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A haircut every year

By Thomas Colignatus

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Governments in the European Union suffer under high rates of interest. Components of interest are: (1) the risk free rate like Germany has; (2) the liquidity premium that we can determine from, say, the difference between Germany and Holland or Finland; (3) the risk of default that applies to Greece; and (4) stigma that consists of irrational factors that become rational since they are rewarded. Thomas Colignatus¹ suggests a new rule helps to reduce (4) and to prevent it developing into (3).

In October 2011, ten year bonds in the EU had widely different rates of interest. Germany paid 2 per cent while the ECB recorded 18 per cent for Greece. The 2 per cent can be regarded as the market risk free rate and the difference of 16 per cent covers liquidity, true default risk and stigma. As Delbecque (2011) explains, an important distinction is between existing debt (solvency) and new debt (liquidity). The following mechanism gives a rule for managing new debt when fear for a default starts to feed on itself and turns into stigma. See Colignatus (2011) for a longer discussion and references.

The solution lies in comparing a bullet loan with an annuity. Part of an annuity is redemption. Thus an investor can feel safe that already part of the loan is paid back during the life of the loan. Putting hairs back is of course different from cutting hairs but financially it remains a sound way to deal with the risk of default. Investors can keep portfolios of annuities of different dates and thus build up an average level of cash redemption over time as a way to insure themselves. The problem in the EU arises when bullet bonds are used where annuities are advisable. Bullet bonds carry only annual interest while the principal is only redeemed at maturity. A haircut on a bullet seems like a breach of contract. This however need not be the case financially if we consider the mathematics involved.

The idea is to have a regime ladder too. For Debt/GDP \leq 80 per cent bullet bonds can be used. For 80 per cent $<$ Debt/GDP \leq 90 per cent annuity schemes are used and there is insurance support from a common regulator to suppress stigma and to enforce the common risk free rate. For Debt/GDP $>$ 90 per cent there is no support and full defaults may happen.

The following formula gives the remaining debt in an annuity scheme with annual payment p , number of paid payments n , principal w and rate of interest r , say for $n = 3$. The formula can be understood as borrowing a perpetuity value p / r and putting a part, $p / r - w$, into an account earning interest.

$$\text{remainder} = \frac{p}{r} - (1+r)^3 \left(\frac{p}{r} - w \right)$$

Consider a bullet loan that after three years is hit by a haircut h on the principal w :

$$\text{present value} = \frac{p}{1+r} + \frac{p}{(1+r)^2} + \frac{p + (1-h)w}{(1+r)^3}$$

Taking these remainders as the same we can calculate h from the other values. Our prime conclusion: the haircut on a bullet scheme can be seen as redemption in an annuity scheme.

Assume a bond with principal 100 per cent ($w = 1$). Germany would have $r = 2$ per cent and $b = 2$ per cent so that no haircut is feasible and $h = 0$. Greece has a liquidity premium so that $r = 2.25$ per cent. The value $b = 18$ per cent for Greece comes from a somewhat curious calculation by the ECB. The ECB uses current market value X of old debt and then calculates the yield or internal rate of return, using the formula of a bullet loan under the assumption that there will be no haircut. The current value X , however, comes from markets that use a 'probability' of a haircut. The mismatch in formulas and choice of the risk free rate is removed by interpreting the 18 per cent as a term in an annuity scheme that partly contains redemption.

If Greece indeed pays 18 per cent on a new bullet loan, and doesn't give a haircut, then there will be excessive profit taking by investors. The only way that Greece could conform to market expectations is to have a default indeed, though governments aren't supposed to default. The whole situation is a conundrum.

The current problem is not just risk of default but also that the Treaty of Maastricht was not built for the market processes on stigma. This is probably best resolved by the regime ladder.

Notes

1. <http://www.dataweb.nl/~cool> - Colignatus is the science name of Thomas Cool, an econometrician in Scheveningen, Holland.

References

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