

# Prosper: at the cutting edge of CPPI

Barclays Capital has great results with constant proportion portfolio insurance

**T**he hedging technique known as constant proportion portfolio insurance (CPPI) is now well established as an alternative to the traditional zero-coupon bond plus call option structure. Barclays Capital has been at the forefront of CPPI's development and is now selling the next generation of the increasingly popular product.

CPPI-based structures are based on managing the balance of assets between the risky assets (typically some form of equity underlying) and the riskless assets (typically a zero-coupon bond, in the case of traditional CPPI). This mix of assets is usually managed on a daily basis by rebalancing the risky and riskless components.

"CPPI is quite simply an incredibly sensible way to run money," says David Stuff, head of UK investor solutions at Barclays Capital in London.

CPPI offers a degree of accuracy in terms of risk and return, flexibility, transparency and a level of performance that traditional structures simply cannot match, says Stuff. "CPPI lets you maximise the investment exposure that you have according to the risks you stipulated in the first place."

Take the example of wanting to guarantee a \$100 investment in five year's time. Using the traditional technique, a capital guarantee provider would have to invest around \$80 today (depending on the interest rate used) in a bond that pays no coupons – and is therefore called zero-coupon – but will instead grow to be \$100 in five year's time. This is a traditional capital guarantee structure. Here, from a \$100 investment, \$20 is left over to invest in risky assets with a potentially high upside, such as equity call options. At maturity, the investment is guaranteed to pay out a minimum of \$100, but could pay out more if the equity investment performs well. The important point to remember is that this is a static technique done on a fixed investment horizon, in this case five years. CPPI, by contrast, is a dynamic technique that, although traditionally also done for a fixed term, can now be done by Barclays Capital on an open-ended basis.

"But what if I were able to adjust my allocation between the risky and riskless assets on a daily basis?" asks Stuff. "I know that if I have \$20 in equities and those equity investments fell to zero then I would still be able to meet my guarantee. But what are the chances of that happening in one day? If I could adjust my allocation on a daily basis then wouldn't it make sense to commit more of the capital to the risky asset, because the chances of it falling to zero in such a short time are so small?"

This is the essence of CPPI. Because it is dynamic, a capital guaranteed product can be issued with higher exposure to risky assets than could be provided with the traditional zero-coupon bond structure, as Stuff explains

using the same example of a \$100 investment: "Let's say the worst result I think I might have is that the equity investment could half in value overnight. In this case I might then put \$40 into equities and have \$60 invested as cash. If, come tomorrow, the equities have in fact halved in value, then my investment overall would now be worth \$80 (\$60 in cash plus half of \$40). If this happens, using CPPI we would sell that remaining \$20 investment in equities and re-allocate the proceeds to the cash side. So, with no more exposure to equities and with \$80 invested in cash, we can still meet the guarantee."

The dynamic allocation process is done by daily calculation of some key numbers, essentially the net-asset-value (NAV) of the overall investment and the present value (PV) of the capital guarantee. The difference between these two numbers is called the 'cushion', and the overall exposure to the risky asset on any one day is a multiple of this. "It's a very straight forward process. And the golden rules are that every day you calculate where your NAV is, what the PV of your guarantee is, and from that you get your cushion and assign your multiplier," says Stuff.

Taking the example once again of a \$100 investment, let's say that on a particular day the cushion is \$20 and Barclays Capital, in making a value judgment on what the multiplier should be, decides the exposure to risky assets can be three times this. That means \$60 of the overall investment would be exposed to the risky asset with \$40 remaining in cash. "The risky asset could then fall by a third and there would still be enough money in the risky asset to switch what is left completely into cash so the full guarantee is maintained," says Stuff. One of the main benefits of CPPI is that it reduces volatility and smoothes returns without the use of options. It should be noted, however, that if the value of the risky asset does start to fall so that the allocations are rebalanced more in favour of the cash component, then, in the case of traditional CPPI, the growth in the risky asset needs to be greater than the growth in the value of the guarantee, in order to rebuild the exposure to the risky asset. In the extreme case of a market collapse such that all the investment ends up as cash, the investment will never again offer any exposure to the risky asset. This is necessary to ensure that the guarantee is hit. This highlights one of the key considerations in respect of traditional CPPI structures: an assigned multiplier that is too high may allow one to market the product with a higher allocation to the risky asset, but this comes at the risk of increased potential for the assets to end up in cash (the term for this being 'cash-locked').

CPPI as it was originally conceived therefore has its drawbacks. Another

**How Prosper works: an example**

The figures provide a demonstration of how Prosper works.

Prosper is set up so that:

The NAV is 100p

The guaranteed minimum value is 80% of the highest ever NAV

The multiplier is three

**How does Prosper work? Day 1**

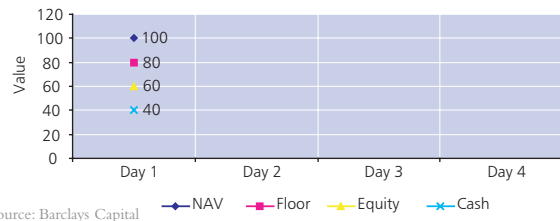
Rule 1: Initial guaranteed minimum value is 80p

Rule 2: The initial allocation is

Equity: cushion x multiplier =  $(100p - 80p) \times 3 = 60p$

Cash:  $100p - \text{equity} = 40p$

On Day 1 there has been a dramatic increase in the equity value: equity is up to 65, so the closing NAV was 105p. Note from Figure 2, the equity exposure is still 60% of the NAV and cash is still 40% of the NAV.

**How does Prosper work? Day 2**

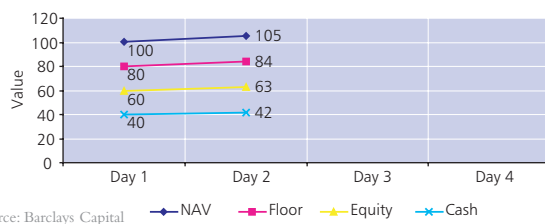
Rule1: The guaranteed minimum value is increased to 84p.

Rule2: Then the Day 2 allocation is:

Equity: cushion x 3 =  $(105p - 84p) \times 3 = 63p$

Cash:  $105p - \text{equity} = 42p$

On Day 2 there has been another dramatic increase in the equity value: equity is up from 63p to 75p, so the closing NAV was 117p. Note from Figure 3, equity exposure is still 60% of the NAV and cash still 40%.



limitation is the fact that in order to set daily PV rates, traditional CPPI requires investment for a fixed term. However, Barclays Capital has innovated to produce an open-ended version of CPPI that is not constrained by these factors. Called 'Prosper' (perpetual rolling open structure protecting equity returns), the technology guarantees a value tomorrow rather than at the end of a fixed term.

The difference between traditional CPPI and Prosper is that rather than setting the cushion as the difference between the NAV of the investment

**How does Prosper work? Day 3**

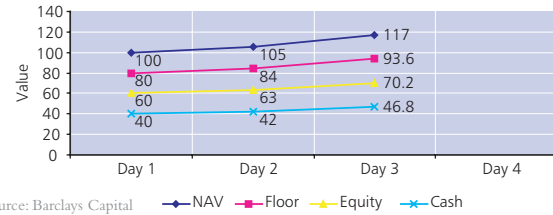
Rule 1: The guaranteed minimum value is increased to 93.6p.

Rule 2: Then the Day 3 allocation is:

Equity: cushion x 3 =  $(117p - 93.6p) \times 3 = 70.2p$

Cash:  $117p - \text{equity} = 46.8p$

On Day 3, there is a fall in the equity value: equity falls from 70.2p to 60p, so the closing NAV was 106.8p. Note from Figure 4, the equity exposure has been cut to 37% of the NAV. Cash has been increased to 63% of the NAV.

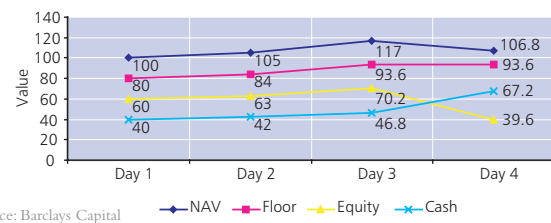
**How does Prosper work? Day 4**

Rule 1: The guaranteed minimum value is maintained at 93.6p

Rule 2: Then the Day 4 allocation is:

Equity: cushion x 3 =  $(106.8p - 93.6p) \times 3 = 39.6p$

Cash:  $106.8p - \text{equity} = 67.2p$



and the PV of the cash component, it is set as the difference between the NAV and a prescribed guaranteed minimum value, which is a percentage of the highest ever NAV. As with traditional CPPI, if equity markets start to fall then equity exposure is reduced in favour of cash, but importantly, any earlier gains made are locked in. Furthermore, unlike traditional CPPI, Prosper can recover from a position of having little or no equity exposure. If all of the assets end up in cash then any interest earned will increase the cushion, which will then support increased equity exposure.

Zurich Financial Services was the first institution to bring Prosper to market in February 2003 with their Protected Profits fund. Since then the concept has steadily won more adherents, with Barclays Capital leading the way in product structuring and innovation. But it has a range of uses, and Barclays Capital continues to develop the concept. Says Stuff: "We're exploring all sorts of institutional applications for Prosper in terms of how it can be incorporated within a liability-driven investment strategy."

As demonstrated by Prosper, Barclays Capital has proven itself a leading innovator when it comes to CPPI technology. The technique will undoubtedly win more adherents, and as it does so Barclays Capital's ability in the area will continue to go from strength to strength. ●