IMF Working Paper

# Do Economists' and Financial Markets' Perspectives on the New Members of the EU differ?

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# IMF Working Paper

European Department

## Do Economists' and Financial Markets' Perspectives on the New Members of the EU differ? [1]

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## Abstract

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In the past several years, the ten new Central and Eastern European members of the European Union have enjoyed rapid growth but frequently alongside growing external imbalances. Economists have pointed to rising vulnerabilities, but markets compressed sovereign bond yields. This paper examines the evidence from the perspective of economists' vulnerability analysis and markets' pricing of sovereign bonds. It finds that spread are lower than can be explained by "fundamentals" and speculates on the causes and permanence of this yield compression.

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## I. INTRODUCTION

In the past several years, many of the ten Central and Eastern European countries (CECs) that acceded to the European Union during 2004-07 have been among the most successful emerging market countries in the world.[2] Financial markets have been correspondingly impressed and generous toward them. At the same time, some economists, employing standard vulnerability indicators, have raised questions about whether the strong economic performance of the CECs would be robust to global financial market disturbances or whether deteriorating vulnerability indicators are pointing to regional risks—even apart from global risks—of a sudden stop in capital inflows. These contrasting perceptions beg two questions. First, are vulnerability indicators missing something from which markets justifiably take comfort? Second, are markets myopic, or worse yet backward-looking, and themselves underestimating risks?

This paper examines the recent and prospective experience of the CECs against that of other emerging markets. It does so from two perspectives. The first is a comparison of macroeconomic performance based on standard fundamentals at the heart of the kind of vulnerability analysis the IMF and other international organizations do—focusing on generally high growth/large investment-savings gap convergence paths of the CECs relative to other emerging markets. The second is an assessment of how *markets* perceive risks in the new members relative to fundamentals underlying these paths.

With an apparent gap between the view of some economists and markets on the riskiness of CECs relative to other emerging markets, the paper goes on to examine quantitatively whether risks of the CECs as perceived by the markets can be explained by fundamentals. Focusing on sovereign default risks, we apply a simple econometric analysis to separate the *level* of spreads on foreign currency denominated bonds into two components—one explained by the current fundamentals and global liquidity conditions and another that is not explained by these influences. We find that, for the CECs, the latter component is negative and persistent in recent years, suggesting that costs of external borrowing for the CECs have been lower than for other emerging markets with similar fundamentals. We argue that in pricing risks of the CECs, markets may factor in something other than *current* fundamentals and liquidity conditions. Prospects of improved fundamentals after joining the European Union and eventual adoption of the Euro may be a good explanation.

The paper concludes with some observations on the implications of our findings for macroeconomic policies.

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[2] The ten CECs are Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia.

## II. MACROECONOMIC PERFORMANCE AND VULNERABILITIES

Recent macroeconomic performance in most of the CECs that are new members of the EU has been impressive. Over the past five years, average per capita GDP growth has been at the strong side of the emerging market spectrum and inflation at the low end. Despite this strong performance, some economists point to relatively high conventionally-defined vulnerabilities on the emerging market spectrum.[3] These conventionally-defined vulnerabilities span the broad, but overlapping areas of reliance on foreign savings, vulnerability to sudden stops in capital inflows, debt exposures, and banks' exposures to credit risk stemming from rapid credit growth much of which is foreign exchange indexed or denominated. Market pricing of financial assets, however, suggests that markets do not share the perception that these countries have significant vulnerabilities on the emerging market spectrum.

The remainder of this section examines the data underlying these observations. The focus is on broad regional groupings of emerging market countries—the CECs, a group of seven East Asian economies,[4] a group of seven Latin American countries,[5] and a group of nine other emerging market countries dominated by India, Russia, South Africa, and Turkey.[6] While developments do vary considerably within these groupings, regional similarities are also clear, and a regional analysis helps simplify the comparisons.

### *Strong growth with low inflation*

Like other emerging markets, CECs have benefited from global growth during the past several years that has approached post-1970 record rates (Figure 1). Measured as the average weighted by GDP (left panel), GDP growth in the CECs since 2003 (including Fund staff estimates for 2006 and projections for 2007) has been strong—substantially outperforming Latin America, slightly outperforming "other emerging markets," though falling short of the giants of East Asia. The unweighted average (right panel) has been (and is projected to remain) even stronger owing to the particularly high growth of the small Baltic countries. Even here, however, the range of growth rates within the CECs is relatively narrow, particularly vis-à-vis Latin American countries or "other emerging markets."

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[3] For example, Menegatti and Roubini (2006), Deutsche Bank (2006).

[4] China, Indonesia, Korea, Malaysia, the Philippines, Taiwan Province of China, and Thailand

[5] Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela

[6] Egypt, India, Israel, Jordan, Morocco, Pakistan, Russia, South Africa, and Turkey

Figure 1. Growth of Real GDP per Capita, 2001-07 1/
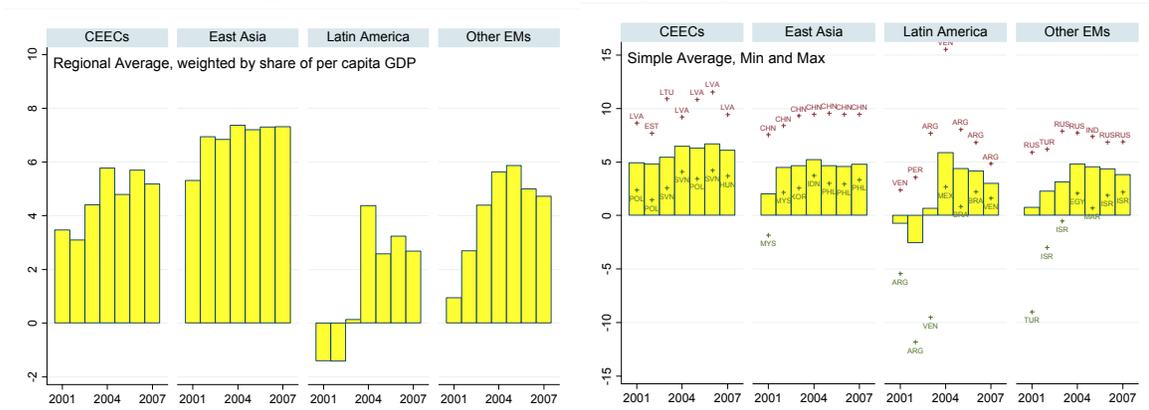


Source: IMF, World Economic Outlook
1/ 2006, IMF staff estimates, 2007, IMF staff projections.

Strong and relatively homogeneous per capita growth reflects several features of the CECs. Schadler and others (2007) point to three key ones—the first transitory, but the other two of more enduring influence.

- o First, the pattern of the transition from central planning—sharp drops in output followed by bounces as labor was reemployed and productive potential restored—has probably created one-off surges in growth. This reflected especially rapid growth of total factor productivity in the past ten years as easy productivity gains were realized, relatively strong investment, and, more recently, some resurgence in employment.

- o Second, growth regressions point to several features of more enduring value that favor strong growth in the CECs: low per capita GDP in some countries creates much scope for catch-up to advanced country income levels; lower population growth than in other emerging markets means that a given investment rate raises labor productivity faster; the quality of political, regulatory, and judicial institutions is relatively strong; and, vis-à-vis Latin America at least, schooling achievements are high.

- o Third, growing European integration, as reflected in large net capital inflows to the CECs, has boosted growth: opening markets of wealthy countries, improving institutional compatibility with home countries of foreign investors, and increasing inflows of transfers are indeed combining to accelerate income catch-up. Looking ahead, EU membership may pay off even more handsomely as official transfers are set to rise to as much as 3-4 percent of GDP per year. This will provide a large near-term demand stimulus, but, if used right, also a medium-term supply stimulus.

Alongside strong growth, average inflation has been low by emerging market standards. (Figure 2). Most countries have clear and appropriately disciplining monetary policy frameworks—be they direct inflation targeting with flexible exchange rates or currency boards/hard exchange rate pegs—that have anchored inflation expectations. Some inflation pressures are starting to show, particularly in the Baltics, but inflation nevertheless remains within safe ranges.



Figure 2. Average CPI Inflation 1/

Source: World Economic Outlook.
1/ IMF staff projections for 2007
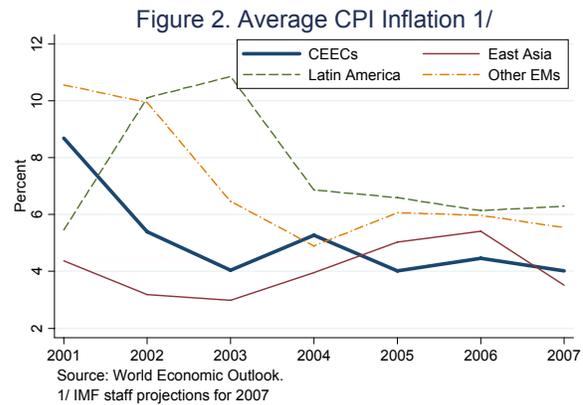
### *Conventional risk indicators are rising*

Against the backdrop of relatively strong growth and low inflation, vulnerability analyses point to conventional signs of increasing exposures to risks. In this paper, we examine these concerns around three conceptually separable, but overlapping and potentially interactive, types of risks: reliance on foreign savings and vulnerability to sudden stops; risks of debt exposure and insolvency; and, finally, overleveraging that could lead to bank distress.

The story in most of the CECs begins with large net capital inflows. As monetary policy frameworks in almost all of them currently preclude discretionary accumulation of reserves, these inflows result in currency appreciation (for the floaters) or monetary expansion (for the currency boards) and therefore growing external current account deficits. These deficits contrast starkly to sizable surpluses on average in other emerging market groupings (Figure 3). Concretely, while CECs are running current account deficits on average of 5 percent of GDP (with the Baltics as well as Bulgaria and Romania much above this), average current account *surpluses* in other groups are 1-4 percent of GDP. Large current account deficits lie at the heart of economists concerns about heavy reliance on foreign savings and vulnerability to sudden stops in inflows.



Figure 3. Average Current Account Balance 1/
(in percent of GDP)

Source: World Economic Outlook.
1/ IMF staff projections for 2007.
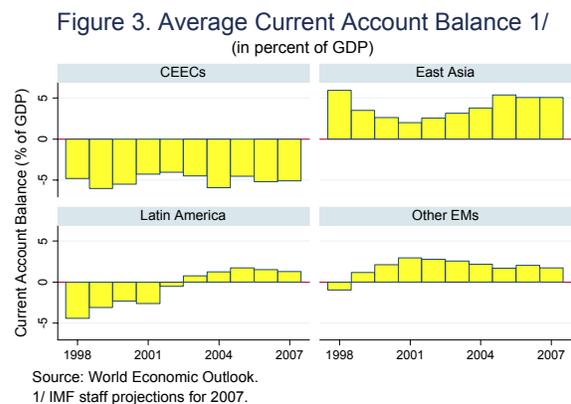
What makes CECs different from other emerging markets? Low savings and high investment (Figure 4). On both measures, the CECs tend to be clustered at the extreme ends of the

Figure 4. Emerging Markets: Investment and Saving, Average 2004-06
(In percent of GDP)
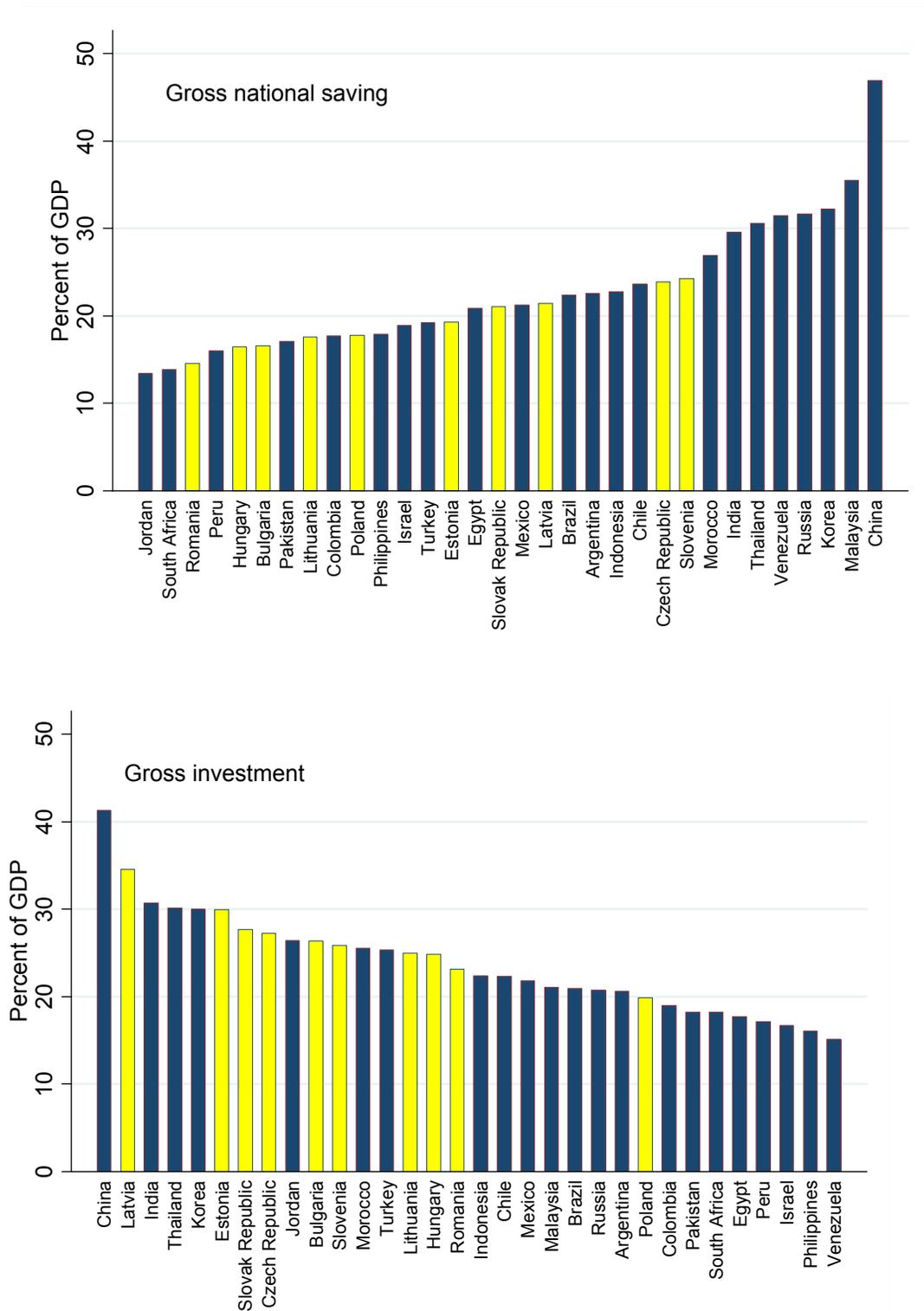


Source: IMF, World Economic Outlook

spectrum. Two questions about the causes for this savings and investment behavior are critical to assessing the accompanying risks.

First, are investment-savings imbalances public or private in origin? Most are quite decisively private imbalances (Figure 5). Despite generally high business saving in the CECs, household savings are quite low, while total private investment rates are among the highest in emerging markets. Except in Hungary and (to a lesser extent) Poland, fiscal positions are in small deficit, balance or even surplus. This configuration

**Figure 5. Investment-Saving Gap and Current Account Deficit Average 2004-2006 (In percent of GDP)**

Average current account deficit for CEC-10

Private I-S gap
Public I-S gap
Current account deficit

Latvia  Estonia  Bulgaria  Romania  Hungary  Lithuania  Slovak Republic  Czech Republic  Poland  Slovenia

Source: World Economic Outlook

offers some, though far from complete, comfort. Yet the Asian crisis was a lesson in the perils of believing that private imbalances are safe. Moreover, to the extent that growth does not remain at the high rates of the past few years, underlying or structural fiscal positions are not as strong as recent headline numbers might suggest. Nevertheless, most economists would accept that private imbalances (particularly when institutions securing transparency are strong) are more likely to be matched by sustained growth than are fiscal imbalances.

The circumstances when red flags may go up over private imbalances arise when inflows appear to be financing bubbles or to be creating indebtedness beyond what is reasonable in light of productive potential. The second question therefore is who is bearing the risks of large use of foreign savings? Is financing FDI dominated so that risks are born largely by foreign investors? Or is it debt-creating so that risks—of lower than expected growth, rising interest rates or exchange rate changes—are born primarily by domestic borrowers?

The financing story is mixed. Net financing flows have been dominated by FDI, which for the most part has exceeded (relative to GDP) that to other emerging markets (Figure 6). But net private debt-creating inflows to the CECs also stand out. Whereas these hovered around balance in most other emerging market groupings, in the CECs they amounted to about 3 percent of GDP in 2004-05, the last years for which comprehensive data are available. In subsequent years, they are likely to have been larger still.
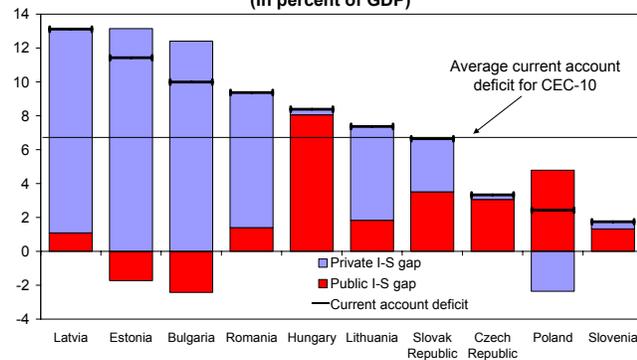
Figure 6. Net Capital Flows to Emerging Markets
(In percent of GDP)
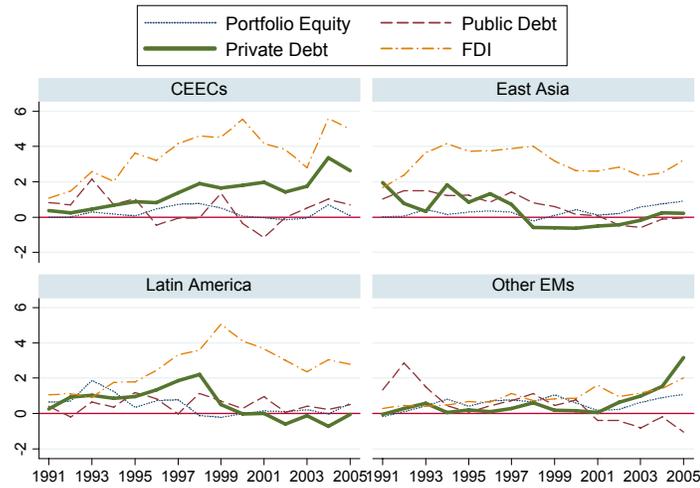


Source: Global Development Finance

The obvious implication of the financing picture is high external indebtedness relative to GDP by emerging market standards (Figure 7). This is true for either gross debt or net (i.e. adjusting for the accumulation of foreign assets mainly in commercial and central banks). And, in contrast to other emerging markets, external debt in the CECs is rising or stable, while official foreign exchange reserves are stable or falling relative to short-term debt (Figure 8). Notably however, except in Hungary and Poland, rising indebtedness is predominantly in the private sector.

Figure 7. Average Gross and Net External Debt
(In percent of GDP)
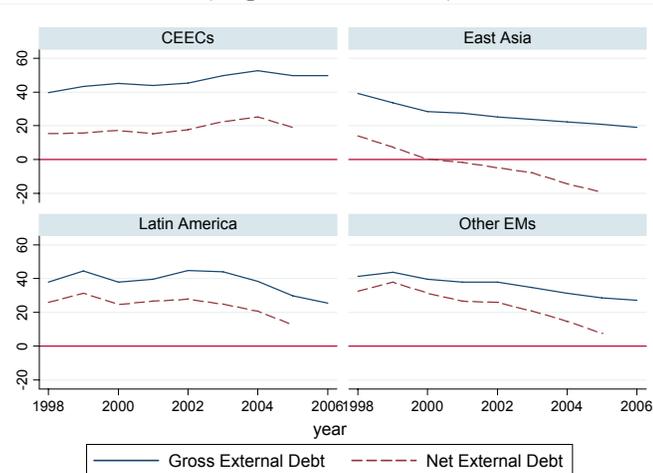


Sources: IMF, World Economic Outlook, and International Financial Statistics.

Figure 8. Official Reserves in Percent of Short-term Debt
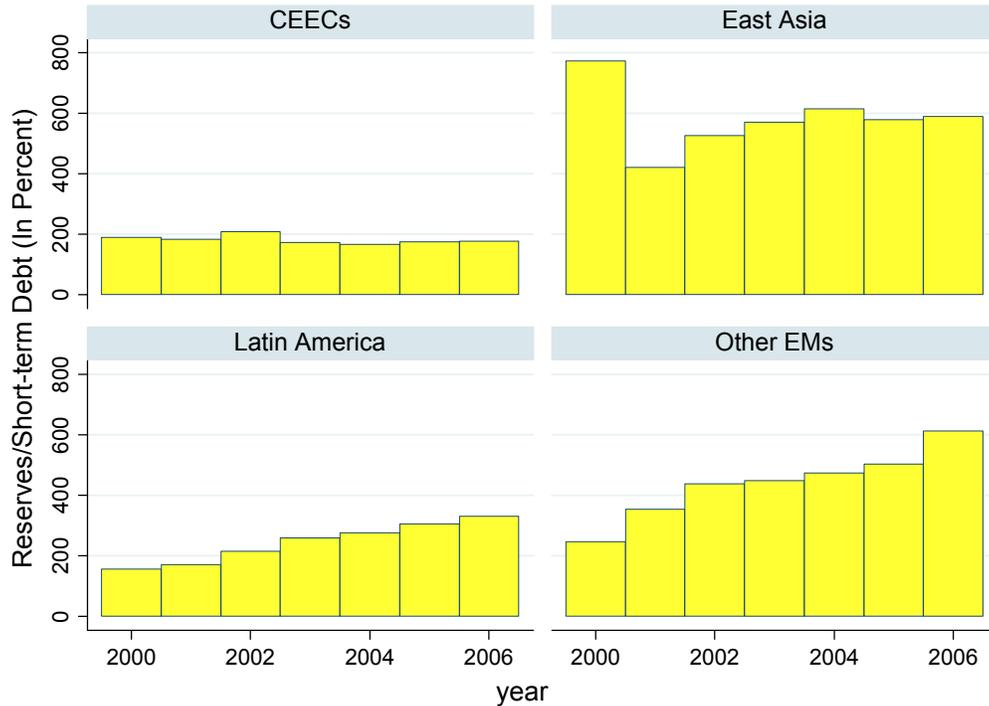


Source: IMF, world Economic Outlook.

How are private debt-creating inflows working through the system? To a large degree they—together with domestic savings—are financing rapid growth of bank credit to the private sector, especially to households. This raises the third question in the vulnerability analysis—are banks exposing themselves to excessive risk? The issue is not about the level of credit outstanding, which for most countries is low. Rather it is about the speed of the expansion—is it compromising risk standards and is it creating overheating and asset price bubbles—and about foreign exchange exposures. The data provide mixed signals on these concerns (Figure 9). Bank credit growth (particularly to households) is rapid, but when scaled by the share of bank credit in GDP, it does not stand out on the emerging market spectrum. Thus far, key indicators of bank soundness—non-performing loans and capital adequacy—are also well within emerging market ranges. Reliable and comparable data on physical asset prices—particularly housing—are not available. However, that the new flow of credit to households in particular is largely denominated in or indexed to foreign exchange in Estonia, Hungary, Latvia, Lithuania, Poland, and Romania means that, until those countries adopt the euro, currency risk of large capital inflows is increasingly born by borrowers.[7]

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[7] Mortgage lending, which typically has up to 3-year maturity, is heavily Swiss franc denominated, although euro denomination is also common. While the Swiss franc risk would not be eliminated after euro adoption, the very limited variation in Swiss franc-euro exchange rates during the past 20 years suggests foreign exchange risks would be substantially lowered after euro adoption.

Figure 9. Selected Banking Indicators



Note: NPL Ratios may not be comparable across countries due to regulatory differences
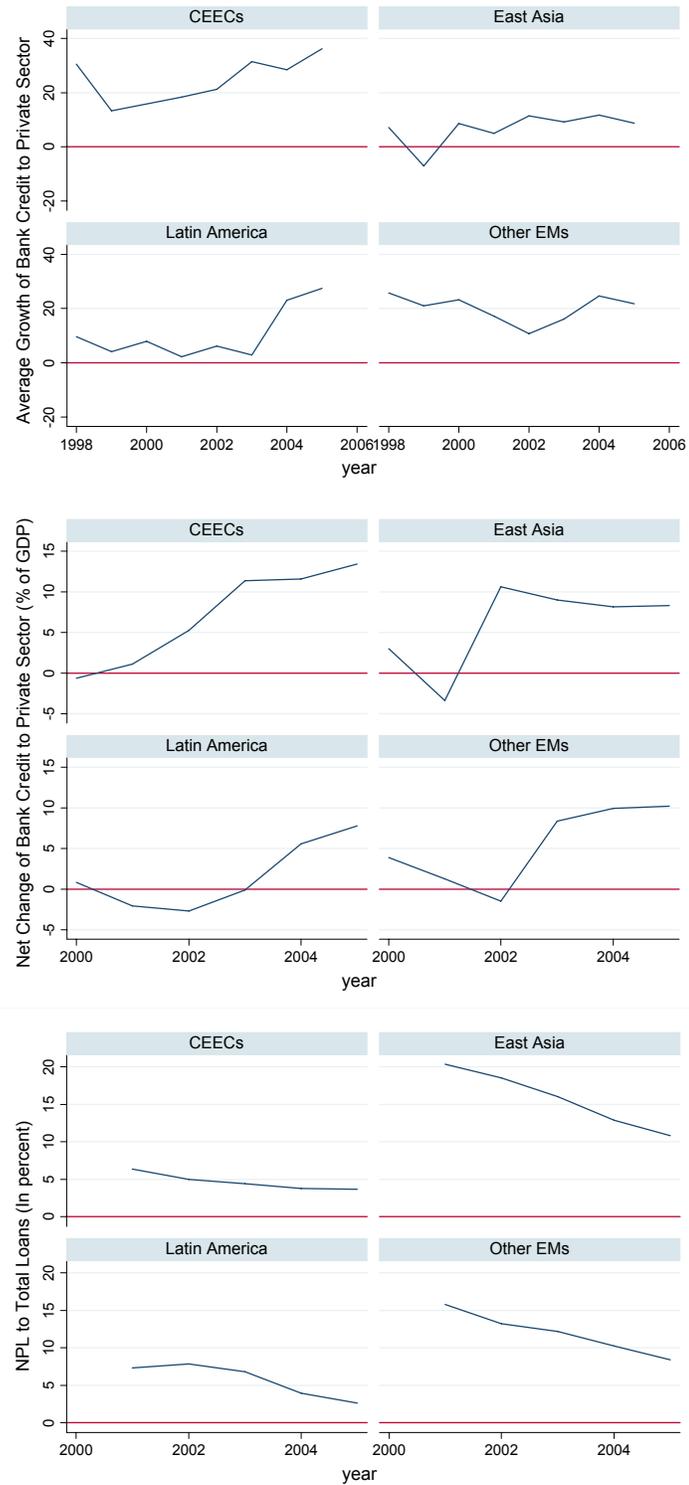
Sources: IMF, World Economic Ooutlook; staff estimates.

The macroeconomic picture presents a conundrum. High growth, particularly to the extent that it reflects high growth potential, and low inflation are reassuring. But risk factors stand out on the emerging market spectrum. Even here, however, a close examination suggests reasons to question whether the CECs, with their close ties to Western Europe and relatively good institutions (including clear and disciplined monetary policy frameworks that make reserve accumulation both small and less necessary than in controlled exchange rate settings) should be held to conventional standards. The critical question is whether the countries can live up to the market's optimistic expectation about income convergence.

### *Market views of the high growth/high imbalance strategy are benign*

Market views must be read through asset prices. And different markets—equities, currencies, bonds and credit default swaps—tell different stories. But broadly the picture that emerges from market developments during the past five years is rather benign, especially for the CECs. Asset prices improved steadily relative to other emerging markets particularly during 2002-03 (later in Bulgaria, Romania). The perception gap leveled off and even narrowed slightly during 2005. And as of early 2007, CECs still maintain an edge in terms of the most directly comparable asset price—sovereign bond spreads—over other emerging markets of some 50-150 basis points depending on the comparator group.

These trends are reflected to varying degrees in each major asset market. (Figure 10)

- o Equity markets (which admittedly are thin) outperformed other emerging markets during 2002-early 2005, but since then the gap has narrowed.
- o Nominal effective currency values also have outperformed other emerging markets, partly owing to close ties between most currencies and the euro, while the euro strengthened against the dollar.
- o Sovereign external bond spreads fell rapidly in 2003-04 but have since leveled off and then risen.
- o CDS spreads also fell sharply during 2002-05 and still stand some 75 basis points below those for other emerging markets.

Figure 10. CECs and Other Emerging Markets–Financial Market Development, 2001-07

A. Stock Market Indices
(Local Currency; Jan 01=100)

B. Indices of Nominal Effective Exchange Rates
(Jan 03=100; (+) = appreciation)

C. External Bond Spreads
(In log scale)

D. 5-year CDS Spreads
(In log scale)
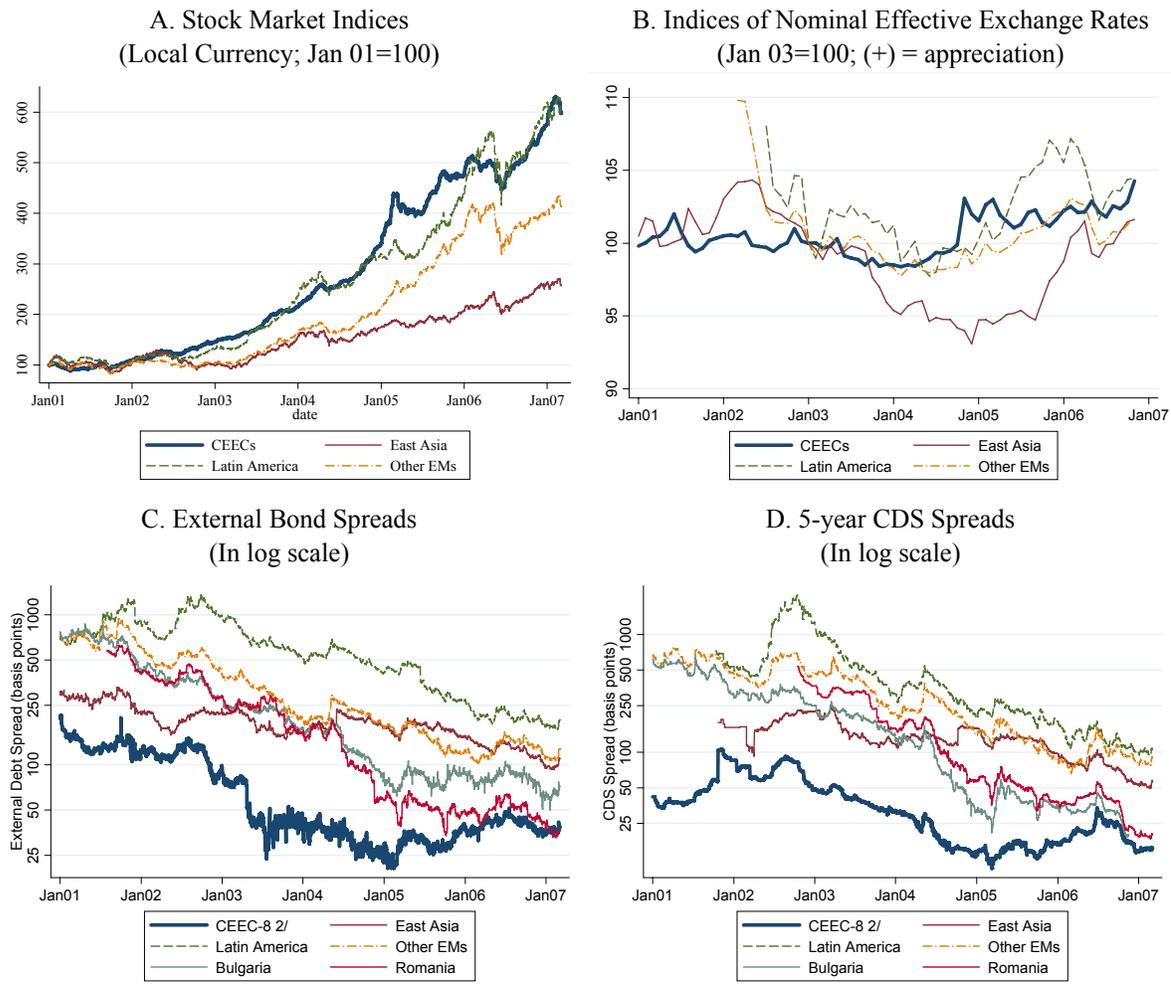
Sources: Bloomberg; INS
1/ MSCI Local Currency Index where available; national stock market indices, otherwise.
2/ CEEC-8 are Central European countries that joined the EU in May 2004.

The CECs, however, were not immune to the emerging market sell-offs in mid-2006 as well as in February 2007 (Figure 11), which affected most CECs about on the same scale as other emerging market groupings. In the May/June 2006 sell-off, equity markets and exchange rates of the CECs were considerably affected, although, returning to early May 2006 levels within a few months after the market turmoil, they proved quite resilient compared to other emerging markets. Sovereign bond spreads and CDS spreads, however, were relatively less affected for the CECs than for other emerging markets. During the first few days of the more recent sell-off in February 2007, equity markets of CECs went down on a similar scale compared to other emerging markets. Their resilience remains to be seen.

Figure 11. Financial Market Developments, Jan 2006-Feb 2007

A. Stock Market Indices 1/
(Local Currency; May 10, 2006=100)

B. Indices of Exchange Rate Against US$
(May 10, 2006 =100; (+) = appreciation)

C. External Bond Spreads
(In log scale)

D. 5-year CDS Spreads
(In log scale)
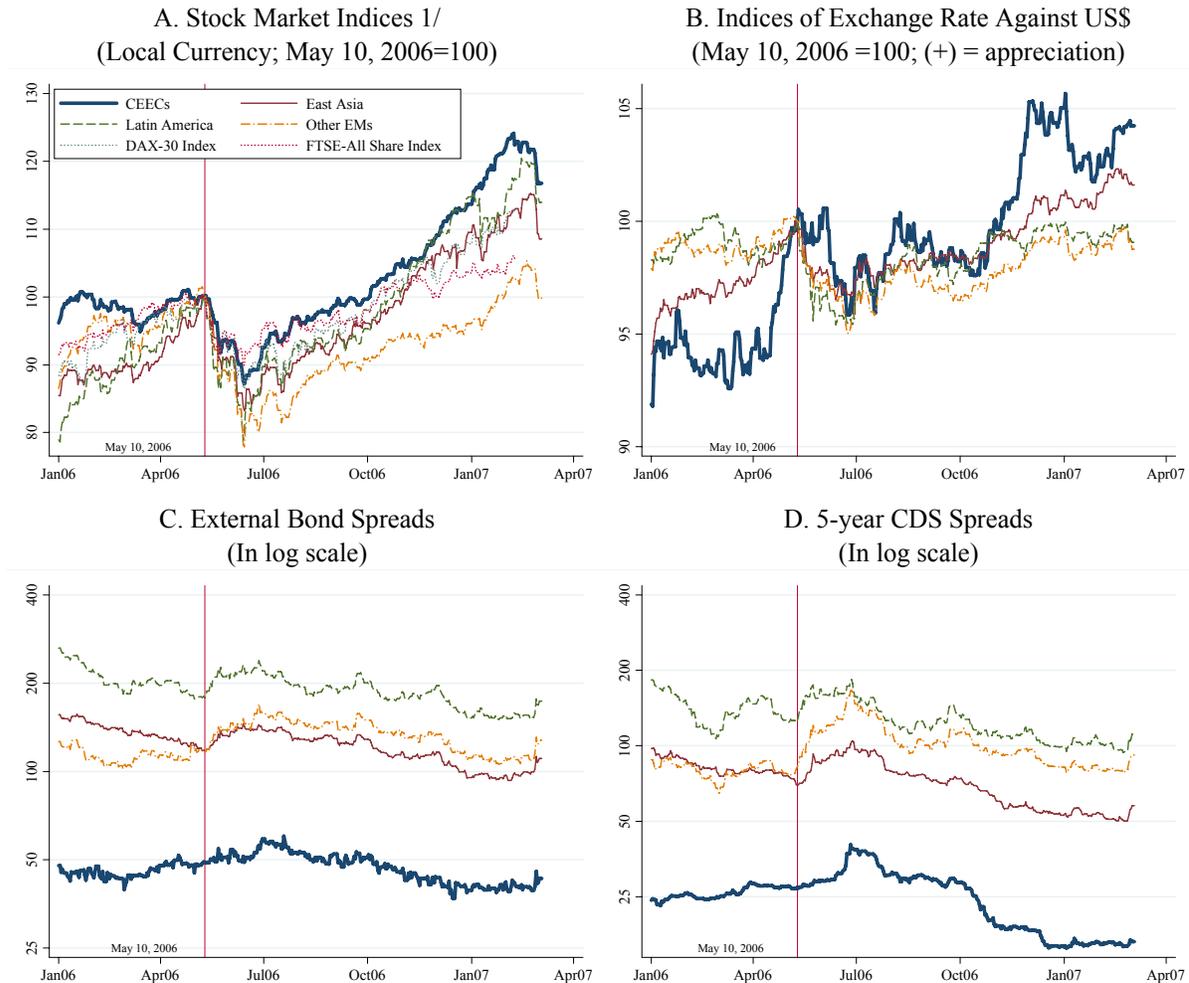


Source: Bloomberg.
1/ MSCI Local Currency Index where available; national stock market indices, otherwise.

## III.    MEASURING THE CEC ADVANTAGE: WHAT FUNDAMENTALS CANNOT EXPLAIN

Why do the CECs seem to enjoy a relatively favorable treatment by markets? The analysis above suggests that fundamentals—underlying conditions and policies specific to each country—are not obviously better and may even be worse than in other emerging markets. Are markets seeing some strength not evident in conventional measures of vulnerabilities? Answering this question requires modeling the relationship between fundamentals and asset prices in order to ascertain whether differences in spreads can be explained by fundamentals, and how any unexplained differences behave over time.

## A. Methodology

We apply a simple econometric analysis to identify the role of fundamentals and global liquidity conditions in determining the *level* of spreads on foreign currency denominated bonds—sovereign spreads—issued by emerging market countries. We then separate the sovereign spreads into two components—one explained by the fundamentals and global liquidity conditions and another that is not explained by these influences. This latter part reflects some non-quantifiable influence on market's perception of sovereign risk.

A number of studies, attempting to explain influences external sovereign spreads, reach the general conclusion that variables measuring policies and economic performance (fundamentals) of a country, as well as exogenous events that affect global liquidity conditions and the solvency of governments are important. Eichengreen and Mody (1998) study the determinants of launch spreads of emerging market debt during 1991-96. They find that fundamentals explain only a fraction of the changes in spreads, while changes in market sentiment not obviously related to fundamentals played a key role in determining emerging market spreads. Other studies use secondary market spreads, mostly from the JP Morgan EMBI data base. For example, like Eichengreen and Mody (1998), Rozada and Yeyati (2006) find that exogenous factors played a critical role in the evolution of spreads. Using a pooled-mean group estimator to estimate long-run relationship, however, Ades and others (2000) and Ferruci (2003) find that market spreads broadly reflected fundamentals, although other financial factors also played an important role. Kachiwase and Kodres (2005) distinguish the impact of economic fundamentals from that of global liquidity on external sovereign spreads. They find that fundamentals as well as expectations of future U.S. interest rates were key determinants of EM Spreads. A recent study by Hauner, Jonas, and Kumar (2007) examines the impact of EU accession on sovereign ratings, foreign currency spreads and local currency yields using panel data for the new member states and other emerging markets.

In the present study we use three indices of fundamentals that group variables influencing economic risks, financial risks and political risks. This avoids the problem of multicollinearity among explanatory variables since several influences affect each risk category and in many instances they move in similar ways. We also include three other measures of global interest rates and liquidity conditions. As shown in IMF (2006), this estimation model does a reasonably good job in predicting the spreads.

## B. Data

To proxy for the price of "risk" of the emerging markets in our sample, we use JP Morgan's Emerging Market Bond Index-Global (EMBIG) sovereign spreads as the dependent variable.[8] The spreads of each country are weighted averages of yield spreads over US

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[8] JP Morgan publishes at least two variants of EM sovereign spreads: *EMBI+* and *EMBI Global*. While EMBI+ spreads are available since 1993, it covers a smaller number of countries; the dataset covered 14 countries in

treasury bills of external debt instruments issued by sovereign and quasi sovereign entities (denominated in US$). For countries where (US$) EMBIG spreads are not available,[9] we use Euro EMBIG spreads,[10] which are yield spreads over German reference rates of external debt instruments denominated in Euro. Our sample encompasses the 25 emerging market countries included in both MSCI Emerging Markets index and JP Morgan EMBIG index and spans 1998 to 2006 for most of the countries. Of the ten CECs, spread data are not available for Latvia, Estonia, and Slovenia, whose external debt is insignificant. Czech Republic and Lithuania entered the sample beginning only in 2004.

One caveat in this exercise is that we look only at market perceptions about government or qusi-government default risks, which do not necessarily reflect overall risks to the economy including the private sector. This is an unavoidable shortcoming insofar as sovereign bond spreads are the principal asset class comparable across countries. Other asset classes— domestic currency bonds, stock markets and exchange markets—are influenced by a variety of factors not directly related to the risk profile of issuing countries.

Each of the three indices of fundamentals that we include as explanatory variables—political, financial and economic—are composites of ratings of several variables from International Country Risk Guide (ICRG).[11] In addition, following Kachiwase and Kodres (2005) and IMF (2006), we include three measures of global liquidity conditions: (1) Volatility Index (VIX), which is the volatility of U.S. stock market volatility implied in the pricing of S&P500 options;[12] (2) implied yield of 3-month ahead 30-day Fed Funds futures, which reflects short term global interest rates as well as market expectations of future U.S. monetary policy; and (3) 90-day rolling standard deviation of the difference between implied yields on 3-month

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1995 and covered 113 instruments of 17 countries at end-2006. EMBI Global was introduced only in 1998, but covers a wider range of countries, currently tracking 191 debt instruments of 32 countries. Therefore, a choice between the two indices poses a trade-off between a longer time series and a wider cross section.

[9] Czech Republic, Lithuania, Romania, and Slovak Republic.

[10] For countries where both spreads are available, (US$) EMBIG spreads are generally higher than Euro EMBIG. However, the correlation between the two is quite high (0.9).

[11] See http://www.icrgonline.com/page.aspx?page=icrgmethods for details on the methodology of the rating system. Political risk rating is a weighted average of ratings on government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democracy accountability, and bureaucracy quality. Economic risk rating is a weighted average of points assigned to economic performances on the level of GDP per capita, real GDP growth, annual inflation, budget balance, and current account balance. Financial risk rating includes ratings on the level of external debt (in percent of GDP), foreign debt service (in percent of exports), current account balance relative to exports, reserve cover ratio (in months of imports), and exchange rate stability.

[12] CBOE Volatility Index (VIX), introduced in 1993, measures the expected stock market volatility over the next 30 days from the prices of the S&P500 stock index options. VIX is often used as an indicator of investors' risk appetite. See CBOE (2003) for details on the calculation of the index.

ahead Fed Funds futures and the Fed policy target rates. The volatility measure indicates the uncertainty about U.S. monetary policy, which has a large impact on global financial markets. These variables are from Bloomberg and are available daily. Since the ICRG ratings are updated on a monthly basis, we average all of the variables to a monthly frequency to smooth sharp movements of higher frequency variables.

## C. Estimation

Following IMF (2006), we include the measures of fundamentals and liquidity conditions in the same estimating equation, using a pooled OLS with country fixed effects. Specifically, we estimate the following equation:[13]

$$
\begin{aligned}
\ln(spread_{it}) = \alpha &+ \beta_1 econ_{it} + \beta_2 financial_{it} + \beta_3 political_{it} \\
&+ \beta_4 VIX_t + \beta_5 FF_t + \beta_6 FFvol_t + u_i + \varepsilon_{it}
\end{aligned}
\tag{1}
$$

where $econ_{it}$, $financial_{it}$ and $political_{it}$ are the value of ICRG's economic, financial and political risk ratings of country $i$ at time $t$. For all these variables, higher values mean better fundamentals. $VIX_t$ is the implied volatility index. $FF_t$ is the implied yield on the 3-month ahead 30-day Fed Funds futures. $FFvol_t$ is the 90-day rolling standard deviation of the difference between implied yields on 3-month ahead Fed Funds futures and the Fed policy target rates. $u_i$ is individual country-specific fixed effects, and $\varepsilon_{it}$ is the residual term. Since we are interested in the residuals of levels, we consider only static models, where the lagged dependent variable is not included

We implement various tests for time series properties of our unbalanced panel. Using Maddala and Wu (1999) tests for panel unit roots, we cannot reject the hypothesis that logs of the EMBI spreads are non-stationary, while some of the independent variables also appear to have unit roots. However, panel cointegration tests proposed by Pedroni (2004) suggest that there are no cointegrating relationships in our model.

An important question in interpreting these results is whether they point to a case of spurious regression as in the pure time series case, where conventional significance tests tend to indicate a relationship between the variables when none exists. This possibility, however, is not a serious problem in regressions using panel data. Philips and Moon (1999) show that the pooled OLS estimator of the slope coefficient of two nonstationary variables with no cointegrating relationship is consistent for the long-run average coefficient between the two variables as $N$ (the size of cross-section dimension) and $T$ (the size of the time dimension) become large. Kao (1999) also shows that an OLS estimator of the slope coefficient between

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[13] This specification can be motivated by a simple theoretical framework suggested by Edwards (1986). See Appendix A. for details.

two independent nonstationary variables converges to zero in the panel case, unlike the pure time series case, where the estimator would be a random variable. While the distribution (and standard errors) of these parameters may be affected by nonstationarity of the variables, point estimates are consistent. This is reassuring for our purpose as we are interested in the residuals, which only require consistent point estimates of the coefficients.

## IV. RESULTS

Table 1 reports the estimation results of the baseline specification (1). The results estimated by pooled OLS, random effects and country fixed effects method are reported in columns 1, 2 and 3 respectively. All variables enter with expected signs, and their coefficients are significant at 1 percent level of significance. As expected, better fundamentals (lower economic, financial and political risks) are associated with lower sovereign spreads. Higher global interest rates and higher volatility in the financial markets lead to higher spreads. Similarly, spreads are higher when the volatility of interest rates implied by Fed Fund Futures rises. These results are consistent with those of other studies.

### *Residuals*

We then look at the residuals of the fixed effects regression. We find that even after controlling for global liquidity conditions and fundamentals, the level of spreads of the CECs is still low by emerging markets standards. Figure 12-1 shows the regional average of the country-specific fixed effects plus the residuals, in basis points, from the pooled regression with country fixed effects. The residuals of the CECs are negative for most of the sample period: they show rather pronounced volatility prior to mid-2003 (ranging from zero to highs of 250 basis point), but since mid-2003 they have been far steadier in the range of 50 -100 basis points. In contrast, the average residuals of Latin American countries (excluding Argentina) are large and positive: that is, the spreads of these countries are higher than what can be explained by fundamentals and global liquidity conditions. The residuals of East Asia and other EMs are close to zero and move in and out of the positive territory.

The pictures are not much different when we look at the residuals plus country fixed effects for each individual CEC (Figure 12-2). The levels of sovereign spreads that cannot be explained by fundamentals and global liquidity conditions, as measured by the residuals, are persistently negative in recent years for all of the CECs. The results suggest that the cost of external funding for CECs is about 100 basis points below what other emerging market countries with similar fundamentals is expected to pay. The persistently negative residuals of the CECs imply that markets factor in something other than the current fundamentals and liquidity conditions in pricing risks of the CECs.

Figure 12. Residuals from country-fixed effects model
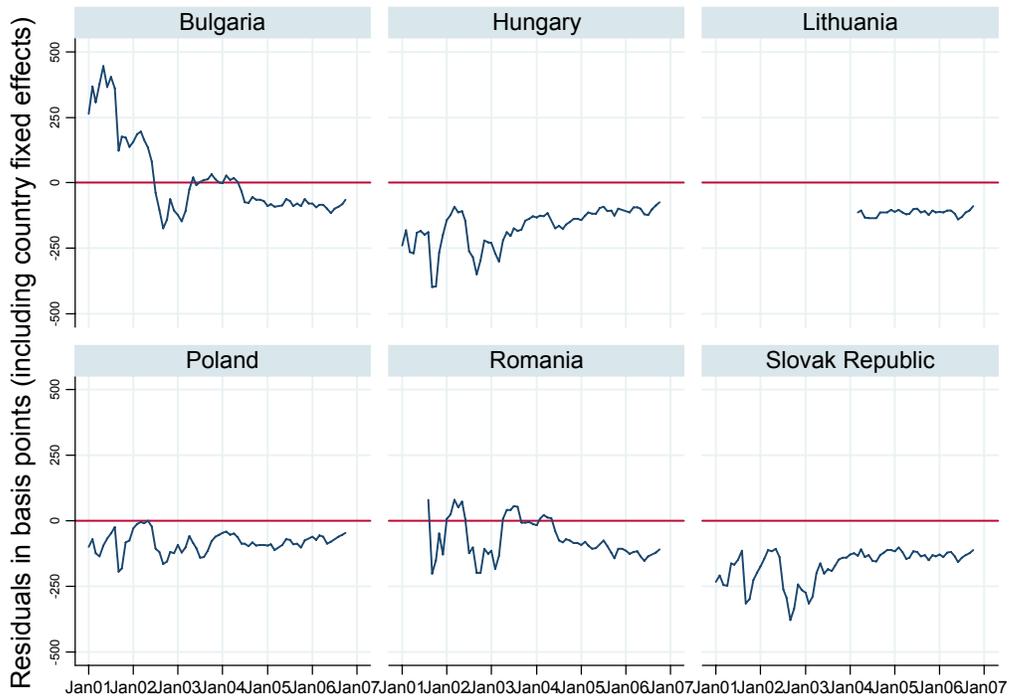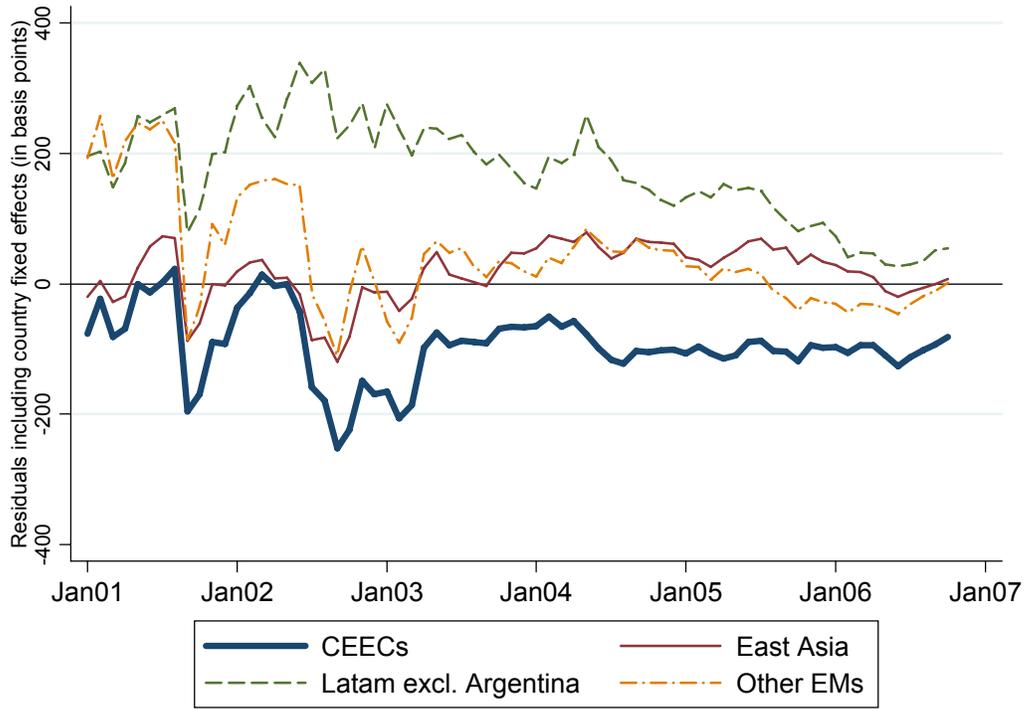
*"EU halo" effect ?*

What could be causing this spread advantage? Obviously, a quantifiable influence cannot be pinpointed: the essence of this "residual" portion of the spread is that it is not explained by quantifiable factors. But one good candidate for an explanation is an "EU Halo" effect— some influence deriving from the close connections between the CECs and the European Union that was fairly volatile in the early part of this decade, but has settled down to produce a 50-100 basis point advantage since mid-2003. This Halo effect could exist for good or bad reasons. A good reason would be that markets believe that the institutional and policy frameworks required of EU members—acceptance of the *acquis communautaire* and fiscal policy discipline through the preparation of yearly convergence reports and the strictures of the Excessive Deficit Procedure—in fact reduce the risk of poor policy choices in the future. A poor reason would be if markets mistakenly perceived EU membership as providing some sort of implicit guarantee against sovereign risk.

Some of the declines in the "residual" spreads of the CECs can be associated with important dates in the EU accession process. For example, in October 2002, the European Commission (EC) recommended closing accession negotiations with the CECs (excluding Bulgaria and Romania). During that time, we observe declines in the residuals in most of the CECs. Similarly, in June 2004 when the EC recommended closing accession negotiations with Bulgaria and Romania, the residual spreads of those two countries declined substantially. While we cannot test the effects empirically due to limited sample size, these events support our conjecture that markets factor in the prospects of EU accession to their pricing of risks.

Prospective euro adoption may also be playing a role in compressing spreads. By eliminating exchange rate risk, euro adoption removes one important channel for sudden stops or adverse market developments that could (directly or indirectly) affect the fiscal position and public sector solvency. However, recent developments do not provide much support for this hypothesis. Specifically, market expectations for the date of euro adoption have receded but any effect on the unexplained portion of the spreads is not obvious. Figure 13 shows the results of a quarterly Reuters poll started in August, 2005, which asks market analysts the date they expect each new member to join the European Monetary Union (i.e. formally adopt the euro). The median values of the expected dates of entry are shown for each country on the vertical axis and the date of the poll is shown on the horizontal axis. Analysts see the schedule for euro adoption receding for all countries except Slovakia and, of course, Slovenia, which entered the euro area on January 1, 2007. For several countries, however, the lengthening of the expected entry date has occurred rather recently. If prospects for euro adoption are, in fact, contributing to relatively low spreads, the lengthening of expected entry dates may shortly start to affect spreads.

Figure 13. Reuters Poll on Euro Adoption Dates
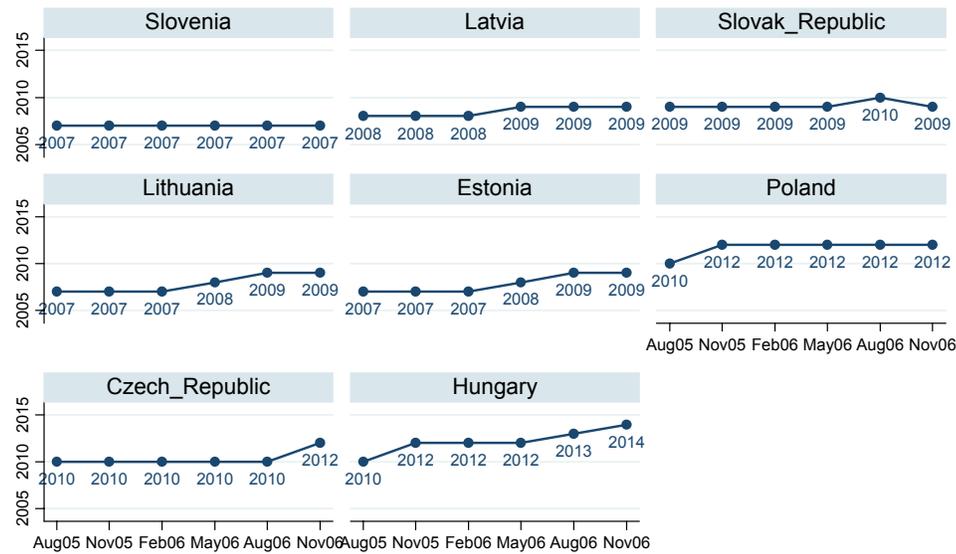
Source: Reuters

*Credit Ratings*

Following Kashiwase and Kodres (2005), we construct the "Total Credit Rating-Outlook Index" (CROI) from long-term external sovereign ratings by Standard & Poor's. The index takes into account the information from changes in the ratings and outlooks and reflects various non-linear relationships between the spreads and changes in ratings or outlooks.[14] The index takes higher values for lower credit ratings.

We apply the two-stage lease squares (2SLS) model as also suggested by Kashiwase and Kodres (2005) using the credit ratings as a proxy for fundamentals. On the first stage, we run an OLS regression of CROI on the three composite ratings on economic, financial and political risks as well as the contemporaneous level of the U.S. Fed Fund target rates (as an exogenous measure of U.S. monetary policy). For the second stage regression, we run a regression with country-fixed effects using the predicted values of the CROI from the first stage regression as one of the explanatory variables, along with VIX index, the implied yield from Fed Fund futures, and the volatility of the Fed Fund futures.

[14] See Appendix Table 1 and Appendix 1.B of Kashiwase and Kodres (2005) for details on how sovereign ratings are converted into a numerical index.

The results of the 2SLS regressions are reported in Table 2. As expected, higher Fed Fund target rates, higher economic, financial, and political risks are all associated with lower sovereign credit ratings (although the coefficient on economic risk is marginally insignificant). In turn, as reported in the second stage regression, worsened predicted "fundamentals" and worsened global liquidity conditions lead to higher spreads. The residuals from the 2SLS regression are not much different from those in Figure 12 (Figure 14). The regional average of the residuals remains persistently negative in recent years, albeit by a smaller magnitude than in the previous results. The residuals for each CEEC also remain largely unchanged.

We also try including credit ratings directly in the regression, as reported in column 3 of Table 2. The results indicate that a one-notch downgrade of sovereign ratings increases spreads by about 24 percent. All other variables enter the regression with expected signs. Although the coefficient on economic risk remains positive, it becomes insignificant, suggesting that it may be correlated with credit ratings. As for the residuals, when credit ratings are directly included in the regression, the comparatively large negative residuals we saw earlier for the CECs almost disappear (Figure 15). This suggests that credit ratings are themselves based not just on agencies' assessment of quantifiable fundamentals and liquidity conditions, but incorporate the subjective assessment of what markets see as distinguishing the CECs from other emerging market countries.

Figure 14. Residuals from 2SLS model
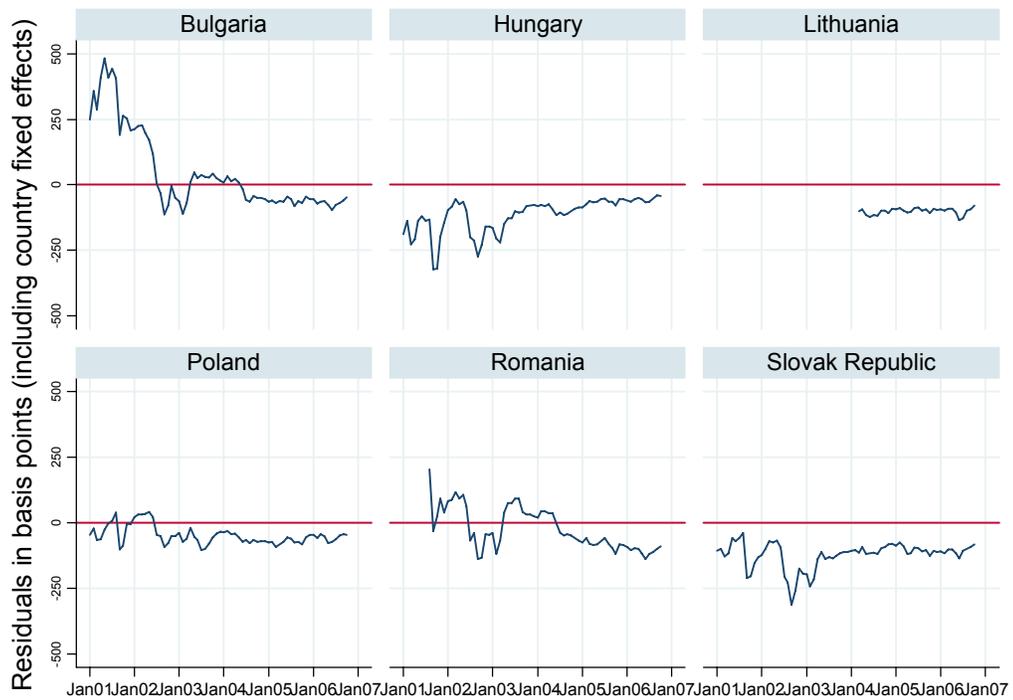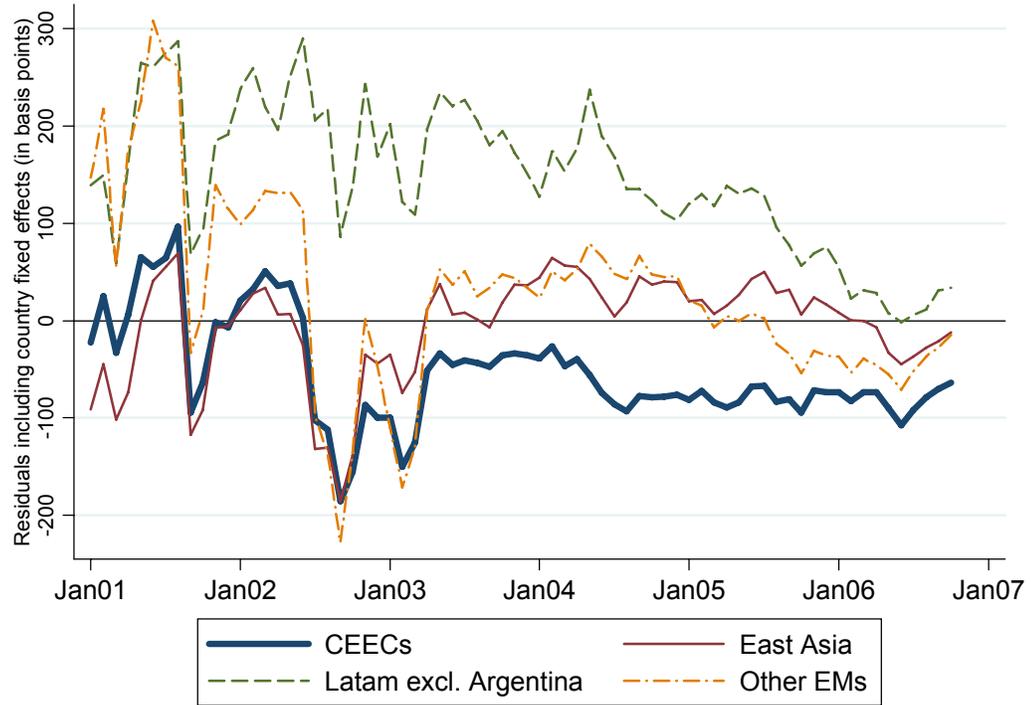
Figure 15. Residuals from Country-Fixed Effects Model with Credit Ratings as an Explanatory Variable
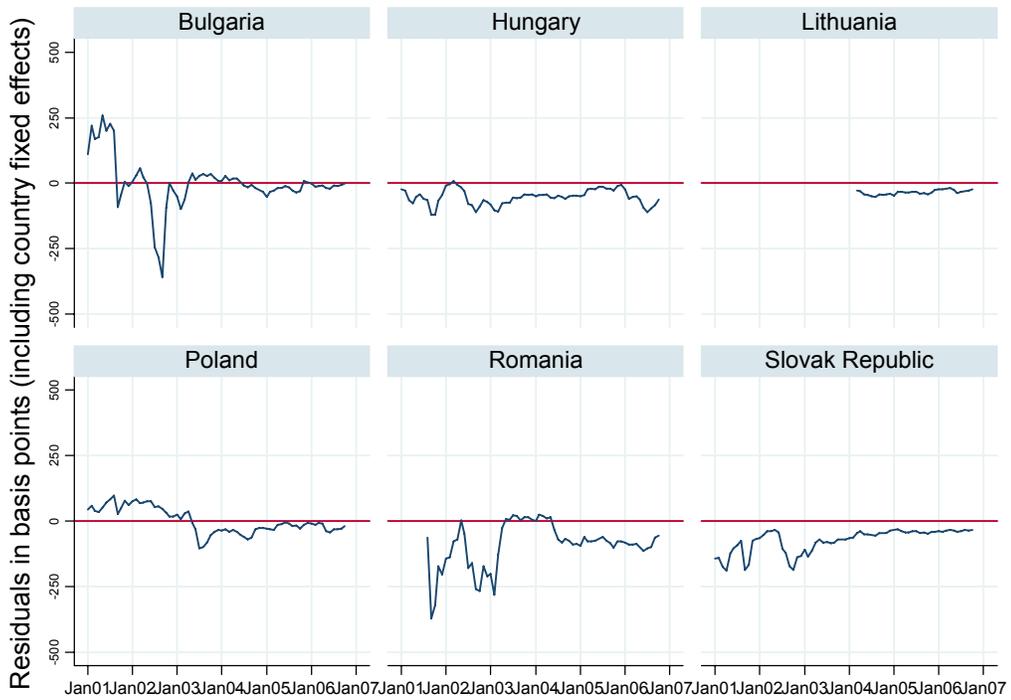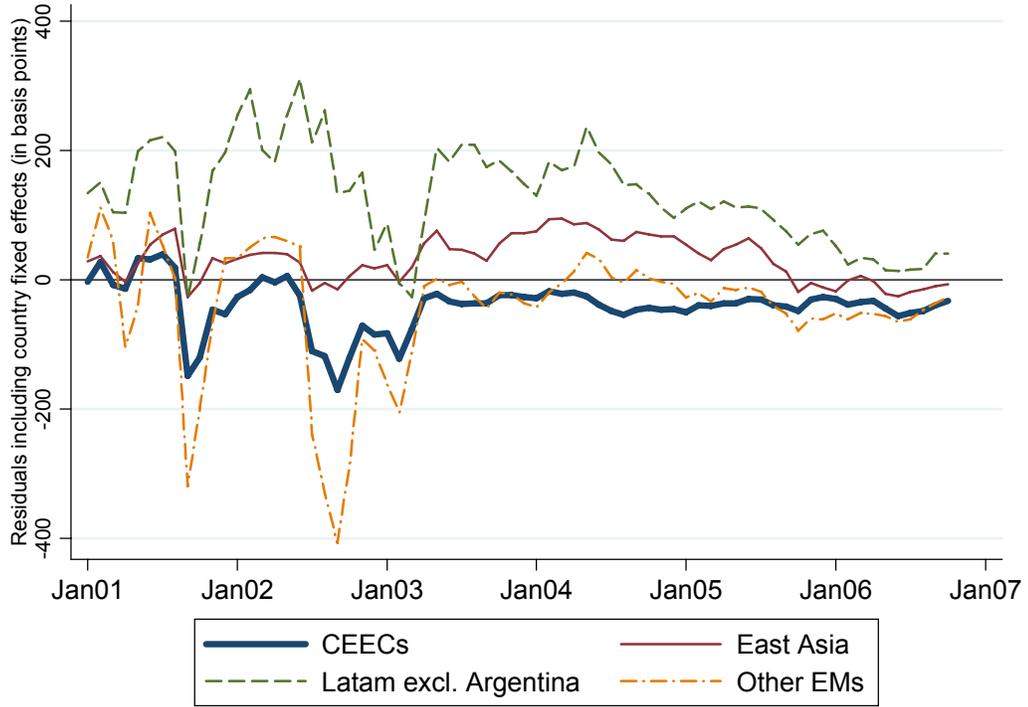
## V. CONCLUSIONS

This paper started by pointing to two possible implications of the gap between conventional vulnerability analyses and market interpretations of risks in the CECs. Are conventional analyses missing something from which markets are justifiably taking comfort? Or, are markets myopic, or worse yet backward-looking, and themselves underestimating risks? The results from an empirical model of spreads add weight to the case that a perception gap exists: despite several classic signs of growing imbalances, markets are pricing foreign-currency denominated sovereign assets of CECs below levels suggested by an analysis of measurable fundamentals in a fairly robust model for bond yields across emerging markets. The findings do not, however, answer the question of whether vulnerability analyses or markets are "right". Yields on CEC's bonds that are consistently lower than fundamentals would suggest may reflect market exuberance or they may reflect economists' inability to measure and therefore account for some key factors differentiating the new members of the EU from other emerging markets. Obvious possibilities for this factor are confidence imparted by EU membership itself or prospects for euro adoption.

The difficulty of determining whether the conventional vulnerability analysis or market perception of risk is right raises questions about the permanence of the favorable risk premia enjoyed by the CECs—some 50-100 bps lower than other emerging markets with similar fundamentals. An EU Halo effect may well be lasting. This would be consistent, for example, with findings in Schadler and others (2007) that European integration fostered by EU enlargement—specifically large net capital flows from west to east—is contributing to strong growth of the new members: in effect, markets are influenced by expectations of both good policy frameworks and a boost to growth from closer EU integration. However, if the gap in risk premia stems rather from the prospect of euro adoption (and the near-elimination of exchange rate risks) then changing perspectives on entry dates—especially after the unsuccessful attempt of Lithuania to gain acceptance in 2007—may start to enlarge spreads.

In any event, the CECs need to be aware that the favorable treatment by markets is hanging on an unexplained and unquantifiable influence that is not necessarily permanent. Under the most favorable interpretation—that markets expect EU membership to produce better policy frameworks and benefits for longer term growth—this ups the ante for CECs to deliver on market expectations. In other words, it may be that CECs will be able to preserve the spread advantage only if they move rapidly to enhance confidence that macroeconomic policies will remain sound, to make institutions and business conditions more attractive to investors and more supportive of productivity gains, and to prepare for euro adoption.

Table 1. Baseline Regression Results

|  | (1) OLS | (2) RE | (3) FE |
|---|---|---|---|
| Economic Risk | 0.031 | -0.040 | -0.041 |
|  | (5.93)** | (9.66)** | (9.94)** |
| Financial Risk | -0.108 | -0.057 | -0.057 |
|  | (25.70)** | (13.80)** | (13.81)** |
| Political Risk | -0.059 | -0.015 | -0.012 |
|  | (31.86)** | (6.16)** | (5.00)** |
| VIX Index | 0.059 | 0.049 | 0.049 |
|  | (24.37)** | (31.06)** | (31.27)** |
| Fed Fund Futures | 0.038 | 0.024 | 0.024 |
|  | (4.62)** | (4.74)** | (4.81)** |
| Vol of Fed Fund Futures | 0.958 | 1.563 | 1.579 |
|  | (2.97)** | (7.94)** | (8.12)** |
| Constant | 10.935 | 8.718 | 8.690 |
|  | (56.13)** | (40.90)** | (44.86)** |
| Observations | 2265 | 2265 | 2265 |
| Number of Country |  | 25 | 25 |
| r2-overall | 0.59 | 0.49 | 0.48 |
| r2-within |  | 0.60 | 0.60 |
| r2-between |  | 0.60 | 0.58 |
| LM Test for Random Effects |  | 22634.30 |  |
| Hausmann Test |  |  | 19.26 |
| Prob > Chi2 |  | 0.00 | 0.00 |

Absolute value of t statistics in parentheses
* significant at 5%; ** significant at 1%

Table 2. Robustness Checks

| Dependent Variable: | (1) CROI 1-stage | (2) ln(Spread) 2-stage | (3) ln(Spread) FE |
|---|---|---|---|
| Fed Fund target rate | -0.145 | | |
| | (5.69)** | | |
| Economic Risk | -0.021 | | -0.006 |
| | (1.31) | | (1.56) |
| Financial Risk | -0.328 | | -0.028 |
| | (25.76)** | | (8.17)** |
| Political Risk | -0.197 | | 0.013 |
| | (35.10)** | | (6.64)** |
| CROI | | 0.173 | 0.249 |
| | | (25.90)** | (43.37)** |
| VIX Index | | 0.054 | 0.041 |
| | | (34.82)** | (33.40)** |
| Fed Fund Futures | | 0.051 | 0.062 |
| | | (9.83)** | (15.29)** |
| Vol of Fed Fund Futures | | 1.323 | 0.969 |
| | | (6.59)** | (6.35)** |
| Constant | 37.786 | 2.172 | 1.865 |
| | (70.12)** | (28.35)** | (8.35)** |
| Observations | 2034 | 2265 | 2034 |
| R-squared | 0.58 | 0.57 | 0.76 |
| Number of country | | 25 | 23 |

Absolute value of t statistics in parentheses
* significant at 5%; ** significant at 1%

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**APPENDIX**

**I. Theoretical Motivation**

Equation (1) can be motivated by a simple framework. Edwards (1986) shows that to invest in a defaultable bond of face value 1 with probability of default, $p$, a risk-neutral investor would require a spread, $s$, over the risk free rate, $r$, so that the bond has the payoff of $1 + r + s$ if the bond does not default. In the equilibrium, assuming that the recovery rate is 0, the spread, $s$, is determined by:

$$p \cdot 0 + (1 - p)(1 + r + s) = 1 + r$$

$$1 + r + s = \frac{1 + r}{1 - p}$$

$$s = \frac{1 + r}{1 - p} - r - 1$$

$$= \frac{p}{1 - p}(1 + r)$$

If probability of default, $p$, has a logistic form, $p = \exp \sum_i \beta_i x_i \left/ \left(1 + \exp \sum_i \beta_i x_i \right) \right.$ where $x_i$'s are the determinants of the probability of default, it follows that $s = \exp \sum_i \beta_i x_i \cdot (1 + r)$.

Taking logs on both sides, we obtain our estimation equation (1):

$$\ln s = \sum_i \beta_i x_i + \ln(1 + r)$$

The assumption of 0 recovery rate can easily be relaxed. If the investor receives a payoff of $R$ in the case that the bond defaults, the spread is determined by

$$\ln s = \sum_i \beta_i x_i + \ln(1 + r - R).$$

In the estimation, if $R$ is different across countries, but is constant over time, it will be captured by the country fixed effects.

## II. Total Credit Rating-Outlook Index (CROI)

| Category | Sovereign Long-term Credit Ratings | Credit Outlook | | |
|---|---|---|---|---|
| | | Stable | Positive | Negative |
| Investment Grade | | | | |
| | AAA | 1.0 | 0.0 | 2.7 |
| | AA+ | 2.0 | 1.0 | 3.7 |
| | AA | 3.0 | 2.0 | 4.7 |
| | AA- | 4.0 | 3.0 | 5.7 |
| | A+ | 5.0 | 4.0 | 6.7 |
| | A | 6.0 | 5.0 | 7.7 |
| | A- | 7.0 | 6.0 | 8.7 |
| | BBB+ | 8.0 | 7.0 | 9.7 |
| | BBB | 9.0 | 8.0 | 10.7 |
| | BBB- | 10.0 | 9.0 | 11.7 |
| Sub-investment Grade, Tier I | | | | |
| | BB+ | 11.0 | 10.1 | 12.7 |
| | BB | 12.0 | 11.1 | 13.7 |
| | BB- | 13.0 | 12.1 | 14.7 |
| | B+ | 14.0 | 13.1 | 15.7 |
| | B | 15.0 | 14.1 | 16.7 |
| | B- | 16.0 | 15.1 | 17.7 |
| | CCC+ | 17.0 | 16.1 | 18.7 |
| Sub-investment Grade, Tier II | | | | |
| | CCC | 18.0 | 18.0 | 18.0 |
| | CCC- | 19.0 | 19.0 | 19.0 |
| | CC | 20.0 | 20.0 | 20.0 |
| | C | 21.0 | 21.0 | 21.0 |
| | SD | 22.0 | 22.0 | 22.0 |

Source: Kashiwase and Kodres (2005).