

## Credit

16 May 2012 | 16 pages

# Default Rates to Climb Rapidly in Q3 and Q4

**Tough credit conditions and negative GDP outlook should feed through to European speculative-grade default rates by Q3 2012**

- Having troughed in late 2011, European default rates seem likely to increase rapidly in the second half of 2012, reaching 6% by the end of the year.
- This modeled rise in default rates is due mainly to the continuous drop in GDP since last year and our forecast drop until the end of 2013.
- A similar rise in default rates was preceded by crossover trading above 750bp in October 2008.
- In the US speculative-grade space, we forecast defaults to remain at 2.5% for the remainder of the year and into 2013.
- The level of macro uncertainty remains high. We calibrate our forecasts to our economists' GDP expectations and these remain subject to negative shocks. For instance, if the actual Eurozone GDP were to come in 2% lower than forecast then the default rates implied by our model would rise to 7.5% by December 2012.

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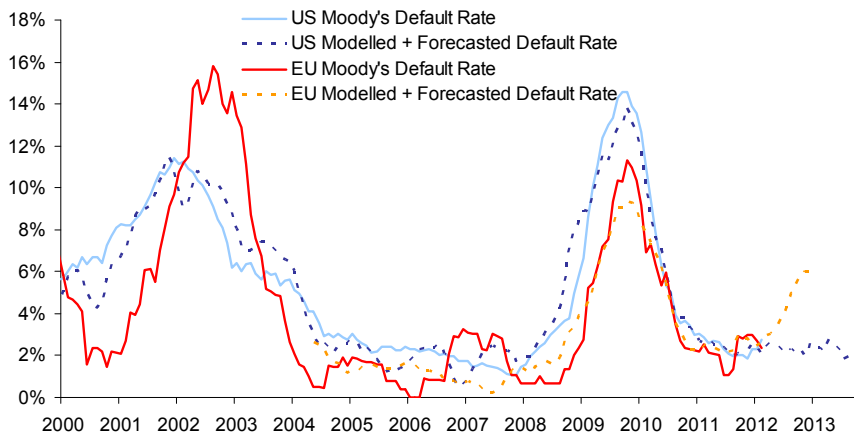
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**Figure 1. US and European Moody's and Citi Modeled Default Rates, %**

Moody's US and European Speculative Grade 12m trailing issuer weighted default rate versus Vector AutoRegressive (VAR) default model, %



Source: CIRA, Moody's, Bloomberg

See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures.

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## European defaults set to rise later this year

The last default cycle was US led, but investors are now much more interested in the potential for European default rates to climb in the second half of 2012. Our default model forecasts that these are set to rise steadily for the rest of the year. However, modeling European default rates is problematic. There is far less history of European speculative-grade defaults than for the US, the universe is smaller, and characterized by a different relationship with lenders. Further complications come from unprecedented market technicals, such as the LTRO, that are being taken to avoid stress and ease tight lending conditions.

Despite these positive technicals, our econometric model suggests that European speculative-grade default rates have passed their low point. They should start to climb quite rapidly later this year as deteriorating fundamentals work their way through. In fact, May is forecast to be the point at which the rate of increase picks up. This is driven largely by our economists' below-consensus European GDP expectations. This, combined with the severe tightening in lending standards that occurred in Q4, has pushed up our default expectations significantly<sup>1</sup>. We would also add that the systemic nature of the sovereign crisis makes GDP forecasting highly uncertain and the past may prove to be a poor guide for the future. By implication, this adds a further source of variation or uncertainty in our default forecasts.

Our US forecasts are much more benign as our key variables do not point to an increase in defaults. The key here is almost certainly GDP expectations. Our model takes a set of GDP forecasts as given and predicts other variables around these forecasts. Citi economists' base case for GDP assumes that the European situation is contained so as not to significantly affect US growth. Given that most market participants would acknowledge the elevated 'tail-risk' of a global downturn, we have also included some scenario analysis to address that potential outcome.

This paper begins with our econometric model default rate forecasts in Europe and the US and lists what variables are most responsible. The projections are tested across various scenarios by shocking an input factor, such as GDP, and projecting how much default rates would move in response. Lastly, we provide a detailed description of the econometric models used in our forecasts.

### Is the past a good guide for European forecasts?

Making econometric forecasts in Europe is difficult because of the lack of consistent data spanning the creation of the Euro. Data pre Euro isn't a good guide for the dynamics post Euro. Equally, Europe's current situation is without precedent. Larger European corporates were well supported in 2008 with only a handful of defaults in the iTraxx XO9 and none from IG9. The next cycle has the potential to be different. Much of the risk is binary. Bailouts and LTROs will support credit availability but one or more exits from the euro, an increasingly probable scenario, would necessarily involve a lot of restructuring. Marginal borrowers will find access to credit variable. Having said all this, the default cycle 2007-9 was unusual, too, and our econometric model performed very well. Many of the following stresses are captured within the GDP forecasts we use but they do increase the potential variation of the results relative to our forecasts.

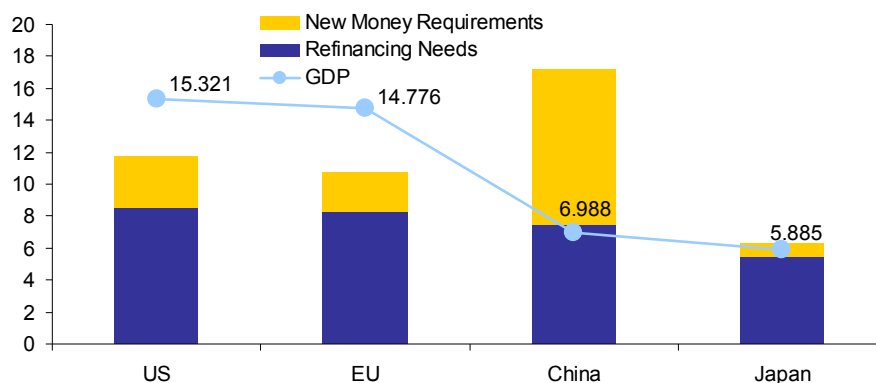
The increase in regulation post 2008 supports the thesis that borrowers will find it harder to access credit in the years ahead. Basel III and compliance with the EBA capital ratios by June mean that, unless banks are able to raise capital, deleveraging will necessarily reduce credit availability. Larger corporates can (potentially) access bond markets but the availability of credit to SMEs seems likely to decline further.

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<sup>1</sup> ECB lending survey tightening indicator has an 8-month lag in our forecast model

Lending surveys suggest that investor demand for loans has declined but this decrease will likely be minor relative to refinancing requirements. Increased demand will come from the much-discussed legacy refinancing wall that peaks in 2013 and 2014. This wall has been extended and pushed back but remains a significant overhang that is likely to restrict credit availability in a deleveraging world. In a recent report, Standard & Poor's estimated the global credit overhang at \$46 trillion maturing by 2016, of which Europe and the UK represent \$11 trillion.

Figure 2. Refinancing Needs and New Money Requirements of Non-Financial Corporates, \$tn



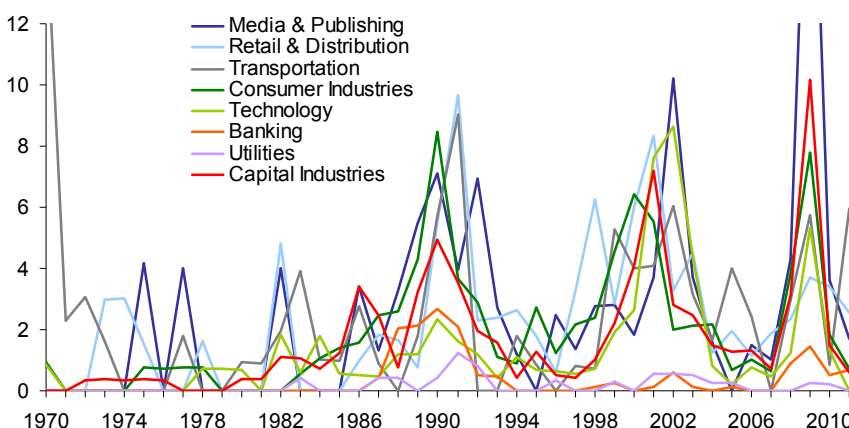
Source: S&P "The Credit Overhang: Is A \$46 Trillion Perfect Storm Brewing?"

There are likely to be country-specific dynamics as well. Take OTE, for example, a Greek telecoms company with good cashflow and 30% non-domestic revenue, but with a September 2012 loan maturity and an August 2013 bond maturity. Within the Euro, a beholden and bailed out Greek bank would likely provide financing if credit markets remain closed to OTE. In a drachma environment, a redenomination of debt would probably be the only option, despite the non domestic revenue and German holding.

Defaults are likely to have a regional slant beyond Greece. If Spanish banks are asked to provision 30% against potential real-estate losses, then credit availability is likely to be reduced; a situation without a parallel in, say, Italy. Equally, defaults might be political with a push for 'bail-ins' in some countries increasing the number of defaults and credit availability at the same time.

Much European high-yield debt is issued by small and private companies but an examination of public distressed debt indicates five broad categories that are consistent with previous default cycles. The fall in GDP data means that cyclical sectors will likely make up a number of defaults, as can be seen in Figure 3. These are: Media & Publishing in dark blue, Retail & Distribution in light blue, Consumer Industries in dark green, Technology in light green and Transportation in grey. Layered upon this are categories that are specific to the current crisis, such as periphery financials, as well as region-specific sectors such as Irish and Spanish construction/property.

Figure 3. Annual Default Rates by Sector, %



Source: CIRA, Moody's

## Europe

Figure 4. EU Forecast Model: Explanatory Power of Factors

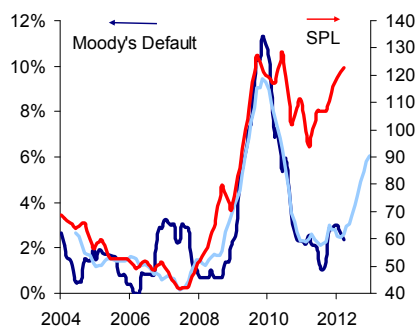
Variable	Explanatory	Lags
GDP	51%	6m
SPL	23%	10m
EURIBOR slope	20%	13m
Lending survey	6%	14m

Source: CIRA

### Base case: European defaults rise to 6% by Dec-2012

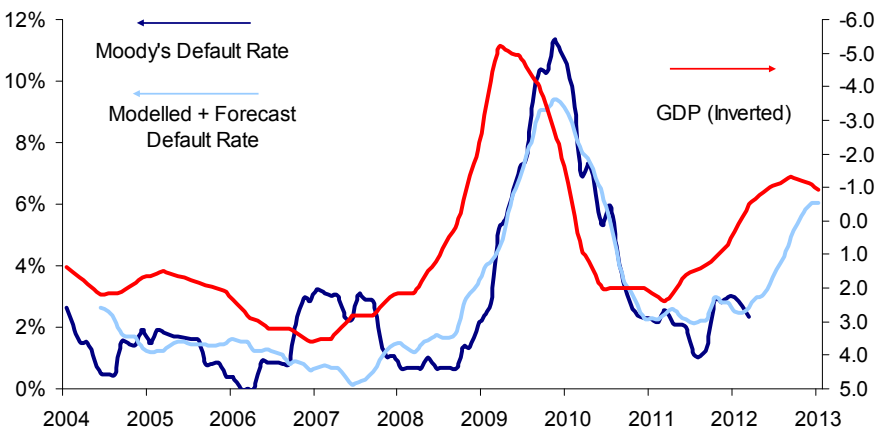
According to our base case scenario, the European 12m trailing Speculative Grade Default Rate, which is currently at 2.35%, is set to rise steadily to 6% by December 2012 (Figure 6). This forecast rise is mostly a result of the drop in GDP growth (Figure 4) since second half of 2011 and our forecast of a continuous drop until the 4<sup>th</sup> quarter of 2012. Another factor affecting this quick rise in default rates is the Spread per unit of Leverage (SPL), which has risen sharply in the past 6 months as spreads continue to widen while corporates continue to deleverage.

Figure 5. European Default Rate Forecast vs. SPL, (% , bp)



Source: CIRA, Moody's, Bloomberg

Figure 6. European Default Rate Forecast vs. GDP Growth, (% , %)

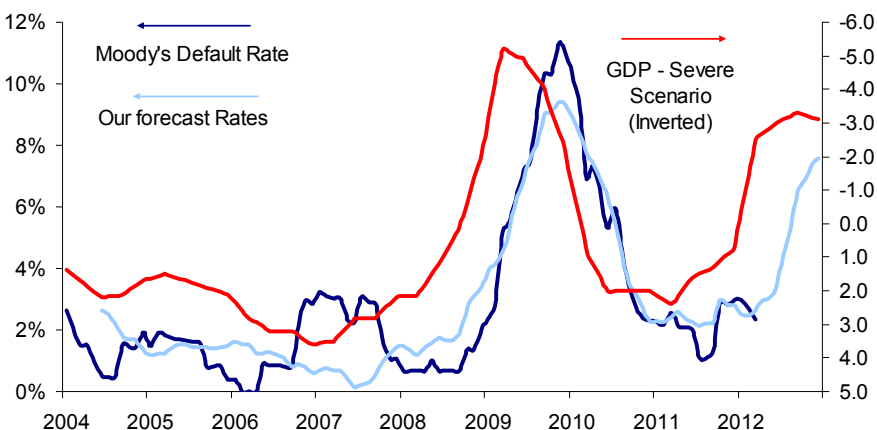


Source: CIRA, Moody's, Bloomberg

## Severe scenario: European defaults rise to 7.5% by Dec-2012

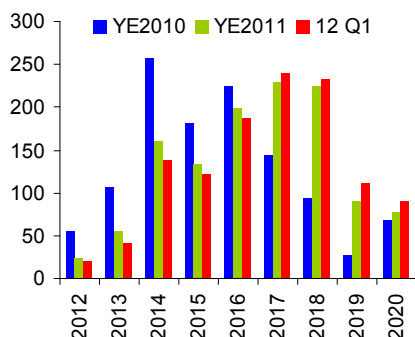
Forecasting GDP in extreme situations is, almost by definition, subject to quite a degree of error. Our base case is that progress on a resolution of the crisis is quite gradual but the disorderly tail-event seems ever closer. Therefore, we have chosen some severe recessionary scenarios in which we lower GDP a further 2%. This is quite severe, although not as severe as 2008, which is in line with historical W-shaped recessions where the second half is not as severe as the first.

**Figure 7. Severe Recession Scenario European Default Rate Forecast vs. GDP, (% , %)**



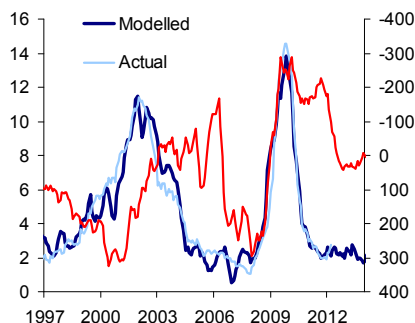
Source: CIRA, Moody's, Bloomberg

**Figure 8. Maturity Wall Pushed Back, \$bn**



Source: S&P LCD, CIRA

**Figure 9. Default Rate vs. Funding Gap, (% , %)**



Source: CIRA, Moody's, Bloomberg

## US

### Base case: US defaults to stay around 2.5% till the end of this year

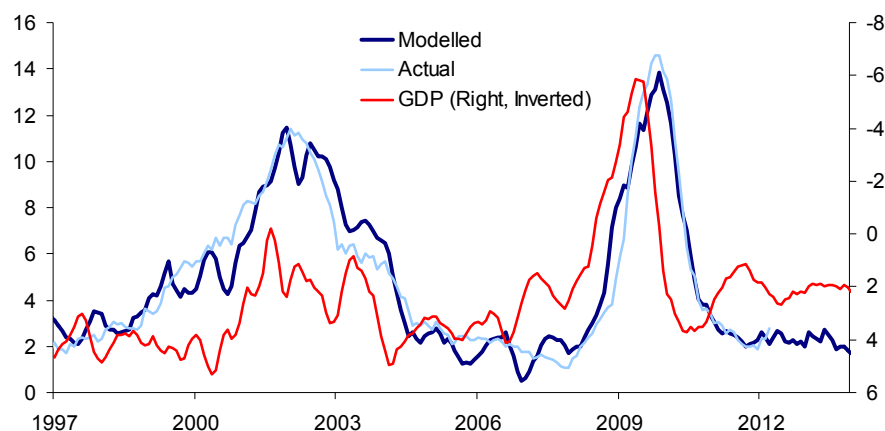
In contrast, we expect the US default rate to remain low into 2013. None of our key indicators is pointing to an increase in default rates. Lending surveys are back in negative territory and our economists' forecasts are for growth to continue.

As a result, we expect defaults will continue to exhibit many of the same trends we've witnessed over the past 1-2 years. Specifically, defaults will be idiosyncratic and affect credits across a number of sectors. Two factors we will be watching in the future are the legacy LBO balance sheets from the prior cycle and the depressed natural gas market. For the time being, however, the distressed LBOs are likely OK until early next year (at least) and most of the large companies negatively affected by low natural gas prices have sufficient near-term liquidity.

The 2013-14 maturity wall has caused some consternation among some market pundits. We believe much the concern is misplaced because US companies have pushed out their liabilities, taking advantage of the strong demand for high-yield product. That is not to say that defaults can't increase over the next 6-12 months.

First, companies often default for reasons other than impending maturities. Some of the high-profile defaults over the past few quarters (e.g. American, Dynegy) have surprised us in that the company had ample liquidity to continue operating. Instead, the companies seized an opportune time to implement their bankruptcy plans and didn't want to wait until bankruptcy was involuntary.

Figure 10. Default Rates vs. GDP, (%,%)

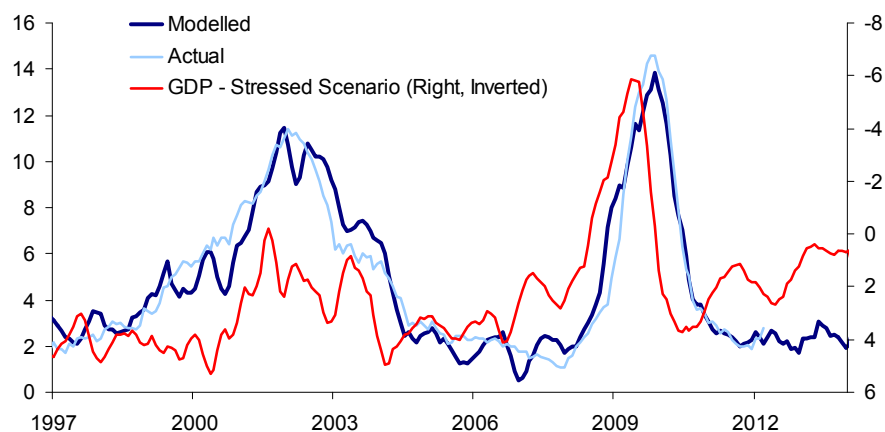


Source: Citi Investment Research and Analysis

### Stressed scenario: US defaults rise to 3.0% by May-2013

If 2013 US GDP were to fall to 2% – for example, in response to a European financial crisis – our model predicts the default rate would rise to 3% by May 2013.

Figure 11. Severe Recession Scenario US Default Rate Forecast vs. GDP, (%,%)



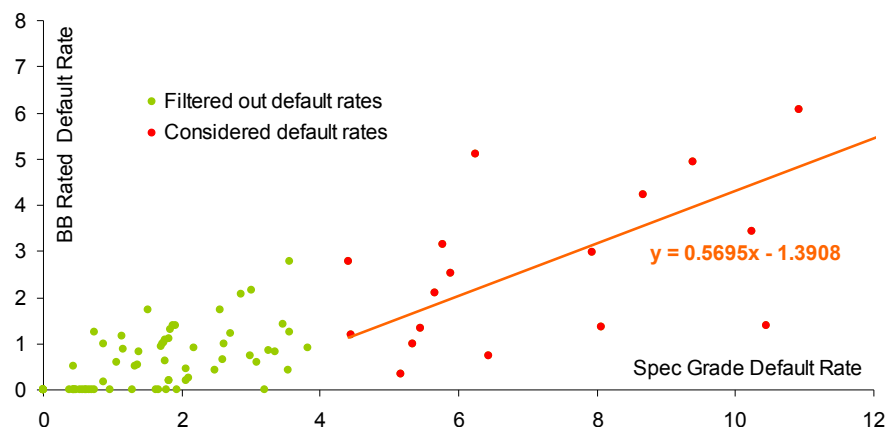
Source: CIRA, Moody's, Bloomberg

### Long-term forecasts

In "[From Vicious to Virtuous - Corporate Bond Forecasting](#)" (M Hampden-Turner, December 2009) we look at techniques for making longer term default and cumulative loss forecasts for portfolios and CDOs. The presentation also illustrates how, using a simple regression, we extrapolate default rate forecasts for different ratings from the speculative-grade default rate forecast.

There are some difficulties in understanding the relationship because of the small sample sets that such an analysis involves. Figure 12 is an example of how we establish a relationship between speculative grade default rates and BB corporate default rates. At times when the speculative grade default rate is very low (green dots), higher-rated default rates are in many instances zero. As a result, when modeling the relationship between different ratings and the speculative-grade default, these points can skew the slope of the relationship. In this section of the piece, we try to limit the effect of this by filtering out the points when the speculative-grade default rate is below 4% (green dots).

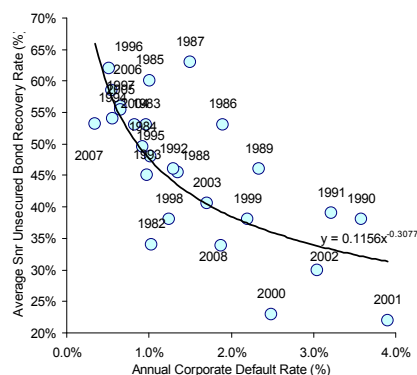
Figure 12. BB Rated Default Rate vs. Speculative Default Rate Modeling, (%,%)



Source: Moody's, CIRA

Figure 14 shows the results for our extrapolation from Figure 12 for all ratings. It illustrates the relationship of average default rates for different rated credits. In Figure 13, we illustrate how recovery rates can be estimated at different points in the default cycle. By combining these estimates, one can make cumulative portfolio loss estimates.

Figure 13. Estimating Recovery Rates,%



Source: Moody's

Figure 14. Extrapolation of Default Rates per Rating by End-2012 Using Long-Term Averages, %

Speculative Grade	AAA	AA	A	BBB	BB	B	CCC
1%	0.00100%	0.0100%	0.0135%	0.0704%	0.5695%	0.9713%	1.8439%
6%	0.006%	0.060%	0.081%	0.422%	3.416%	5.828%	11.064%

Source: Citi Investment Research and Analysis

## Appendix: Econometric Model and Factors Explained

Econometric models start from the assumption that historic correlations and relationships can be used to forecast future default rates. They assume that one economic cycle is similar to the next. Effective explanatory variables that anticipate future changes in default rates are critical. While we inevitably reality-check the model conclusions relative to our own bottom-up instincts, it is still reliant on the past being a good indicator for the future.

Having said this, the model has proved very accurate over the past four-and-a-half years without any major revision of explanatory variables. In fact, we've virtually used the same variables in our last five publications: December 2007 ([How high will Defaults rise in 2008?](#)), September 2009 ([How far will Defaults fall in 2010](#)), October 2010 ([Will Defaults keep falling in 2011?](#)), and July 2011 ([Default rates to trough in](#)

(late 2011). The variables are: GDP growth, the slope of the interest rate curve, the availability of credit and corporate funding requirements for the US and spread per unit of leverage for Europe.

Of these variables, access to credit is probably the most widespread for econometric models forecasting default rates, especially as default rates tend to lag moves in credit availability by about 12 months. We use the Fed's Lending Survey<sup>2</sup> in the US and the ECB's Lending Survey in Europe, which reflects the number of banks loosening or tightening their standards as a barometer of credit availability. When it is harder to borrow money, struggling companies are less likely to survive, reflecting both their own ability to roll over debts and the negative implications for the general macro-economic environment.

We use the S&P's "Spread per Unit of Leverage" as a useful explanatory variable. It is an indicator of both leverage in the system and the cost of that leverage. In the US we use the corporate funding gap. In a downturn, revenues suffer while costs remain high, creating a funding gap. A funding gap and tough borrowing conditions together are typically found in a period of high defaults. We use the Federal Reserve's seasonally adjusted Corporate Business Financing Gap.<sup>3</sup>

GDP is a key explanatory variable and we have incorporated our economists' forecasts for 2012. Their central scenario is for a recession in 2012 and well into 2013, reaching the biggest decline in Q3 2012. Our economists are more bearish than the market consensus and the increase in default rates is consistent with their forecasts as GDP is one of the more powerful explanatory variables in the model, as can be seen in Figure 4. Their base case forecasts are in Figure 15 as follows:

Figure 15. European and US GDP Forecasts YoY%

	2012				2013			
	Q1	Q2F	Q3F	Q4F	Q1F	Q2F	Q3F	Q4F
Europe	-0.5	-1%	-1.3%	-1.1%	-0.6%	-0.4%	-0.1%	N/A
US	2.2%	2.1%	2.2%	2.0%	1.7%	1.8%	2.0%	N/A

Source: CIRA

In Europe with only a single cycle to calibrate to, we use a conventional regression analysis. The lags and explanatory significance can be seen in Figure 4. More formally:

$$\text{DefaultRate}_t = \text{Lend}_{t-8} \times A + \text{GDP}_{t-6} \times B + \text{Euribor}_{t-13} \times C + \text{SPL}_{t-11} \times D + \text{constant}$$

Forecasting European default rates is difficult because of the shortage of historical data that can be used to calibrate models and the potentially atypical nature of a default cycle led by sovereign stress and strong market technicals originating from the liquidity injected by the ECB.

In the US, where there is more data, we are able to use Vector Autoregression (VAR) models to extend a conventional regression analysis by using multiple lag periods and multiple lag factors to forecast default rates. This allows us more flexibility and the ability to make longer-dated forecasts than lag periods permit.

<sup>2</sup> Net % of Domestic Respondents Tightening Standards - C&I Loans for Large/Medium

<sup>3</sup> FOF Corporate Businesses Financing Gap SA



## Forecasting using a VAR Model

In "[How far will Defaults fall in 2010](#)" (M Hampden-Turner, 18 September 2009) we introduced our Vector AutoRegressive ('VAR') model in its current form. As the model has performed well, we have decided not to change the lags or the key explanatory variables: the Fed lending survey ('Lend'), GDP ('GDP') and the corporate funding gap ('Fund'). We also haven't included as much detail as before so please revisit our previous forecasts if you are interested in learning more about the model.

A VAR model is similar in principle to the simple regression we use to forecast European default rates. The VAR model extends the regression analysis by using multiple lag periods and multiple lag factors to forecast default rates. The model also forecasts all the explanatory variables which enable an extension of the forecast beyond the scope of the shortest-lagging variable. More formally:

$$\begin{aligned} \text{Defaultrate}_t = & \text{defaultrate}_{t-4} \times A1 + \text{defaultrate}_{t-8} \times A2 + \text{defaultrate}_{t-12} \times A3 + \text{defaultrate}_{t-24} \times A4 + \\ & \text{Lend}_{t-4} \times B1 + \text{Lend}_{t-8} \times B2 + \text{Lend}_{t-12} \times B3 + \text{Lend}_{t-24} \times B4 + \\ & \text{GDP}_{t-4} \times C1 + \text{GDP}_{t-8} \times C2 + \text{GDP}_{t-12} \times C3 + \text{GDP}_{t-24} \times C4 + \\ & \text{Fund}_{t-4} \times D1 + \text{Fund}_{t-8} \times D2 + \text{Fund}_{t-12} \times D3 + \text{Fund}_{t-24} \times D4 + \text{constant} \end{aligned}$$

All other explanatory variables are similarly modeled. For example:

$$\begin{aligned} \text{Lend}_t = & \text{defaultrate}_{t-4} \times E1 + \text{defaultrate}_{t-8} \times E2 + \text{defaultrate}_{t-12} \times E3 + \text{defaultrate}_{t-24} \times E4 + \\ & \text{Lend}_{t-4} \times F1 + \text{Lend}_{t-8} \times F2 + \text{Lend}_{t-12} \times F3 + \text{Lend}_{t-24} \times F4 + \\ & \text{GDP}_{t-4} \times G1 + \text{GDP}_{t-8} \times G2 + \text{GDP}_{t-12} \times G3 + \text{GDP}_{t-24} \times G4 + \\ & \text{Fund}_{t-4} \times H1 + \text{Fund}_{t-8} \times H2 + \text{Fund}_{t-12} \times H3 + \text{Fund}_{t-24} \times H4 + \text{constant} \end{aligned}$$

...and so on

As with simple regression models, a residual solver technique is used to find values for our A1, A2 ...H1, H2 etc variables such that we get the best fit to actual observed values.

Although this creates a large number of variables to solve for, we now have a powerful tool with which to forecast both the default rates and all the other explanatory variables. The fit is reasonable with an  $R^2$  of 95%.

## Notes

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## **Notes**

## Appendix A-1

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