 (0.078)
Fiscal Procyclicality in 2006-08	-0.006 [0.017]	-0.022 [0.018]	0.011 [0.016]	-0.005 [0.018]	0.003 (0.016)	0.014 (0.013)	-0.001 (0.015)	0.015 (0.014)
Dummy for the Fixed/Pegged Exchange Rate Regime	-0.037 [0.022]*	-0.046 [0.023]*	-0.019 [0.018]12%	-0.028 [0.017]	-0.029 (0.014)*	-0.013 (0.016)	-0.021 (0.015)	-0.021 (0.015)
Int'l Reserves (% of GDP) as of 2005	0.093 [0.050]*	0.051 [0.045]	0.083 [0.057]	0.05 [0.043]	-0.004 (0.039)	0.050 (0.049)	0.030 (0.039)	0.015 (0.041)
Real Interest Rate as of 2005	-0.083 [0.117]	-0.054 [0.115]	-0.051 [0.071]	-0.045 [0.074]	-0.117 (0.076)	-0.137 (0.072)*	-0.121 (0.073)	-0.125 (0.069)*
Average Change in Private bond market development (PVBM) in 2002-06			-0.281 [0.055]***	-0.617 [0.318]*			-0.421 (0.234)*	-0.438 (0.245)*
Average Change in Public bond market development (PBBM) in 2002-06			-0.065 [0.238]	-0.218 [0.252]			-0.484 (0.192)**	-0.528 (0.193)**
Average Housing Appreciation Rate in 2002-06					-0.730 (0.163)***	-0.698 (0.175)***	-0.656 (0.121)***	-0.593 (0.115)***
Dummy for the U.S.		-0.118 [0.037]***		-0.071 [0.034]**		-0.066 (0.030)**		-0.062 (0.031)*
Dummy for China		0.111 [0.022]***		0.103 [0.017]***		0.068 (0.011)***		0.075 (0.012)***
Dummy for Greece		-0.065 [0.023]***		-0.064 [0.018]***		-0.050 (0.014)***		-0.065 (0.012)***
Dummy for Iceland		-0.121 [0.035]***		0.193 [0.173]		-- --		-- --
Observations	58	58	36	36	35	35	31	31
Adjusted R-squared	0.20	0.31	0.47	0.61	0.62	0.57	0.69	0.56

Notes: Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1.

Figure 1: Estimated Contributions to Current Accounts Balances

(Using the Estimates from Table 1)

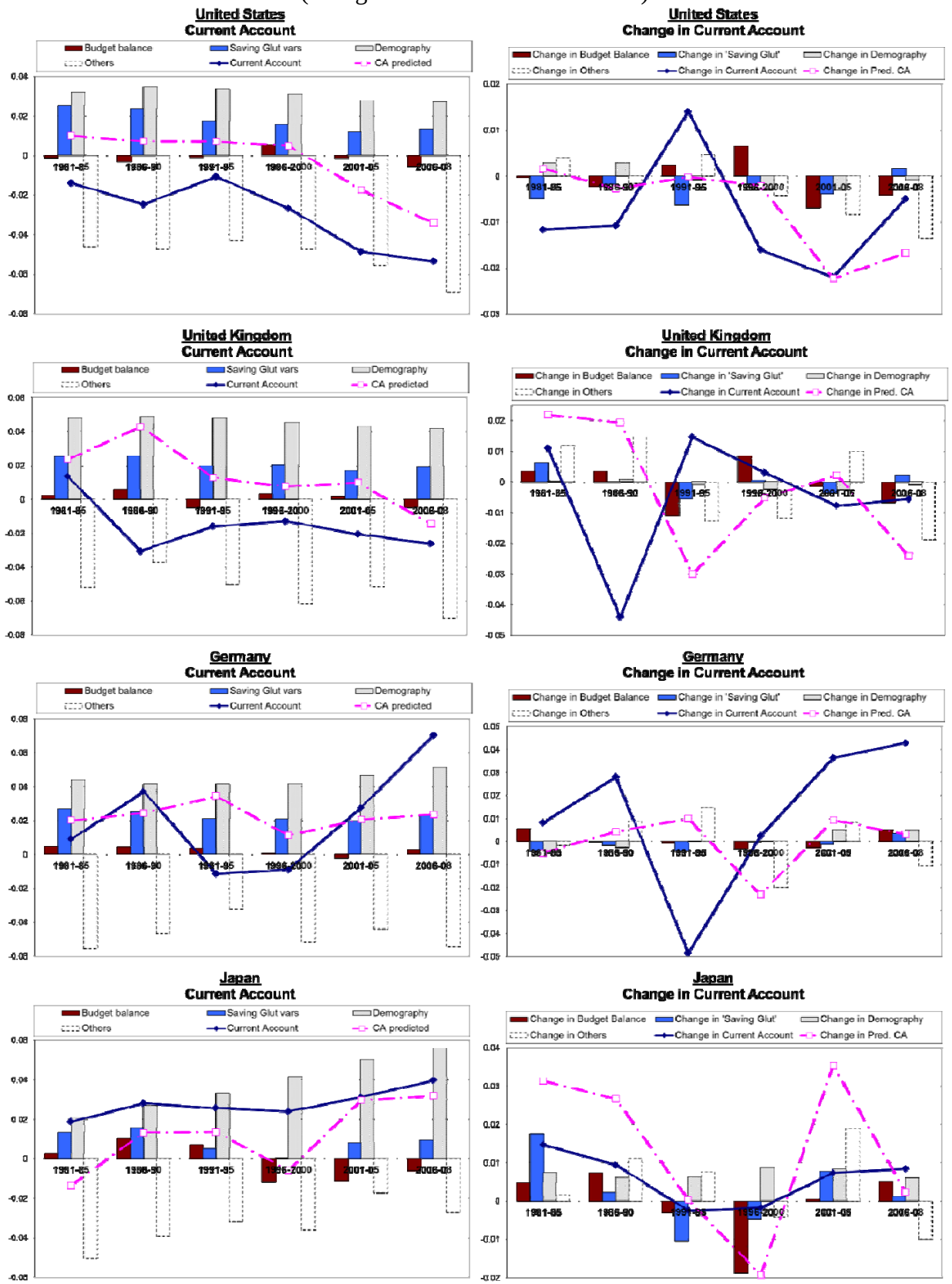


Figure 1 (continued): Estimated Contributions to Current Account Balances
(using the Estimates from Table 1)

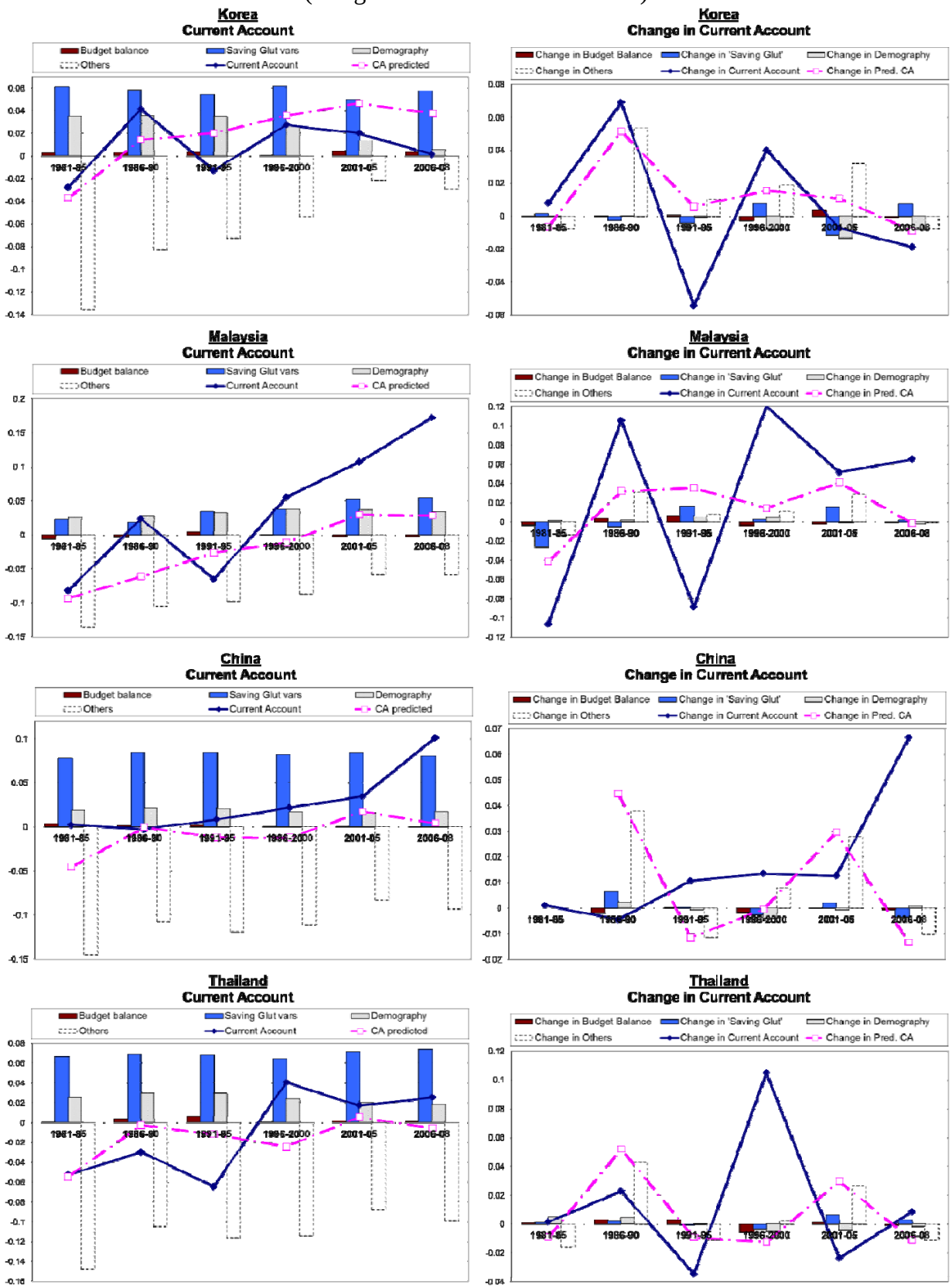
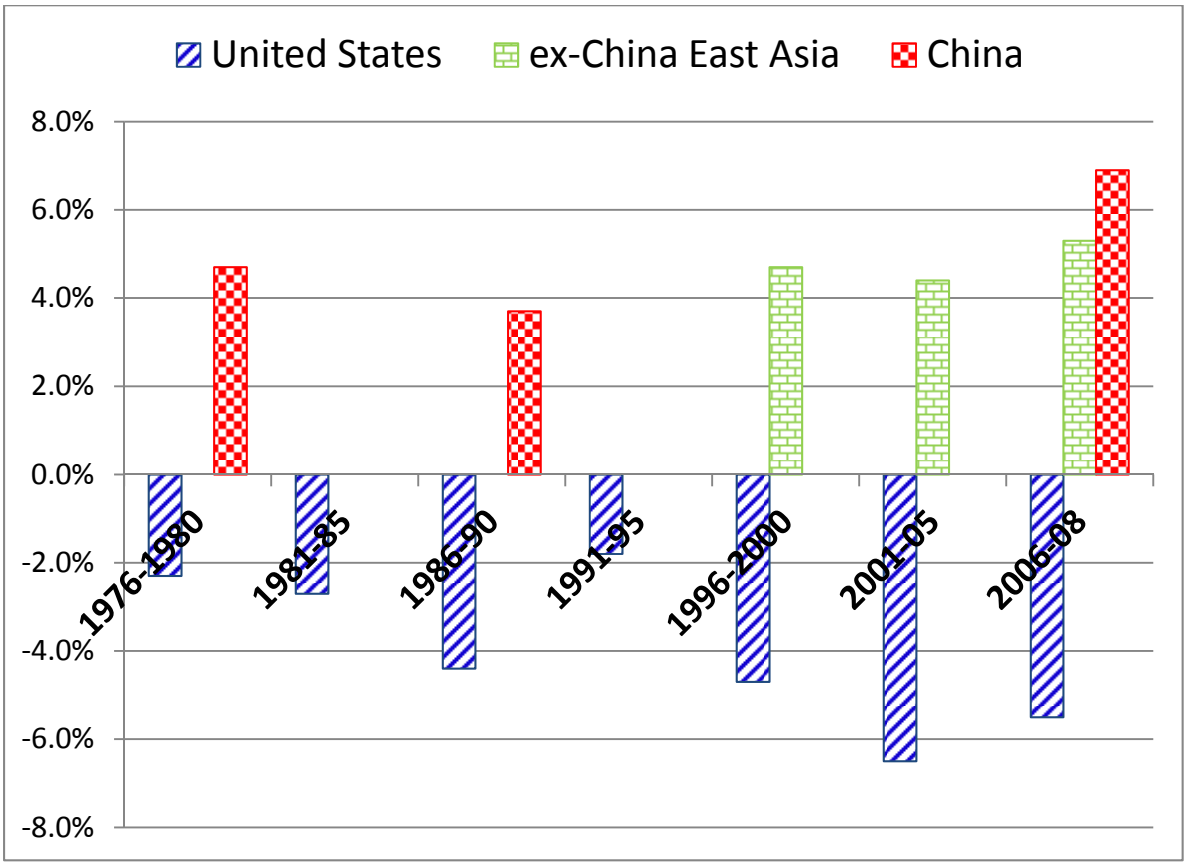


Figure 2: The Estimates on the Interactions Between Country/Area Dummies and Time Fixed Effects



Note: Insignificant estimates are shown as "zeros" in the figure.

Figure 3: Distributions of Prediction Errors

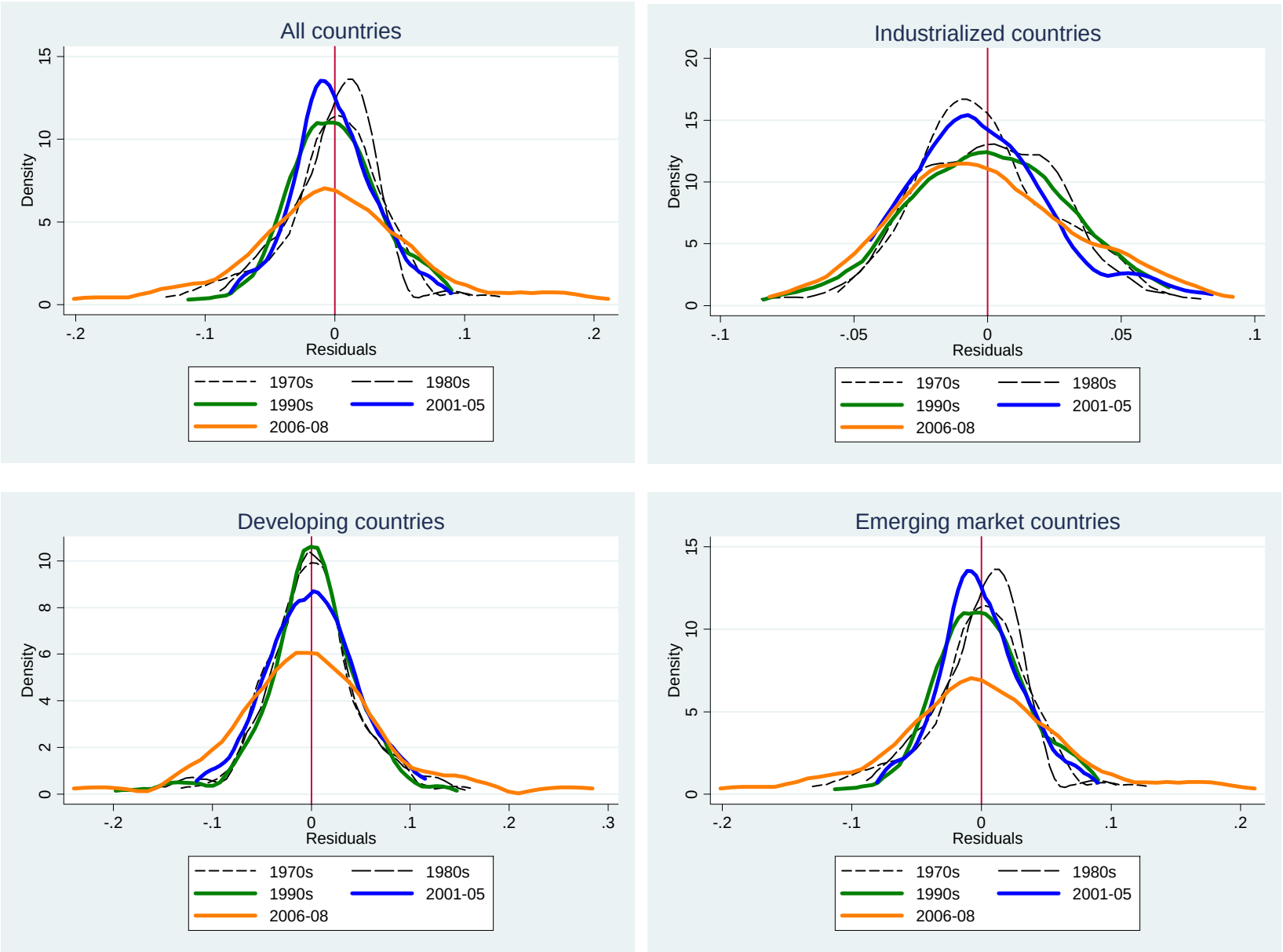
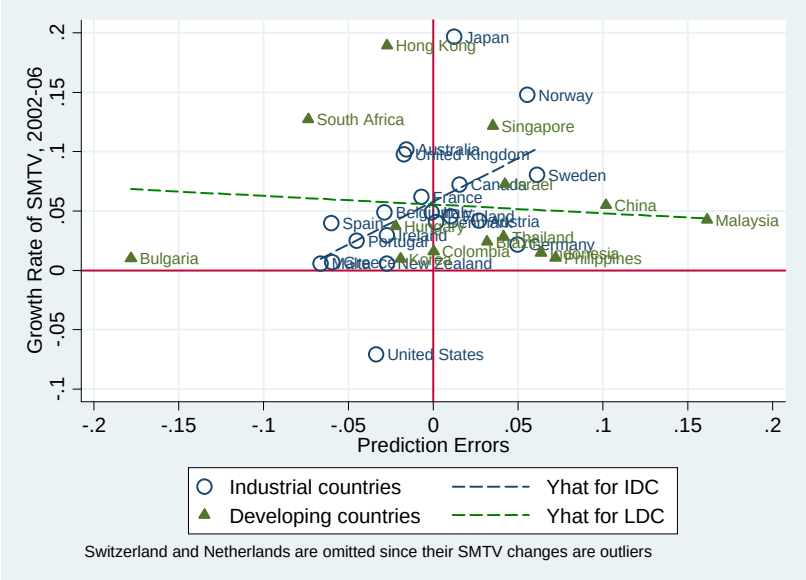
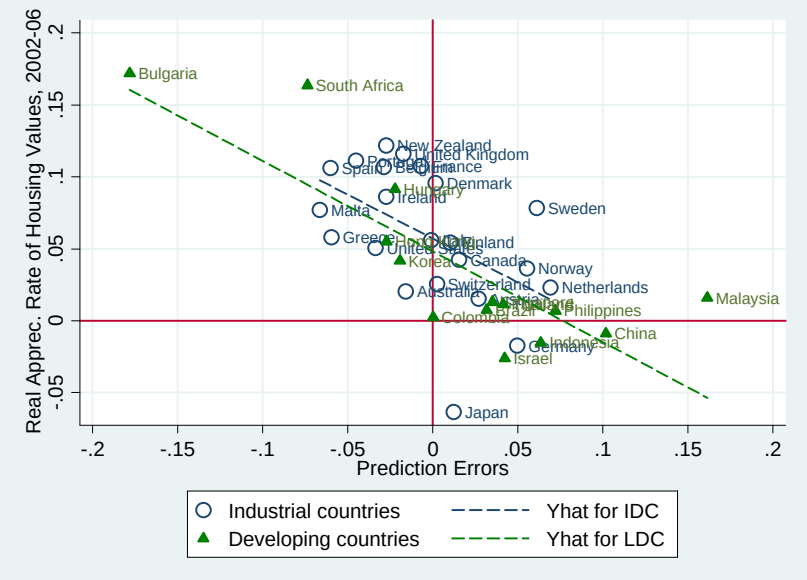


Figure 4: Prediction Errors vs. Real Appreciation Rate of Housing Values

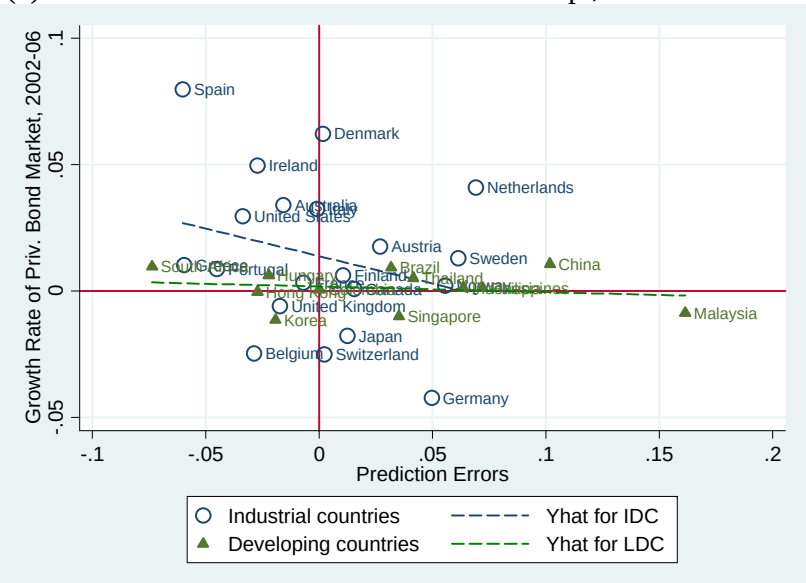
(a) Growth Rate of Stock Market Total Value, 2002-06



(b) Real Appreciation Rate of Housing Values, 2002-06



(c) Growth Rate of Private Bond Market Cap., 2002-06



(d) Growth Rate of Public Bond Market Cap., 2002-06