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SPECIAL REPORT

Fiscal Space

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More than two years after the end of the Great Recession, the global economy cannot seem to shake its effects. Advanced economies are still struggling to grow; unemployment in the U.S. and Europe remains near double digits, and Japan is stuck in a 20-year slump.

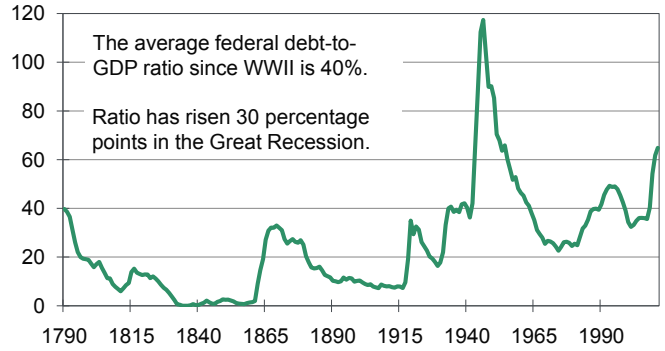
The most serious impediment to stronger growth is arguably fiscal, as governments in advanced economies struggle with record budget deficits and burgeoning debt loads. Policymakers are attempting to strike a balance, imposing enough fiscal austerity to reassure global investors, but not so much or so quickly that they undermine nascent recoveries.

This predicament came about as the economic upheavals of recent years brought long-simmering fiscal pressures to a boil. Problems stemming from aging populations and rapidly rising healthcare costs have long been anticipated, but the financial crisis and economic contraction brought the day of reckoning sooner than expected, forcing governments to borrow and spend heavily to avoid even worse outcomes.

This is evident in the U.S., where the federal government's debt-to-GDP ratio has surged by some 30 percentage points in just the past four years. The current ratio of publicly traded debt to GDP is close to 65%, the highest since World War II and well above the approximately 40% average of the postwar period (see Chart 1). This reflects the impact of the recession on tax revenues and government spending and also the government's multifaceted response to the crisis.[1] The total budgetary cost of the Great Recession is expected to ultimately top $2.35 trillion, equal to more than 15% of GDP.[2] The cost to taxpayers was substantial but would have been measurably greater without the government's aggressive policy response, as the economy would have almost surely suffered a depression.[3]

Chart 1: The Great Recession Was Very Costly

U.S. federal government public debt-to-GDP ratio



Sources: Treasury, BEA, Moody's Analytics

Europe's debt problems are even more daunting. While government debt loads in Germany, France and Britain are similar to those in the U.S., many nations on Europe's periphery are having severe difficulty managing their finances. Greece will not repay all it owes, and other nations will have to take extraordinary fiscal steps to avoid reneging on their own obligations. Europe's banking system is inadequately capitalized to withstand significant losses on its sovereign debt holdings and is thus at grave risk. The future of the euro zone and the global economy hangs in the balance.

The risk that a national government will not meet its full debt obligations is difficult to quantify. Given that governments have the power to raise taxes and cut spending, making timely debt payments is almost always a question of political will. Governments generally give debt payments a very high priority, but there are times when debt loads increase so much that the political will evaporates. In democracies, a consensus can develop that austerity is no longer worth it and people just give up, forcing leaders to give up as well. The ultimate economic cost of default is likely to be greater than the cost of the austerity necessary to avoid it, but enraged voters are unlikely to see it that way.

Argentina's sovereign default a decade ago was an example. Chafing under the restrictions imposed by the International Monetary Fund and other creditors, Argentine leaders decided that default was the preferable option. The country had the resources to pay its debts, but

1 The recession cost the federal government an estimated $750 billion. The government's response—including the TARP bailout fund, the fiscal stimulus, mortgage-related losses at Fannie Mae and Freddie Mac, and other measures—cost an additional $1.6 trillion. The fiscal stimulus cost a total of $1.3 trillion.

2 For historical comparison, the savings and loan crisis of the early 1990s cost some $350 billion in today's dollars: $275 billion in direct costs plus $75 billion due to the associated recession. That was equal to about 6% of GDP at the time.

3 See "How the Great Recession Was Brought to an End," Alan Blinder and Mark Zandi, July 27, 2010. http://www.economy.com/mark-zandi/default.asp

Argentines decided that the pecuniary and nonpecuniary costs of doing so were too great. Recent riots in Athens and other European capitals are a reminder that similar pressures are building today throughout that region.

The concept of fiscal space can be used to determine how close a government is to this point of no return.[4] Fiscal space is defined as the difference between a nation's sovereign debt-to-GDP ratio and the limit beyond which the nation will default unless policymakers take fiscal steps that are outside of anything they have done historically.[5] Identifying the debt limit is obviously important for investors in sovereign debt, but it is also important for policymakers working to find an appropriate balance between too much fiscal austerity to allow economic growth and not enough to achieve fiscal sustainability.

Fiscal space and the debt limit are estimated using econometric techniques to identify how nations' fiscal policies have responded historically to increases in their public debt. Nations that have aggressively managed their budgets when their debt loads have increased—because of recessions, financial crises, wars, natural calamities and other shocks—have higher debt limits and thus more fiscal space. Canada and South Korea are examples of nations that have shown political will to address their fiscal problems. Others, such as Japan and Portugal, have shown much less resolve in managing their fiscal affairs, and thus have lower limits and less space.

Fiscal space and the debt limit are also significantly affected by a country's economic growth rate and the interest rate it pays on its sovereign debt. Not surprisingly, nations that enjoy stronger GDP growth and lower interest rates have higher limits and more fiscal space than those that do not. Stronger growth lifts tax revenues and reduces demand for government services, making it easier for a nation to escape a fiscal bind. Lower interest rates bring down the cost of financing debt. Countries such as Portugal and Italy are experiencing fiscal strife in large part because their economies have historically had weak growth rates.

Of course, a nation's fiscal situation can also affect its pace of growth and the interest rates it pays. As a nation's debt-to-GDP ratio approaches the debt limit, interest rates will rise, and those higher rates will weigh on growth. There is a so-called survival interest rate, above which a nation's debt load spirals out of control as the cost of servicing its debt increases more quickly than its GDP.

A nation's fiscal space and debt limit are not immutable. Today's policymakers could deal with fiscal problems differently than their predecessors. In a crunch, a nation may respond more aggressively than it did in the past. But the debt limit defines a key juncture beyond which a country's historical fiscal response to rising debt becomes insufficient to maintain fiscal sustainability. Policymakers must then break with past practice or their nation will default.

It is also important to note that the debt limit does not define an optimal level of public debt. Since the debt limit is the point at which a nation's fiscal solvency is in jeopardy, a nation's debt load should remain well below that level. If it does not, the government risks triggering rapidly rising interest rates, or even a liquidity crisis, as global investors lose faith. How close a country can get to its limit before this happens depends on investors' assessments of potential fiscal shocks. These assessments are continually changing; nations that stray too close to their debt limits can quickly find it difficult to even roll over existing debt if investors turn negative, no matter the reason.

Our analysis includes the current debt limits and estimated fiscal space for 30 advanced economies. Australia, Korea and Taiwan top the list of countries with the most fiscal space; for nine countries, fiscal space exceeds 200 percentage points (see Table 1). Australia's survival interest rate is above 10%; that is, Australia's 10-year sovereign yields would have to be consistently above 10% for the nation to be at risk of default.

At the other end of the spectrum are Greece, Ireland, Italy, Portugal and Japan. These nations have already run out of fiscal space, as their current debt loads have risen above their debt limits. This does not mean these nations will default, but it does mean that to avoid default, their policymakers cannot conduct business as usual; they must take extraordinary steps. Japan's situation is so severe that it would take a negative interest rate on its debt to solve its fiscal problems.

Several other European nations are also flirting with severe fiscal problems. Most notable are Spain and Belgium, but even France is at risk. These nations have close to 125 percentage points of fiscal space—a key threshold—and this is sure to shrink quickly given their already-large deficits and weakening economies. Their survival interest rates have fallen to near 7% or lower. It is no wonder that the European Central Bank has resumed purchasing large volumes of European sovereign debt. The ECB purchases are critical to ensuring that yields remain below survival rates; otherwise, the European debt crisis could quickly spiral out of control.

Our analysis suggests that U.S. policymakers have some room to maneuver. With almost 170 percentage points of space and a survival 10-year Treasury yield of nearly 9%, the U.S. is still a meaningful distance away from a significant fiscal problem. This is not to say that U.S. policymakers can be complacent. Given a budget deficit equal to 8.5% of GDP in fiscal 2011 and large deficits likely for a number of years even under the most optimistic assumptions, this space will quickly narrow. Policymakers must therefore follow through on the agreement reached this past summer to increase the Treasury debt ceiling.

But our analysis also suggests that while substantial austerity is necessary in the U.S., policymakers have the latitude to wait at least another year before imposing the steps needed to achieve fiscal sustainability. It is neither necessary nor desirable to do too much too quickly. After all, nothing will push the U.S. to its debt limit faster than another recession.

The fiscal space methodology and results are presented in detail in this article. The results are compared with sovereign

4 The fiscal space analysis presented here is motivated by a methodology presented in "Fiscal Space," Ostry et al, IMF Working Paper, September 2010.

5 The debt limit is also known as the fiscal cliff.

Table 1:
Who Has Fiscal Space and Who Does Not

	Fiscal Space Increase in debt-to-GDP ratio, ppts	Survival 10-Yr Yield Upper limit on 10-yr bonds, %
South Korea	243	> 10
Australia	232	> 10
Taiwan	228	8.0
Luxembourg	226	8.2
New Zealand	221	> 10
Hong Kong	219	10.0
Singapore	217	7.9
Sweden	213	7.4
Norway	207	> 10
Denmark	194	8.3
Israel	189	> 10
Switzerland	189	6.6
Finland	178	7.4
U.S.	171	8.7
Netherlands	163	6.7
Canada	155	8.5
Germany	149	6.5
U.K.	142	7.1
Austria	139	5.4
France	127	5.5
Belgium	120	7.2
Iceland	117	> 10
Spain	98	6.1
Ireland	No Space	6.3
Italy	No Space	4.3
Portugal	No Space	4.2
Greece	No Space	1.6
Japan	No Space	Negative interest

Source: Moody's Analytics

ratings from Moody's Investors Service and the expected default probabilities from credit default swaps on sovereign debt. The usefulness of the fiscal space approach is also tested by determining how accurately it would have predicted the current sovereign debt problems in the advanced economies. Because of rapidly changing economic and political events, the Moody's Analytics fiscal space analysis will be updated monthly.

Fiscal space in theory

Fiscal space is defined as the difference between a government's actual debt and the theoretical debt limit implied by the historical behavior of its policymakers. To determine a country's debt limit and fiscal space, we begin with a simple fact; namely, that a country must issue debt equal to the difference between the interest payments on its existing debt and its primary balance. The primary balance is the difference between the government's revenues and its non-debt servicing expenditures. This relationship can be expressed as:

$$\dot{D}_t = D_t r_t - PB_t, \quad (1)$$

where $\dot{D}_t$ is the change in a country's debt level or debt issuance at time t, r_t is the nominal interest rate, and PB_t is the primary balance.[6] This can be rewritten in terms of shares of GDP:

$$\dot{d}_t = (r_t - g_t)d_t - pb_t, \quad (2)$$

where $\dot{d}_t$ is the change in the debt-to-GDP ratio, pb_t is the primary balance-to-GDP ratio, and g_t is the country's nominal GDP growth. $(r_t - g_t)d_t$ is a country's growth-adjusted interest payments.

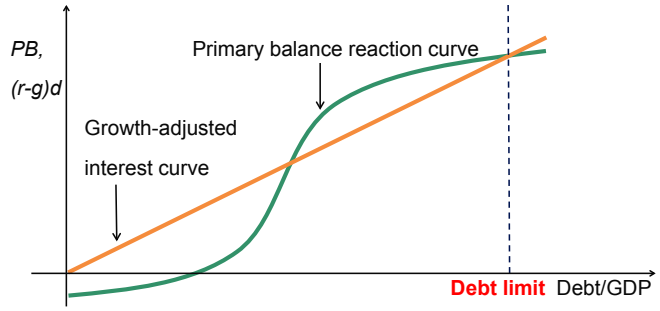
Governments are generally responsible in managing their fiscal affairs. When their debt-to-GDP ratio—also called the debt load—is low and manageable, they respond sensibly to rising deficits by tightening their proverbial belts, stabilizing their debt load at a reasonable level. The large costs associated with wars, natural disasters or even financial crisis may result in big increases in their debt loads, but as long as they respond with fiscal discipline, they are able to stabilize their financial situations.

However, there is a point when a country's debt-to-GDP ratio and interest payments on that debt rise so high that policymakers are tempted to give up. This can happen when the share of national income going to paying taxes has become so onerous, or cuts in government spending have grown so severe, that further tax hikes or more cost-cutting meet stiff resistance. Governments face a Hobson's choice: They can impose fiscal austerity, risking unrest and their own jobs; or they can default and take their chances with the nation's creditors.

This dynamic is determined by the relationship between the governments' primary balance reaction function and growth-ad-

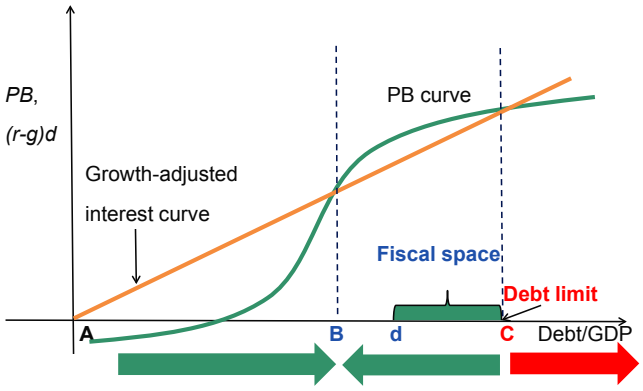
6 Because a sovereign government normally issues bonds with different maturity dates, the interest r_t determining the actual debt-to-GDP ratio movement should be the effective interest rate, or total interest payments divided by total debt.

Chart 2: Market Revealed Debt Limit



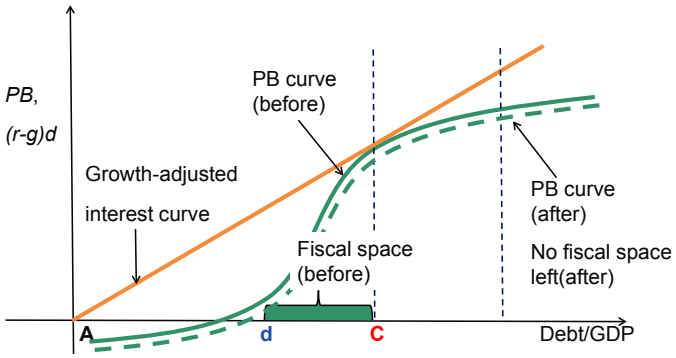
Source: Moody's Analytics

Chart 3: Sovereign Debt Dynamics



Source: Moody's Analytics

Chart 4: Fiscal Space Can Shrink Suddenly



Source: Moody's Analytics

justed interest payment curve. The primary balance reaction function is represented by:[7]

$$pb_i = A_i + F(d_i, x_i) + \varepsilon_i, \qquad (3)$$

where pb_i is the primary balance-to-GDP ratio of country i, d_i is its public debt-to-GDP ratio, x_i is a vector of fundamental economic factors, which also affect the primary balance, A_i is a country-specific constant, and ε_i is a random element. This reaction function can be linearized to become:

$$pb_i = a_i + x_i\gamma + f(d_i) + \varepsilon_i\ , \qquad (4)$$

where γ is a vector of linear parameters determining the impact of economic fundamentals on the primary balance. Based on the just-described reaction of policymakers to changes in their debt load and repeated regression experiments, $f(d_i)$ is best approximated by a cubic function (see Chart 2). Also shown in Chart 2 is the growth-adjusted interest payment curve $(r_t - g_t)d_t$.

The primary balance reaction curve and the growth-adjusted interest payment curve determine the debt limit. To see this, suppose that a country's debt-to-GDP ratio lies between B and C in Chart 3; its primary balance is greater than the required interest payment (the PB curve lies above the interest payment curve).[8] This corresponds to the case in which policymakers worry about their country's high debt load and respond by increasing taxes or imposing other austerity measures. The surplus of the primary balance over interest payment is used to pay down debt and the debt-to-GDP ratio falls back to B, the steady state debt-to-GDP ratio. As long as a country's debt-to-GDP ratio stays between A and C, it will remain solvent.

However, if a country's debt-to-GDP ratio is so high that it lies to the right of C, it is on a path toward insolvency. From C onward, the primary balance curve is permanently below the interest payment curve and the government is locked in a vicious debt-financing cycle: Required total interest payments, which are already higher than the primary balance, will rise further if new debt is issued. But because of public resistance to austerity measures or fiscal fatigue, the primary balance can no longer go up and may even start to decline. To avoid immediate default, the government must issue more debt to make up the gap in debt servicing. But this just postpones the inevitable, for it further enlarges the future wedge between the required interest payments and the primary balance. Over time, the debt-to-GDP ratio moves along the red arrow in Chart 3 and grows without bound. C is the debt limit or fiscal cliff for this country. The distance between the current debt-to-GDP ratio (d in Chart 3) and its debt limit is equal to the country's fiscal space.[9]

A very important feature of fiscal space is that it may shrink suddenly when conditions change. Take the scenario in Chart 4 as an example: Suppose before the deterioration of a country's economic fundamentals, the pri-

7 A few other empirical studies which inspired our model share this assumption, including Bohn, 1998, "The Behavior of U.S. Public Debt and Deficits," Quarterly Journal of Economics, 113(3), 949-63; and Mendoza and Ostry, 2008, "International Evidence on Fiscal Solvency: Is Fiscal Policy 'Responsible'?" Journal of Monetary Economics, 55(6), 1081-93.

8 Chart 3 is a version of the phase diagram in dynamic analysis derived from equations (2) and (4) by holding the economic fundamentals and interest rate constant over time.

9 If the world we live in were as certain as that in Chart 3, then only the sign of fiscal space matters: if the sign is positive, the sovereign debt-to-GDP ratio will move toward the steady state B even if it were literally just a percentage point away from the debt limit. In other words, the value of fiscal space does not matter as long as it is positive. In a more realistic, uncertain world, the primary balance reaction curve is shifting up and down because of stochastic movements of fundamentals and the additive random error term, and less fiscal space means higher risk.

mary balance reaction curve is the solid line, and the debt limit is at C. Given the country has a debt-to-GDP ratio at d, then it still has positive fiscal space. But what if there is a deterioration in economic fundamentals that pulls down the primary balance reaction curve? The country suddenly finds that it has no fiscal space left! The new primary balance curve is now below the interest payment curve everywhere and the debt-to-GDP ratio rises out of control.

Estimating fiscal space

The primary balance reaction function is estimated for 30 countries using a panel regression with data over the period 1985 to 2007. After testing a large number of economic and demographic variables in the regression analysis, the following variables were ultimately determined to be most helpful in explaining changes in the primary balance-to-GDP ratio:

- lagged values of the debt-to-GDP ratio in linear, quadratic and cubic forms;
- real output gap defined as the percent difference between Log real GDP and Log potential GDP. For a number of countries, potential GDP was defined as trend GDP calculated using a Hodrick-Prescott filter;
- real government expenditure gap defined as the difference in actual expenditures-to-GDP ratio and trend calculated using a Hodrick-Prescott filter;
- lagged moving average of the ratio of the sum of exports and imports to GDP;
- projected future dependent-population ratios; and
- real oil price (for oil-exporting countries only).

The results of the fixed-effect regression are shown in Table 2. The R^2 is 0.90, which pedagogically means that the model can explain 90% of the fluctuations in the country's' primary balances. Almost all of the coefficients reject the zero null hypothesis at a 5% significance level.

The regression results are intuitive. The relationship between the primary balance and the output gap is positive. The output gap represents the difference between actual

Table 2:

Fixed Effect Regression of Primary Balance on Economic Fundamentals

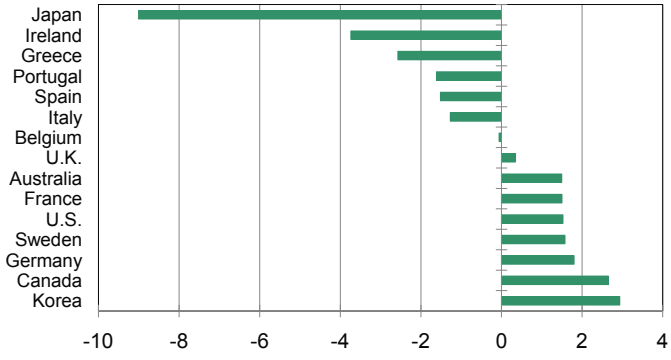
Dependent variable: primary balance - GDP ratio
Sample: 1985 to 2007
Included observations: 23
Cross-sections included: 30 IMF-defined advanced economies
Total pool (unbalanced) observations: 391

	Coefficient	Std. error	t-statistic	P-value
Lagged debt-GDP ratio	-0.047	0.062	-0.755	0.451
Square of lagged debt-GDP ratio	0.001	0.001	1.912	0.057
Cube of lagged debt-GDP ratio	0.000	0.000	-2.017	0.045
Output gap	0.565	0.046	12.350	0.000
Expenditure gap	-0.368	0.024	-15.317	0.000
Oil-exporting country dummy * log of real oil price	2.901	0.897	3.233	0.001
Lagged trade-openness index	0.023	0.013	1.818	0.070
Dependent-population ratio	-0.929	0.319	-2.910	0.004
20-year forward dependent-population ratio	-0.436	0.225	-1.943	0.053
R-squared	0.90			
Adjusted R-squared	0.89			
S.E. of regression	1.14			
Sum squared resid	459.97			
Log likelihood	-586.57			
F-statistic	82.55			
Prob(F-statistic)	0.00			
Mean dependent var	1.25			
S.D. dependent var	3.46			
Akaike info criterion	3.20			
Schwarz criterion	3.61			
Hannan-Quinn criterion	3.37			
Durbin-Watson statistic	1.67			

Note: Due to lack of data, San Marino is the only IMF-defined advanced economy excluded from the regression.
Sources: Moody's MIS, Moody's Analytics, IMF Economic Outlook, World Bank, Census Bureau

Chart 5: Propensity for Fiscal Prudence

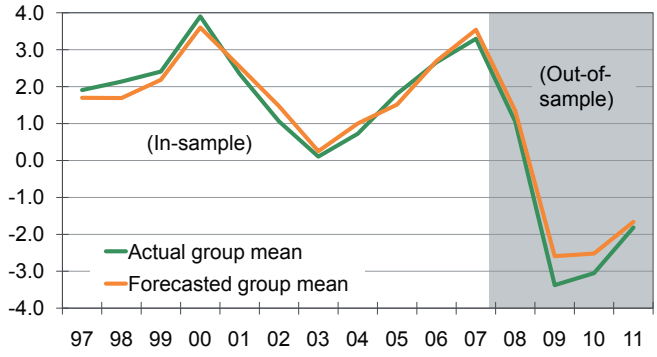
Estimated fixed effect, deviation from the cross-country mean



Source: Moody's Analytics

Chart 6: In-Sample and Out-of-Sample Validation

Primary balance-to-GDP ratio, all developed economies, %



Source: Moody's Analytics

GDP and the economy's potential GDP—GDP consistent with a fully employed economy and stable and low inflation. During periods of economic prosperity, when the output gap is positive and the economy is operating at or above its potential, the government will collect more in tax revenues, and government spending on unemployment insurance and other countercyclical programs will decline. The primary balance improves. In recessions, when the output gap is negative, the primary balance deteriorates.

The government expenditure gap has a negative relationship with the primary balance. The expenditure gap measures actual government spending-to-GDP relative to its cyclically adjusted trend. The expenditure gap will increase because of temporary spending to finance wars and cleanup from natural disasters and man-made calamities. A higher expenditure gap results in a deterioration in the primary balance.

The more open a country is to the global economy, the more likely it is that the country will be fiscally disciplined and operate with a larger primary balance. Policymakers in open economies recognize their dependence on global investors and trade, and as such have more incentive to maintain a strong balance sheet. A country's openness is measured by the ratio of the sum of its exports and imports to GDP.

Most oil-exporting countries rely heavily on revenues generated from levies on their oil industry to fund government operations. Higher oil prices thus quickly result in a better primary balance.

The age dependency ratio—the share of the population above 65 and under 15 years old—is a good proxy for the contingent liabilities that many countries are struggling with. Developed economies with aging populations need to devote an increasing amount of public resources to medical care, while emerging economies with younger populations need to invest more in education: The higher the dependency ratio the more negative the primary balance.

All other national features affecting fiscal prudence such as the political structure of the country, the ideological tint of the major parties, and so on are captured by the fixed-effect term in the panel regression. The fixed effects can be loosely thought of as a measure of a country's fiscal prudence. Not surprisingly, those countries currently experiencing sovereign debt crises are those determined by this measure to be less fiscally prudent (see Chart 5). The most fiscally prudent are also no surprise: They include South Korea, Canada, Germany and Sweden. Perhaps somewhat surprising in light of recent political acrimony, U.S. policymakers are also deemed fiscally prudent.

The primary balance model performs well in both in-sample and out-of-sample validation tests (see Chart 6). The in-sample mean of fitted values of the primary balance-to-GDP ratios of all developed economies closely tracks the actual historical mean between 1997 and 2007. In the out-of-sample test for the period from 2008 to 2011, the mean of the fitted values correctly reflects the sharp drop of the actual mean during the Great Recession. When the actual mean bottoms out in 2011, the fitted mean also moves up.[10]

Market and endogenous interest rates

A significant complication in implementing the fiscal space model is the choice of interest rate to use in calculating a country's future interest payments. Using forecasts of market interest rates will likely overestimate a country's fiscal space.[11] That is because interest rates will rise modestly with a rising debt-to-GDP ratio when the debt-to-GDP ratio is low. But as it becomes clearer that a country's debt-to-GDP ratio is approaching its debt limit, interest rates will increase more quickly as investors demand higher yields to compensate for increased risk of default. If it becomes clear that the country will default, interest rates spike.

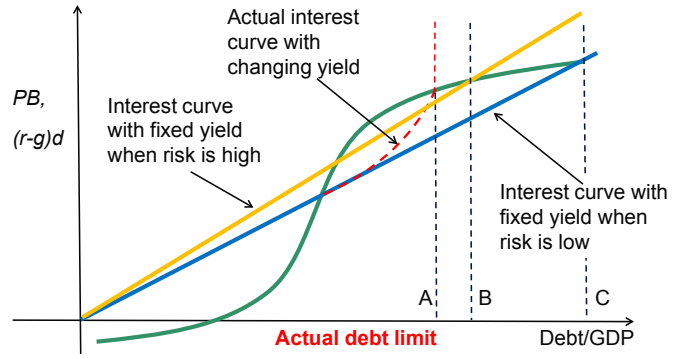
Using market interest rate forecasts to calculate a relatively safe country's fiscal space thus likely overstates the country's actual space. For instance in Chart 7, if the market interest rate is used to determine the risk of default when default risk is thought to be low (the blue curve), then the calculated debt limit is at C while the actual limit is at point A. The fiscal space is overstated by the distance between A and C.

The fiscal space model deals with this problem by providing estimates of

10 In general, test results from out-of-sample validation should always be worse than that from an in-sample validation.

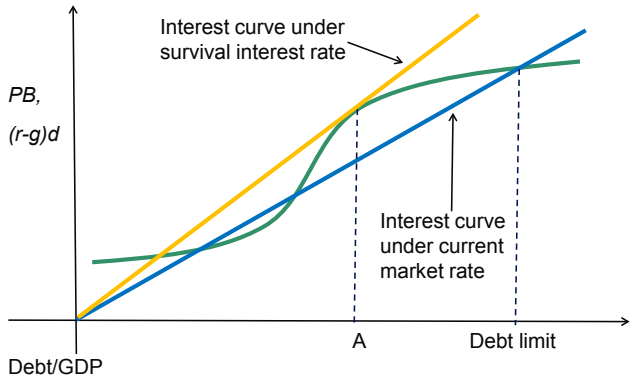
11 The current and future market interest rates and sovereign debt structure affect the future effective interest rates that determine a country's future interest payments.

Chart 7: Interest Rate Rises When End Is Near



Source: Moody's Analytics

Chart 8: Finding the Survival Interest Rate



Source: Moody's Analytics

fiscal space based on both forecasts of market interest rates and so-called endogenously determined interest rates. The endogenous interest rate is derived from the standard arbitrage condition for risk-neutral investors:

$$r_t^* = E(\tilde{r}_t)\,, \qquad (5)$$

where r_t^* is the riskless rate of return one can invest in, and $\tilde{r}_t$ is the random return of a risky asset.

For a risk-neutral investor considering a risky government bond, the expected return from the asset is

$$E(\tilde{r}_t) = r_t(1 - PD_t) + (RR_t - 1)PD_t\,, \qquad (6)$$

where r_t is the government bond yield, PD_t is the probability the country will default, and RR_t is the recovery rate on the debt after the default. Given PD_t, RR_t, and the risk-free rate r_t^*, the interest rate that determines the debt limit can be determined using nonlinear numerical methods. This is the endogenous interest rate.

The fiscal space for a country calculated using the market interest rate can differ from that calculated using the endogenous interest rate. The endogenous rate results are not necessarily superior to the market rate results, particularly when a country is already deemed to be risky by investors. The market rate results may be more accurate as the collective psyche of investors incorporates the impact of a wider range of issues than accounted for by a model-determined endogenous rate.[12] Moreover, calculating the endogenous rate depends on assumptions regarding investors' expectations regarding the probability of default, recovery rate, and risk-free rate, all of which are inherently unknowable. If the debt limit derived from the endogenous rate is greater than the market rate-based limit, then either the model for the endogenous rate is not fully capturing reality or global investors are overreacting. Further analysis is needed before determining which conclusion is more accurate.

Survival interest rate

The so-called survival interest rate for a country can also be derived from the fiscal space analysis. The survival rate is the highest nominal long-term sovereign interest rate a country can survive without getting trapped in a vicious cycle in which its rising interest payments outstrip its ability to service its debt, ultimately resulting in a default without extraordinary fiscal policy action.

The survival interest rate is calculated by raising sovereign rates, and thus the growth-adjusted interest rate curve, until the interest curve is tangent to the primary balance curve. In Chart 8, this occurs at point A.

For countries that have a very low debt load and have shown a high degree of fiscal prudence in the past, the survival interest rate could theoretically be well into the double digits. In reality, investors would likely panic if interest rates got that high. These countries would suffer a liquidity crisis long before interest rates rose to the very high calculated survival rate. Indeed, it is assumed in our analysis that this will happen once market rates rise above 10%.

It is important to note that a government will not immediately devolve towards default if the interest rate on its debt only temporarily rises above the survival rate. Market rates must remain persistently above the survival rate for this to happen.

The survival interest rate also depends on the outlook for long-term inflation: The higher the long-term inflation, the higher the survival rate. This does not mean the country can inflate its debt away; unexpected inflation can bite away some debt, but once a government embarks on a long-term inflation path, bond markets will build this expectation into the interest rate when the country is rolling over its debt. Consequently, its real debt burden will not become any easier to manage.

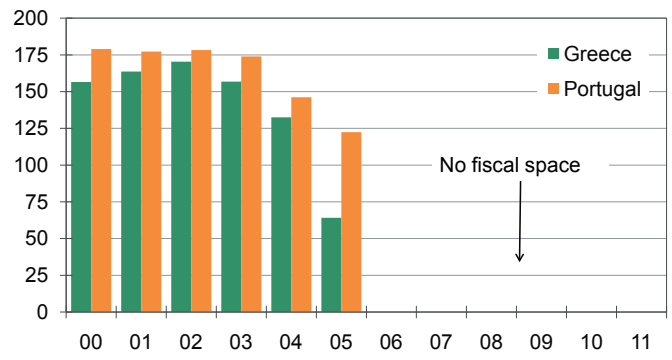
Validating fiscal space

To validate the results, the fiscal space model was simulated to determine how well it would have predicted the current European sovereign debt crisis. The model was simulated as if we were in the middle part of the last decade, before the financial crisis and Great Recession. Simulations were done using actual historical data, to isolate errors due solely to the model, and forecasted economic data.

12 In Chart 5, if we use the orange curve corresponding to higher default risk in calculation, the debit limit will be at point B and the upward bias from the actual limit A would be the difference between A and B. This bias is smaller than the bias represented by the difference between A and C from using the blue interest curve corresponding to a lower default risk.

Chart 9: Fiscal Spaces for Greece and Portugal

Fiscal space with actual economic data, debt-GDP percentage



Source: Moody's Analytics

The results are satisfying. Greece and Portugal provide good examples. Under the simulation using actual economic data, both began to run out of fiscal space in the middle of the last decade; by 2006, they had no space left (see Chart 9). In other words, the fiscal space model projected that these countries would default unless policymakers undertook unprecedented fiscal austerity steps or were bailed out. Moreover, the fiscal space model strongly signaled by year-end 2007 that Iceland, Ireland, Italy and Spain were all at serious risk of default without big policy changes or bailouts (see Table 3).[13]

To account for errors in economic forecasting, the fiscal space model was simulated under the assumption that the forecasts were wrong to a degree consistent with Moody's Analytic's current forecast errors.[14] When the forecast error was one standard deviation, the fiscal space model began signaling fiscal problems in the euro zone as early as 2004. When the forecast error is a large 1.96 standard deviation, the model no longer signals problems in Spain and Iceland, but it warns of problems in other euro zone nations as early as 2006.

13 An important caveat to this validation test is that the primary balance response functions of many governments may have changed since the middle part of the last decade.

14 While it would be desirable to use actual country economic forecasts made during the mid-2000s to test the fiscal space model, this is not possible given that the forecasts were not archived. Besides, the econometric models currently being used by Moody's Analytics to produce country forecasts were developed very recently. They differ substantially from those used in the middle part of the last decade.

Table 3:
Earliest Warning Time for European Sovereign Debt Crisis

	Scenario 1 Actual economic data	Scenario 2 Wrong-side 1 standard deviation Probability of equal or greater same-side mistakes = 16%	Scenario 3 Wrong-side 1.96 standard deviation Probability of equal or greater same-side mistakes = 2.5%
Greece	Dec-05	Dec-05	Dec-06
Iceland	Dec-07	Dec-08	NA
Ireland	Dec-05	Dec-05	Dec-06
Italy	Dec-04	Dec-04	Dec-06
Portugal	Dec-06	Dec-07	Dec-07
Spain	Dec-07	Dec-08	NA

Note:

The standard deviation of forecast error is estimated from available archived forecast errors for all countries forecasted by Moody's Analytics.

NA means that the country's sovereign risk problem is not captured in the scenario.

Source: Moody's Analytics

Fiscal space results

Of the 30 countries included in the fiscal space analysis, five have completely run out of space based on the Moody's Analytics economic forecast and market interest rates (see Table 4). Given current events, it is no surprise that these include Greece, Ireland, Italy, Japan and Portugal.

Greece has already effectively defaulted, as private investors in Greek sovereign debt are being asked to cut the value of their holdings in half. Ireland and Portugal have been bailed out, borrowing money from the European stability fund. Italy has not defaulted or been bailed out, but Italian policymakers are now working feverishly to impose fiscal austerity. It is unclear whether these efforts will be sufficient, and Italy may yet be forced to seek help from the stability fund or the International Monetary Fund. Japan has not taken any significant steps to address its long-term fiscal problems, and at the moment faces little financial pressure to do so, but the fiscal space analysis suggests it will ultimately need to take unprecedented action.

Survival interest rates for these countries are very low, or in the case of Japan, negative. Somewhat surprising is Italy's survival rate of just over 4%. Yields on 10-year Italian sovereign debt have briefly risen to over 7% in recent weeks and are still near 6%. According to this analysis, Italian policymakers will need to work very hard and exhibit unprecedented fiscal discipline to avoid some form of bailout or default.

Belgium and Spain have some fiscal space left but have no margin for error. Much depends on these nations' economic growth prospects. Fiscal space is sensitive to economic fundamentals; even a modest deterioration can quickly reduce the amount of fiscal space available. Based on historical experience, it is wise for sovereigns to maintain at least 125 percentage points of fiscal space. Both Belgium and Spain are below this threshold assuming they suffer only mild recessions, ending by the second half of next year. If the downturn is more severe

Table 4:
Fiscal Space Results

	Market Interest Rate				Endogenously Determined Interest Rate				Real GDP Growth		GDP Deflator Growth		Long-Term Bond Yield
	Moody's Analytics		IMF		Moody's Analytics		IMF		5-Yr Annualized Growth		5-Yr Annualized Growth		5-Yr Forward MA*
	Fiscal Space	Debt Limit	Fiscal Space	Debt Limit	Fiscal Space	Debt Limit	Fiscal Space	Debt Limit	Moody's Analytics	IMF	Moody's Analytics	IMF	Moody's Analytics
Australia	232	254	227	250	186	209	179	202	3.2	3.0	3.1	2.8	5.0
Austria	139	211	154	226	92	164	90	162	1.7	2.2	1.5	2.0	3.9
Belgium	120	215	132	227	59	153	92	187	1.5	1.9	2.2	2.5	5.1
Canada	155	239	153	237	139	223	136	220	2.3	2.3	2.4	2.3	4.3
Denmark	194	239	201	246	136	180	152	197	1.8	1.7	1.6	2.3	3.8
Finland	178	228	187	238	121	171	147	197	2.1	2.4	2.2	2.5	4.4
France	127	214	128	214	75	162	74	161	1.6	1.8	1.9	1.6	3.8
Germany	149	232	142	225	116	199	104	187	1.9	1.7	1.3	0.9	3.1
Greece	No space	No space	No space	No space	No space	No space	No space	No space	-0.7	0.0	1.9	0.5	13.6
Hong Kong	219	253	232	266	202	236	217	251	4.3	4.7	2.4	3.3	4.6
Iceland	117	218	117	218	84	185	84	185	2.8	2.8	3.0	3.0	8.9
Ireland	No space	No space	No space	No space	44	153	43	152	1.3	2.0	1.3	1.2	8.2
Israel	189	260	189	260	155	226	155	226	3.9	3.9	2.6	2.6	5.3
Italy	No space	No space	No space	No space	No space	No space	No space	No space	0.8	0.7	2.2	1.8	6.2
Japan	No space	No space	No space	No space	No space	No space	No space	No space	1.1	1.5	-0.2	-0.5	1.9
Luxembourg	226	246	232	252	174	194	185	205	2.4	3.0	2.0	1.8	3.3
Netherlands	163	228	164	229	88	153	87	152	1.3	1.6	1.8	1.5	3.6
New Zealand	221	256	220	256	178	214	178	213	3.1	2.8	2.9	2.9	5.5
Norway	207	262	209	264	177	232	179	234	1.9	2.1	2.6	2.6	4.8
Portugal	No space	No space	No space	No space	No space	No space	No space	No space	0.2	0.4	2.1	1.4	9.9
Singapore	217	260	227	270	173	216	189	232	4.6	4.4	0.9	2.2	2.1
South Korea	243	275	245	277	227	259	229	261	4.3	4.1	2.8	3.1	6.5
Spain	98	166	110	177	90	158	88	156	1.5	1.5	1.7	1.7	6.1
Sweden	213	249	227	263	121	157	165	201	2.8	3.4	1.7	2.3	2.6
Switzerland	189	242	189	241	143	196	142	194	1.6	1.8	1.3	1.0	2.2
Taiwan	228	267	238	277	166	205	185	224	4.5	5.0	0.3	1.0	1.0
U.K.	142	223	150	231	94	175	115	196	1.8	2.1	2.9	3.1	4.8
U.S.	171	242	153	223	140	211	104	175	3.1	2.5	2.0	1.2	4.3

Note: The results shown in this table are based on forecasts from Moody's Analytics and the IMF.
* MA is moving average
Sources: IMF, Moody's Analytics

Table 5:
Probabilities for Maintaining Fiscal Space Over Given Level

December 2011

	Fiscal space >0 (Probability)	Fiscal space >25 (Probability)	Fiscal space >50 (Probability)	Fiscal space >75 (Probability)	Fiscal space >100 (Probability)	Fiscal space >125 (Probability)	Fiscal space >150 (Probability)	Fiscal space >175 (Probability)	Fiscal space >200 (Probability)
Australia	100	100	100	100	100	100	100	100	100
Austria	99	99	99	99	98	88	7	0	0
Belgium	100	100	100	100	98	27	0	0	0
Canada	100	100	100	100	100	100	84	0	0
Denmark	100	100	100	100	100	100	100	100	11
Finland	100	100	100	100	100	100	100	67	0
France	99	99	99	99	98	61	0	0	0
Germany	100	100	100	100	100	100	44	0	0
Greece	0	0	0	0	0	0	0	0	0
Hong Kong, China	100	100	100	100	100	100	100	100	100
Iceland	100	100	100	100	98	10	0	0	0
Ireland	1	1	0	0	0	0	0	0	0
Israel	100	100	100	100	100	100	100	100	0
Italy	0	0	0	0	0	0	0	0	0
Japan	0	0	0	0	0	0	0	0	0
Korea	100	100	100	100	100	100	100	100	100
Luxembourg	100	100	100	100	100	100	100	100	100
Netherlands	100	100	100	100	100	100	96	1	0
New Zealand	100	100	100	100	100	100	100	100	100
Norway	100	100	100	100	100	100	100	100	97
Portugal	0	0	0	0	0	0	0	0	0
Singapore	100	100	100	100	100	100	100	100	100
Spain	53	53	53	53	49	12	0	0	0
Sweden	100	100	100	100	100	100	100	100	100
Switzerland	100	100	100	100	100	100	100	99	1
Taiwan, China	100	100	100	100	100	100	100	100	100
United Kingdom	100	100	100	100	100	97	10	0	0
United States	100	100	100	100	100	100	100	21	0

Note: Background color — blue is safe [97.5,100], yellow is cautionary [84,97.5], orange is at significant risk [16,84], red is at grave risk [0,16].

Source: Moody's Analytics

and prolonged, then what space they have will quickly evaporate. Moreover, assuming the European economy cooperates, policymakers will not have to take unprecedented fiscal policy steps, but the austerity needed will be very painful.

That Spain is on very thin fiscal ice is also evident from its close to 6% survival 10-year sovereign yield. It was only a couple of weeks ago that yields were well over 6%. They are still uncomfortably high at close to 5.5%.

France and the U.K. have an adequate amount of fiscal space, but policymakers in these countries must act judiciously. With more than 125 percentage points of space, these countries should be able to manage through the current crisis, but only if the European economic downturn is modest and short-lived as expected. France in particular appears vulnerable to the economic outlook. Clearly, if the euro zone were to crack even a bit, these countries would have to take unprecedented fiscal steps to avoid defaulting on their debt.

The U.S. and Germany have a substantial amount of remaining fiscal space. While the U.S. has a larger budget deficit and somewhat higher debt load than Germany, its growth prospects are meaningfully stronger. U.S. real GDP growth over the next five years is forecast to be near 3% per year, while Germany is expected to grow closer to 2% per year. The U.S. survival interest rate of almost 9% is meaningfully higher than Germany's survival rate of 6.5%. This reflects both the higher growth potential in the U.S., but also higher underlying long-term inflation prospects. Despite their better fiscal positions than most other big countries, U.S. and German policymakers have no room for complacency; deficits and debt loads are still rising, and the risk that growth will fall short of expectations is uncomfortably high.

Nations with the most fiscal space are for the most part smaller Scandinavian and Asian economies. Some of these nations such as Sweden and South Korea have experienced fiscal problems in the past but have learned from their experience. These nations generally also have solid economic growth prospects due in part to disciplined government finances. Survival interest rates in these countries are generally at least in the high single digits.

Countries whose fiscal space is above 125 percentage points when calculated using market interest rates have less space when the calculation is based on endogenously determined interest rates. This is consistent with our earlier reasoning. The relative calculations of fiscal space for high-risk countries are somewhat different. Some countries with no fiscal space using market interest rates have some positive fiscal space using endogenously determined rates. These results are not in the direction expected, either because the fiscal space model is not capturing all the factors being considered by global investors or because investors are overly pessimistic.

Dealing with uncertainty

Since the fiscal space model is a simplified representation of reality, estimates of a country's debt limit and fiscal space are subject to significant uncertainty. This uncertainty can be measured and accounted for in part by deriving probabilities that a country has a given amount of fiscal space.[15]

For example, the probability that the U.S. has more than 125 percentage points of fiscal space is close to 100% (see Table 5). That is, using Moody's Analytics economic projections for the U.S. economy and market interest rates, it is highly likely that the U.S. will solve its fiscal problems without policymakers having to take fiscal steps they have not taken historically. The U.S. has shown the political will in the past to address its fiscal problems. However, the probability that the U.S. has more than 175 percentage points of fiscal space is closer to 20%, and it is very unlikely that the U.S. has more than 200 percentage points of fiscal space.

More broadly, if the probability that a country has fiscal space of the given level is greater than 97.5%, then it is deemed to be highly likely to have at least that much fiscal space. This is consistent with the 95% confidence interval commonly used in statistical analysis. Probabilities between 84% and 97.5% are considered very likely. The 84% cutoff is consistent with the calculation used by banks to cover their unexpected losses under capital regulations. Banks generally keep enough capital to cover losses that are at least one standard deviation greater than expected; the losses that occur with an 84% probability assuming a normal distribution. Probabilities between 16% and 84% are considered somewhat likely, and those below 16% are termed unlikely.

The probability of fiscal space is helpful in gauging how resistant a sovereign is to an unexpected shock such as a war or a financial crisis. For instance, there is a more than 97.5% probability that both Belgium and Norway have more than 100 percentage points of fiscal space. However, there is a nearly 97% probability that Norway has fiscal space of more than 200 percentage points while, the probability that Belgium has that much space is close to 0%. Norwegian sovereign debt is much safer against the fiscal fallout from adverse events. The Belgians have much less room to tolerate anything that may go wrong.

Attaching probabilities to different levels of fiscal space should also be helpful to users of this analysis with different levels of risk aversion. Risk-averse regulators for instance will take solace in a country that has a higher probability of having a substantial amount of fiscal space, while an aggressive risk-taking investor may not care as much.

Fiscal space, ratings and CDS-EDFs

Fiscal space provides an alternative approach to evaluating prospects that a sovereign will default on its debt. Other useful approaches include ratings and implied default probabilities derived from credit default swaps, essentially insurance contracts that pay off if a debtor defaults.

Fiscal space is highly correlated with ratings from Moody's Investors Service (see Table 6). All sovereigns rated Aaa have more than 125 percentage points of fiscal space; sovereigns rated Baa or less have less than 125 percentage points of space, and in most cases have already run out of space.

There are also some interesting discrepancies between the fiscal space analysis and the ratings. Several Asian economies and Israel are considered very safe according to

15 These probabilities are calculated from the distribution of the modeling error of the primary balance reaction function.

Table 6:
Comparing Fiscal Space and Moody's Investors Service Ratings

December 2011

	Fiscal Space Moody's ECCA	Foreign Currency Rating Moody's MIS	Outlook Moody's MIS	Domestic Currency Rating Moody's MIS	Outlook Moody's MIS
Korea	243	A1	STA	A1	STA
Australia	232	Aaa	STA	Aaa	STA
Taiwan, China	228	Aa3	STA	Aa3	STA
Luxembourg	226	Aaa	STA	Aaa	STA
New Zealand	221	Aaa	STA	Aaa	STA
Hong Kong, China	219	Aa1	POS	Aa1	POS
Singapore	217	Aaa	STA	Aaa	STA
Sweden	213	Aaa	STA	Aaa	STA
Norway	207	Aaa	STA	Aaa	STA
Denmark	194	Aaa	STA	Aaa	STA
Israel	189	A1	STA	A1	STA
Switzerland	189	Aaa	STA	Aaa	STA
Finland	178	Aaa	STA	Aaa	STA
United States of America	171	Aaa	NEG	Aaa	NEG
Netherlands	163	Aaa	STA	Aaa	STA
Canada	155	Aaa	STA	Aaa	STA
Germany	149	Aaa	STA	Aaa	STA
United Kingdom	142	Aaa	STA	Aaa	STA
Austria	139	Aaa	STA	Aaa	STA
France	127	Aaa	STA	Aaa	STA
Belgium	120	Aa1	RUR-	Aa1	RUR-
Iceland	117	Baa3	NEG	Baa3	NEG
Spain	98	A1	NEG	A1	NEG
Japan	No space	Aa3	STA	Aa3	STA
Italy	No space	A2	NEG	A2	NEG
Ireland	No space	Ba1	NEG	Ba1	NEG
Portugal	No space	Ba2	NEG	Ba2	NEG
Greece	No space	Ca	DVLPG	Ca	DVLPG

Note: Background color — blue is safe, yellow is cautionary, orange is at significant risk, red is at grave risk.

Sources: Moody's Analytics, Moody's MIS

fiscal space, yet their ratings are meaningfully lower and imply a higher degree of risk. Conversely, the fiscal space analysis shows Italy and Japan having more serious problems than their ratings would suggest. These differences could be explained by future political developments anticipated by the rating analysts but not considered in the fiscal space analysis.

An advantage of fiscal space is that it provides more granularity with respect to judging future risks. The fiscal space values are neither bounded from above nor from below. In contrast, ratings are bounded by the top grade of Aaa. Consider Norway and Austria, for example. Both are rated Aaa, but the fiscal space analysis suggests that the risks involved in investing in the debt of these two sovereigns are very different.

Fiscal space and CDS-implied expected default frequencies (CDS-EDF) are also highly correlated (see Table 7). As CDS-EDF values increase, the probability of various amounts of fiscal space decline. Except for Korea and Israel, countries with close to a 100% probability of having at least 125 percentage points of fiscal space have less than a 0.1% probability of defaulting in the next year, according to the CDS-EDF. Moreover, save for Japan, those countries that have no fiscal space left have almost a 2% or greater probability of defaulting in the next several years.

It is important to note that an EDF typically has a relatively short time horizon (often one year or just a few years). In contrast, the horizon considered by fiscal space analysis is much longer. For instance, if a country has a 99% probability of having no fiscal space, it does not mean that its chance of default next year is 99%. Rather, it only means that its probability of default *sometime in the future assuming no extraordinary changes in fiscal policy* is 99%. For this reason, despite the observed strong comovement between fiscal space and CDS-EDFs, they are in general very different in terms of magnitude of values. The no-space probability should generally be greater than the short-term default probabilities implied by CDS, especially for those currently safe countries with long-term structural problems such as Japan.

There are some notable differences between fiscal space and CDS-EDFs. According to the CDS market, U.S. Treasury debt has the lowest default risk. In contrast, according to fiscal space, there are a number of other sovereigns with lower default risk than the U.S. The CDS market's evaluation of the risk of U.S. debt has actually improved since the spring, perhaps due to flight-to-quality movements stemming from the European crisis. Perhaps also, the agreement reached between Democrats and Republicans in the wake of this summer's showdown over the debt ceiling is viewed as substantive. The fiscal space analysis of U.S. debt has not changed appreciably during this period. This highlights the difference between the two measures: The CDS-EDF is driven by changes in investor sentiment, while fiscal space is largely driven by changes in economic fundamentals.

This was particularly helpful in identifying the troubles brewing in Greece. In late 2007, for example, the fiscal space analysis identified Greece as a significant and increasing default risk. By November, the probability that its fiscal space was more than 125 percentage points had fallen to less than 85%. The CDS-EDF for Greece at the time was still 0.01%, the lowest default frequency a country can get in the CDS-EDF universe.

Because the CDS-EDF and fiscal space are derived from two completely different approaches, it is encouraging when they are both signaling the same thing. When they diverge, it is very important to ascertain why.

Development plans

The fiscal space analysis presented here will be updated each month after the completion of the Moody's Analytics country economic forecasts. The results will be archived to allow for a more thorough validation of the model in the future. Any significant changes in the fiscal space results will be identified and reported to clients.

The fiscal space model will also be enhanced in three key ways. First, the risk to sovereigns posed by too-big-to-fail financial institutions will be incorporated into the model. A potentially significant limitation of the current model is that the primary balance response function is not directly impacted by the potential failure of major financial institutions. The collapse of the Irish and Icelandic banking systems is clearly a reason why the Irish government required a bailout and why Iceland defaulted. The near collapse of the U.S., U.K., and euro zone banking systems has put significant pressure on the fiscal space of these nations. CDS-EDFs of systemically important financial institutions for each nation are a good proxy for this risk and will be tested in the model.

The fiscal space results will also be stress-tested under the range of Moody's Analytics alternative economic scenarios. Results presented in this paper assume a generally benign economic outlook, save for a modest near-term European recession. It is not difficult to construct darker economic scenarios, however, and regulators are asking their banks to formally consider such scenarios in the stress-testing process. Given how sensitive fiscal space is to changing economic fundamentals, this could be a very informative exercise.

A third enhancement will be to consider the impact of the share of a sovereign's debt that is owned by foreign investors. This varies substantially across countries and could have a significant bearing on the threat of default posed by a given debt-to-GDP ratio. Japan has no fiscal space in the current fiscal analysis, but the risk may be overstated given that so much of its debt is held by Japanese citizens and institutions. This may be a reason why ratings and CDS-EDFs show much less concern about Japan's fiscal situation than that implied by a fiscal space analysis.

Conclusions

The global economic upheaval that began four years ago has undermined the finances of the wealthiest nations. Most developed economies continue to run large budget deficits; debt loads have increased rapidly and grown very heavy. Global investors are demanding higher interest rates to compensate for the risk of owning the debt of many of these nations. In some notable cases, investors have stopped buying altogether.

While most nations have the financial wherewithal to make good on their debt obligations, they may lack the political will. History provides numerous examples of na-

Table 7:

Comparing Fiscal Space and CDS-Implied EDF

December 2011

	Fiscal space >75 (Probability)	Fiscal space >100 (Probability)	Fiscal space >125 (Probability)	CDS-I EDF 1-yr	CDS-I EDF 5-yr
Norway	100	100	100	0.03	0.06
U.S.	100	100	100	0.03	0.07
Canada	100	100	100	0.04	0.08
Finland	100	100	100	0.05	0.11
Sweden	100	100	100	0.05	0.11
Switzerland	100	100	100	0.05	0.12
Germany	100	100	100	0.06	0.14
Australia	100	100	100	0.07	0.15
Netherlands	100	100	100	0.08	0.17
Singapore	100	100	100	0.08	0.17
U.K.	100	100	97	0.08	0.17
Hong Kong, China	100	100	100	0.08	0.18
New Zealand	100	100	100	0.08	0.18
Denmark	100	100	100	0.09	0.19
Taiwan, China	100	100	100	0.08	0.19
Japan	0	0	0	0.13	0.29
Korea	100	100	100	0.16	0.34
Austria	99	98	88	0.21	0.44
Israel	100	100	100	0.23	0.47
France	99	98	61	0.23	0.48
Belgium	100	98	27	0.45	0.82
Iceland	100	98	10	0.52	0.91
Spain	53	49	12	0.75	1.20
Italy	0	0	0	1.08	1.57
Ireland	0	0	0	2.19	2.63
Portugal	0	0	0	4.43	4.41
Greece	0	0	0	32.07	23.64

Note: Background color — blue is safe, yellow is cautionary, orange is at significant risk, red is at grave risk.

Note: Economies are ranked according to CDS-implied EDF.

Source: Moody's Analytics

tions that calculated it more desirable to short creditors than to engage in the fiscal austerity required to repay in a timely way. While these examples generally involve emerging economies, Greece's recent default signals that when under pressure, even more advanced economies can show the same political dynamics. Given the turmoil in European bond markets, investors are clearly wary.

There are a number of different approaches to evaluating just how close a sovereign is to reneging on its financial obligations. Credit rating agencies have provided opinions for decades. More recently, techniques have been developed to discern what investors think the risks are as implied by the cost of buying insurance against default in the CDS market. Bond yield spreads provide similar information.

Fiscal space is a different approach. Using econometric techniques, it relates fiscal policymakers' historical behavior to changes in their nation's debt load and to economic and demographic fundamentals. Based on forecasts of these economic fundamentals and borrowing costs, the debt limit of sovereigns can be determined. This limit does not identify at what point a sovereign will default, but it identifies at what point policymakers must act more responsibly than they have historically to avoid default.

There are many limitations to the fiscal space approach, but it provides an alternative perspective that should be carefully considered. If that perspective implies something very different than a credit rating or a CDS-implied probability of default, it is important to determine why.

The fiscal space analysis signals that policymakers in a number of European nations will need to take unprecedented steps, seek bailouts, or risk default. Greece, Ireland and Portugal are already at that point, Italy and Spain are not far behind, and even Belgium and France appear at some significant risk. Global investors are not wrong to be concerned about policymakers' ability to preserve the euro zone as currently structured.

The U.S. has more fiscal space, but not nearly as much as it had before the financial panic and Great Recession. Moreover, just how much space it has critically depends on whether the U.S. economy is able to avoid sliding back into recession. Even another modest downturn would likely wipe out what fiscal breathing room is left. Policymakers also need to act quickly to rein in future long-term budget deficits. Unlike their European counterparts, U.S. lawmakers can still reform spending and tax policies on their own terms. That will not last much longer.

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Economic & Consumer Credit Analytics

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Moody's Analytics tracks and analyzes trends in consumer credit and spending, output and income, mortgage activity, population, central bank behavior, and prices. Our customized models, concise and timely reports, and one of the largest assembled financial, economic and demographic databases support firms and policymakers in strategic planning, product and sales forecasting, credit risk and sensitivity management, and investment research. Our customers include multinational corporations, governments at all levels, central banks and financial regulators, retailers, mutual funds, financial institutions, utilities, residential and commercial real estate firms, insurance companies, and professional investors.

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Moody's Analytics added Economy.com to its portfolio in 2005. Its economics and consumer credit analytics arm is based in West Chester PA, a suburb of Philadelphia, with offices in London and Sydney. More information is available at www.economy.com.

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