

Run risk in Money Market Funds

“This paper suggests that whilst there are theoretical differences between CNAV and VNAV funds, for all practical purposes they behave in the same way during normal markets and during periods of market stress, and neither shows more propensity towards runs than the other.”

3 November 2011

There is no meaningful economic difference between CNAV and VNAV funds, and neither fund is more prone to runs than the other

Summary

Since 2008, regulators and industry participants have been debating how to improve the soundness and continued viability of money market funds (MMFs¹). That debate has largely focussed on how to reduce 'run risk', i.e. the risk of large and systemically consequential redemptions from MMFs.

Some participants have proposed that constant net asset value MMFs (CNAV funds) pose greater run risk than variable net asset value MMFs (VNAV funds) and therefore recommend CNAV funds should be required to adopt a variable net asset value.

In this paper we assess that proposal by comparing the experience of US and European CNAV funds with French VNAV funds during the financial crisis.

In the interest of transparency, please note that HSBC Global Asset Management manages US and European CNAV funds, and French VNAV funds (and, indeed, MMFs domiciled in other countries around the world, which have a variety of pricing structures).

In summary, we find that from an investor's perspective, there is no meaningful economic difference between CNAV and VNAV funds, and neither fund is more prone to runs than the other. Therefore, we recommend that regulators consider alternative proposals for reducing run risk. As we have written in our paper "Liquidity fees – a proposal for MMF reform", we believe that run risk is best mitigated by empowering MMFs to impose a liquidity fee on redemptions during periods of market dislocation.

However, we do find that 'enhanced cash' funds pose greater run risk than regular MMFs. Therefore, we recommend that regulators should seek to agree a narrow, international definition of a MMF, and should prohibit any fund that is not a MMF from using expressions such as 'money market', 'cash', or 'liquidity' in its name. That would help to reduce 'contagion risk', i.e. the risk that runs from enhanced cash funds, could lead to runs from regular MMFs.

In the remaining part of this paper, we answer the following questions:

1. What are the theoretical differences between CNAV and VNAV funds?
2. What are the practical differences between CNAV and VNAV funds?
3. What causes investors to run from MMFs?

The share price of a VNAV fund ought (in theory) to be more variable than the share price of a CNAV fund, i.e. the capital component of the share price ought to fluctuate

1. What are the theoretical differences between CNAV and VNAV funds?

The expressions 'CNAV' and 'VNAV' are somewhat misleading, and therefore remain poorly understood. CNAV is often supposed to refer to a MMF that makes a promise or commitment to provide security of capital, whereas VNAV is often supposed to refer to a MMF whose share price regularly fluctuates in proportion to the market value of its underlying portfolio. Neither supposition is correct.

In an Appendix to this paper, we provide a detailed description of differences in the pricing mechanism of CNAV and VNAV funds. It shows that CNAV and VNAV funds have much more in common than is often thought. Both use amortised accounting to estimate market prices, although subject to different constraints. And both can offer accumulating and distributing shares, which can impact investors' impression of constancy and variability in the share price.

¹For the purposes of this paper, a MMF is defined as an investment fund, whose objective is to provide investors with security of capital and daily liquidity, and which seeks to achieve that objective by investing in a diversified portfolio of high quality, low duration money market instruments.

US-domiciled MMFs are regulated by Rule 2a-7 of the Investment Company Act of 1940. Rule 2a-7 imposes detailed obligations on MMFs.

EU-domiciled MMFs are regulated, at a European level, by the Undertakings for Collective Investments in Transferable Securities Directives (UCITS Directives). The UCITS Directives are broad pieces of legislation, which do not impose detailed obligations on MMFs, equivalent to Rule 2a-7. Therefore, in 2010, the Committee of European Securities Regulators (CESR, now succeeded by the European Securities and Markets Authority, ESMA) issued guidelines which sought to define MMFs more closely. However, CESR's definition of a 'short term' MMF remains significantly less detailed than Rule 2a-7, and envisages MMFs with both a constant and a variable NAV per share.

In the absence of a European definition of MMFs that is as detailed as Rule 2a-7, the Institutional Money Market Funds Association (IMMFA) maintains a Code of Practice, which is binding on its Members, and imposes obligations equivalent to 2a-7 on their EU-domiciled funds. In addition, certain Member States of the European Union impose detailed obligations on locally-domiciled MMFs, notably in France in relation to 'monétaire funds'.

Notwithstanding these similarities, the share price of a VNAV fund ought (in theory) to be more variable than the share price of a CNAV fund, i.e. the capital component of the share price ought to fluctuate. For that reason, it has been proposed that CNAV funds may be more prone to runs than VNAV funds. For example, in the USA the President's Working Group on Money Market Fund Reform has written²:

"[CNAV funds could have]... fostered investors' expectations that MMF shares are risk-free cash equivalents. When the Reserve Primary Fund failed to maintain those expectations in September 2008, the sudden loss of investor confidence helped precipitate a generalized run on MMFs.

By making gains and losses a regular occurrence, as they are in other mutual funds... [VNAV funds] could alter investor expectations and make clear that MMFs are not risk-free vehicles. Thus, investors might become more accustomed to and tolerant of NAV fluctuations and less prone to sudden, destabilizing reactions in the face of even modest losses."

Similarly, in France the Autorité des Marchés Financiers (AMF) has been critical of CNAV funds³. The AMF's position is particularly significant given its long experience of regulating a domestic VNAV MMF industry:

"The financial crisis has highlighted the systemic nature of money market funds. New regulation enacted in the US and in Europe now enables some risks to be mitigated, but the possibility of runs on these funds can not be ignored especially for Constant Net Asset Value (CNAV) funds. Moreover, Basle III implementation will lead banks to look more intensively for client deposits, at the expense of money market funds. These developments can have significant consequences for the fund management industry and for the short term financing of the economy."
(Translated from original French text)

What, then, are the practical differences between CNAV and VNAV funds, and do VNAV funds actually pose greater run risk?

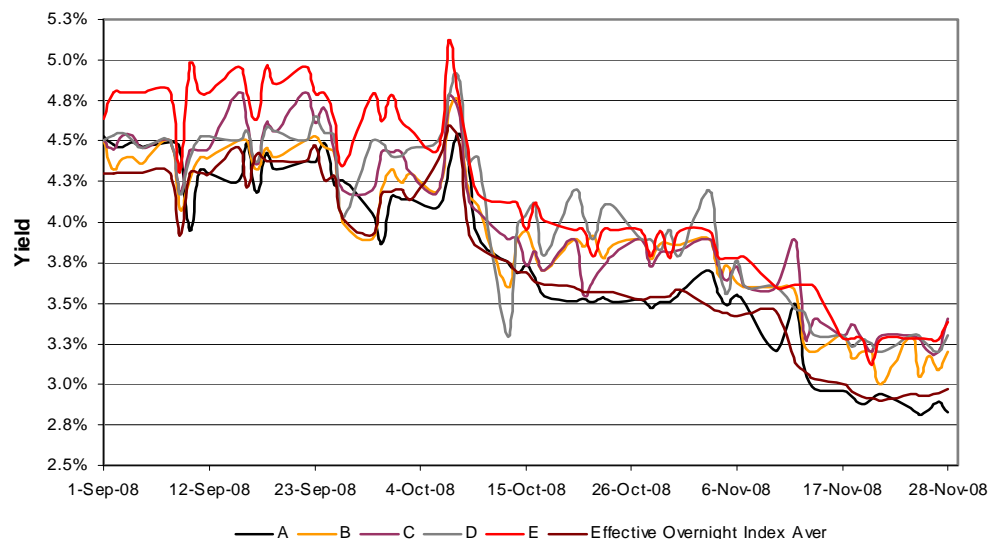
Only one of the VNAV funds in our sample posted a negative return over the last 5 years and both CNAV and VNAV funds experienced runs during the credit crisis

2. What are the practical differences between CNAV and VNAV funds?

From an investors perspective, is there any economic difference between an investment in a CNAV and VNAV fund?

We have sought to answer that question by looking at the actual variability of the share price of VNAV funds. Since the most developed market for VNAV funds is in France, we have looked at the share prices of six of the largest French VNAV 'monétaire' funds (as at June 2007) over a ten year period (from January 1999 to September 2009). Since these funds only offer accumulating shares, we assessed the variability of their share price by looking at the daily yield of the fund; a negative yield implies that the day's accumulation of income was more than offset by a mark-to-market loss. We estimated the daily yield by comparing the accumulated share price from one day to the next, and making adjustments for accumulations over weekends and Bank Holidays.

In the case of five of those six funds, at *no point* during the ten year period did they post a negative yield, i.e. daily mark-to-market losses were never substantial enough to cause the price of the funds to fall. This includes the period between September and November 2008 illustrated below, when markets were significantly dislocated. In other words, from an investor's perspective, these funds behaved much the same as if they were CNAV.



Source: Bloomberg

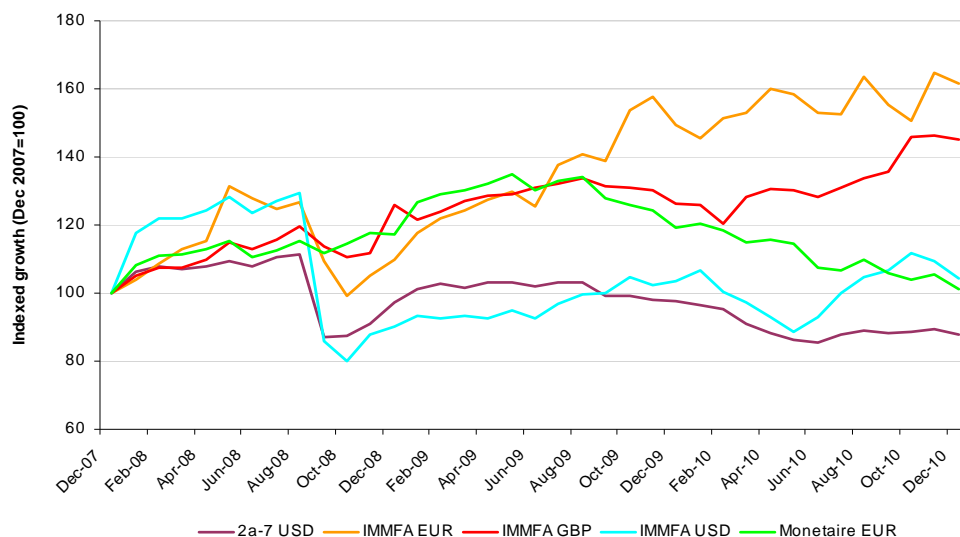
² <http://www.treasury.gov/press-center/press-releases/Documents/10.21%20PWG%20Report%20Final.pdf>

³ See also http://www.amf-france.org/documents/general/9998_1.pdf

We also sought to assess whether CNAV funds posed greater run risk than VNAV funds, by comparing fund flows between 2008-2010. For the purpose of our analysis, CNAV funds comprised: 2a-7 prime funds; IMMFA USD funds; IMMFA EUR funds; and IMMFA GBP funds. VNAV funds comprised French monétaire funds.

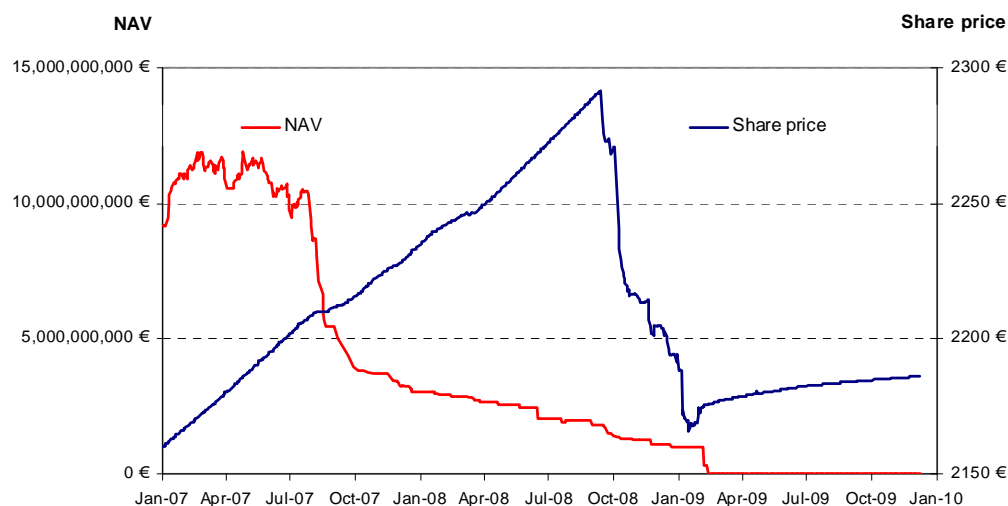
We found that in 2008, run risk appears to be correlated by currency rather than by pricing mechanism: USD denominated MMFs suffered runs, whereas EUR and GBP denominated MMFs funds did not.

MMF indexed asset growth 2007-2010



Source: iMoneynet, Europerformance

Furthermore, neither did we find that investors are more sanguine to losses in VNAV than CNAV MMFs. Of the six French VNAV monétaire funds we surveyed, one did post a negative yield in September 2008. Investors largely redeemed from that fund in the year before the decline in its share price, and what few shareholders remained in the fund redeemed after the decline in its share price. Either way, this fund clearly experienced a run notwithstanding that it was a VNAV fund.



Source: Bloomberg

In conclusion, we cannot find any evidence for the argument that there are substantial differences between CNAV and VNAV funds, which cause CNAV funds to be more prone to run risk than VNAV funds.

Investors are likely to run from a MMF if they have reason to believe it will fail to maintain principal value regardless of a funds moniker

3. What causes investors to run from MMFs?

The proposal to require CNAV funds to adopt a variable NAV is premised on VNAV funds being less susceptible to run risk. But why do investors run from MMFs?

In order to answer that question, one needs to understand (a) why investors subscribe to MMFs in the first place and (b) when they run, where they run to.

Investors subscribe to MMFs in order to manage credit risk, as described by the Institutional Money Market Funds Association (IMMFA):

“The cash assets of many investors (including, in particular, institutional investors such as corporate treasurers) are in excess of the amount guaranteed by deposit insurance schemes. Therefore, the deposits of such investors are exposed to the credit risk of their deposit bank.

Most institutional investors manage that credit risk by only depositing with an approved panel of banks, and up to an approved limit. Those approvals are set out in a ‘treasury policy’, and enable an institutional investor to preserve capital through diversification amongst strong counterparty credits. But there are resource constraints on the amount of diversification that an institutional investor can achieve on its own, including: credit resources (to distinguish relatively strong from relatively weak banks) and operational resources (to match the term of fixed deposits with the investors cash flow needs, and to roll those deposits). For many institutional investors, it makes sense to ‘outsource’ those credit and operational tasks via a MMF...

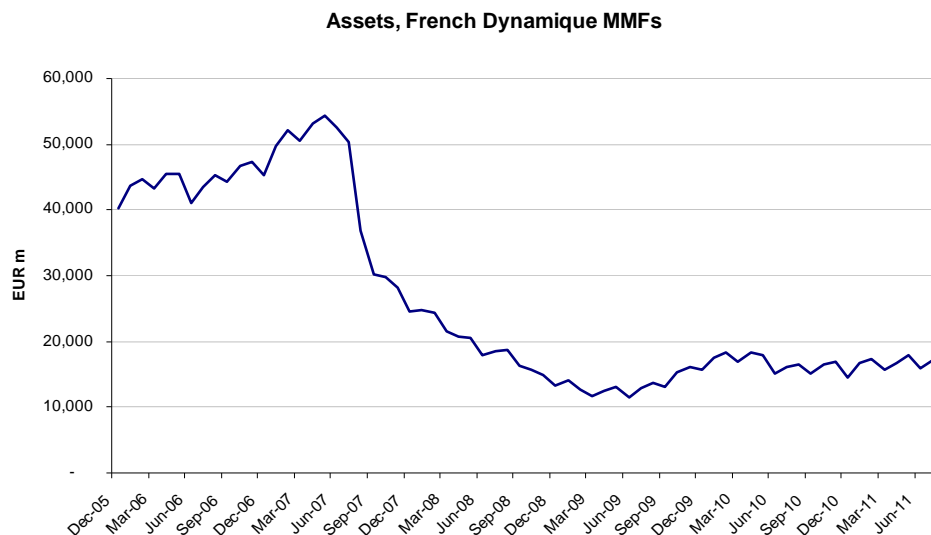
In summary, then, MMFs are used by investors – and in particular by institutional investors – to meet their legitimate need to manage credit risk through diversification.”⁴

Whilst there is no guarantee that investors in a MMF will avoid losses, that is clearly their preferred outcome.

On this account, investors are likely to run from a MMF if they have reason to believe it will fail to maintain principal value. Since MMFs invest the substantial part of their assets in banks, and since banks were under extraordinary stress in September 2008 - particularly in the USA - investors redeemed for fear of suffering a credit loss.

In our opinion, it is implausible to suppose that investors would have been less likely to redeem if they have been normalised to the risk of loss by investing in a VNAV fund – and, for these purposes, let us assume a ‘true’ VNAV fund, i.e. whose share price, net of accumulated income, regularly fluctuates above and below par.

This can be seen in the runs experienced by ‘enhanced cash’ funds in 2007 and 2008. Enhanced cash funds take greater credit and/or duration risk than regular MMFs in exchange for greater yield, i.e. in principle, investors accept a greater risk of loss in exchange for higher long run returns. But in practice, when losses actually arise (i.e. when the share price becomes volatile, or in anticipation of such volatility) investors in enhanced cash funds tend to redeem. For example, and in the case of French dynamique funds:



Source: Europerformance

⁴ <http://www.immfa.org/press/responseFSB.pdf>

Investors' aversion to losses is also evidenced when one considers where they run to. Again, IMMFA's observations are helpful:

"It is also worth noting that a material amount of the money redeemed from prime 2a-7 MMFs was reinvested in treasury 2a-7 MMFs. In other words, there wasn't a run from MMFs per se; rather investors sought to 'switch' their exposure from prime MMFs to treasury MMFs."

This supports the observation that investors are highly risk averse: when they run, they reinvest their proceeds in – what they perceive to be – less risky assets, in the hope of avoiding losses. So, again, the supposition that they would be less likely to run if they had been normalised such losses seems doubtful, to say the least. Indeed, price fluctuations in a 'true' VNAV fund are likely to act as a signal to investors to redeem – particularly during a financial crisis.

Both CNAV and VNAV funds are susceptible to runs which are best managed by empowering MMFs to impose a liquidity fee on redemptions

Conclusion

We draw two conclusions:

- ▶ First, since there is no evidence to support the argument that CNAV funds are more susceptible to run risk than VNAV funds, regulators should consider alternative proposals for reducing run risk than requiring CNAV funds to float their NAV. As we have written in our paper "Liquidity fees – a proposal for MMF reform", we believe that run risk is best mitigated by empowering MMFs to impose a liquidity fee on redemptions during periods of market dislocation. Whereas movements in the share price of a 'true' VNAV fund would act as a signal to redeem, a liquidity fee would impose a cost on that redemption and so would directly disincentivise unnecessary redemptions.
- ▶ Second, since investors in MMFs and enhanced cash funds are ultimately both risk averse, and since enhanced cash funds are necessarily more risky than MMFs, it follows that enhanced cash funds pose greater run risk than MMFs. Therefore, we recommend that regulators should seek to agree a narrow, international definition of a MMF, and should prohibit any fund that is not a MMF from using expressions such as 'money market', 'cash', and 'liquidity' in its name. That would help to reduce the risk of runs from enhanced cash funds contaminating MMFs by association.

Contacts

Jonathan Curry
jonathan.curry@hsbc.com
+44 (0) 20 7992 1678

Chris Cheetham
chris.s.cheetham@hsbc.com
+44 (0) 20 7204 0179

Travis Barker
travis.barker@hsbc.com
+44 (0) 20 7204 0905

APPENDIX

The pricing mechanism of CNAV and VNAV funds

We draw two conclusions:

In most respects, CNAV and VNAV funds are indistinguishable. Both are collective investment schemes, whose objective is to provide investors with security of capital and high levels of liquidity, and which seek to achieve that objective by managing a portfolio of high quality, low duration money market instruments. There is no guarantee they will achieve that objective, and so investors in either fund face a number of risks, including the risk of loss due to default in a fund's portfolio.

However, there are differences in the way those funds price their shares and value their portfolio, which has given rise to a convention of distinguishing 'CNAV' funds from 'VNAV' funds. Those differences comprise:

- ▶ Differences in share price rounding;
- ▶ Differences in the use of amortised accounting; and
- ▶ The impact of accumulating and distributing shares.

Differences in share price rounding

Like any other investment fund, the share price of a MMF is calculated by dividing its net asset value by the number of shares in issue: therefore increases or decreases in the net asset value of the fund, will cause increases or decreases in its share price. The precise relationship between the net asset value and the share price of a fund is determined by the degrees of significance to which its shares are priced. This is best illustrated by way of example.

Assume at T1 a newly formed MMF issues 100m shares upon receipt of an initial subscription of EUR100m, and invests the subscription in a diversified portfolio of short term, high quality money market instruments. Assume the NAV of the fund changes over time as shown below. Assume the fund receives no further subscriptions or redemptions during that period, and ignore income and expenses. Then depending on whether the fund prices its shares to six, four or two decimal places, and assuming they round to the nearest number, then they would increase/decrease as follows:

	NAV	6dps	4dps	2dps
T1	100,000,000	1.000000	1.0000	1.00
T2	99,999,990	1.000000	1.0000	1.00
T3	99,999,950	0.999999	1.0000	1.00
T4	99,995,000	0.999950	0.9999	1.00
T5	99,500,000	0.995000	0.9950	0.99

CNAV funds price their shares to two decimal places – a practice known as 'penny rounding'. As can be seen from the above example, penny rounded shares are sensitive to movements in the funds' NAV of 0.5% (or 50bps). Because it is rare for the NAV of a MMF to move by as much as 50bps, the share price of a CNAV fund tends to remain constant, hence the description of the fund as tending to have a 'constant' NAV. CNAV funds that fail to maintain a constant price are described as having 'broken the buck', as occurs at T5.

VNAV funds price their shares to more than two decimal places, and for that reason are more sensitive to movements in the funds' NAV. As can be seen from the above example, each additional decimal place causes a ten-fold increase in the sensitivity of the share price to changes in the NAV. This increased sensitivity means that the share price of a VNAV fund tends to be more variable.

In the case of both CNAV and VNAV funds, the tendency of their shares to be constant or variable depends on movements in the NAV.

Differences in the use of amortised accounting

Like any other investment fund, the NAV of a MMF is calculated on the basis of the mark-to-market value of its portfolio, which comprises high quality, short dated money market instruments. As money market instrument edge toward maturity, there is little-to-no profit to be made from trading them, and are largely held to maturity. Consequently, whereas equity and fixed income markets provide a wealth of mark-to-market prices, money markets do not. The lack of market prices is more pronounced in Sterling markets than Euro markets, and in Euro markets than US Dollar markets.

In the absence of regular and reliable mark-to-market prices, MMFs make use of 'amortised accounting' to estimate market prices. Amortised accounting assumes that money market instruments will mature at par, and any difference between their acquisition cost and par value should be realised on a straight-line basis between acquisition and maturity.

Amortised accounting generally produces a reasonable estimate of market price, except in two circumstances:

- ▶ First, sudden movements in interest rates can cause changes in the market price of money market instruments. MMFs manage interest rate risk by limiting the weighted average maturity (WAM, calculated as the weighted average interest rate reset period) of their portfolio and/or by using interest rate swaps to neutralise the impact of movements in interest rates on the market price of their portfolio.
- ▶ Second, changes in the credit quality – or the perceived credit quality - of issuers can result in changes in the market price of instruments they have issued. MMFs manage credit risk by employing credit analysts to distinguish relatively strong from relatively weak issuers. In addition, MMFs limit the weighted average life (WAL, calculated as the weighted average legal maturity) of their portfolio, and the final legal maturity of each instrument. By limiting their portfolio to instruments with a very short legal maturity, it is more likely that MMFs' holdings will mature at par – unlike investors who have longer-dated holdings, and are more fully exposed to credit risk. (This is the basis on which ratings agents distinguish short-term from long-term credit ratings.)

Notwithstanding their best efforts to manage interest rate and credit risk, there remains a risk that amortised price may not be an accurate estimate of market price. Therefore, the use of amortised accounting is conditional. For example, CESR's Guidelines Concerning Eligible Assets for Investment by UCITS says:

With respect to the criterion "value which can be accurately determined at any time", if the UCITS considers that an amortization method can be used to assess the value of a MMI [Money Market instrument], it must ensure that this will not result in a material discrepancy between the value of the MMI and the value calculated according to the amortization method. The following UCITS/MMI will usually comply with the latter principles:

- ▶ *MMI with a residual maturity of less than three months and with no specific sensitivity to market parameters, including credit risk; or*
- ▶ *UCITS investing solely in high-quality instruments with as a general rule a maturity or residual maturity of at most 397 days or regular yield adjustments in line with the maturities mentioned before and with a weighted average maturity of 60 days. The requirement that the instruments be high-quality instruments should be adequately monitored, taking into account both the credit risk and the final maturity of the instrument.*

These principles along with adequate procedures defined by the UCITS should avoid the situation where discrepancies between the value of the MMI as defined at Level 2 and the value calculated according to the amortization method would become material, whether at the individual MMI or at the UCITS level. These procedures might include updating the credit spread of the issuer or selling the MMI.

The first bullet in CESR's Guidelines accommodates the pricing practices of French VNAV funds, which apply amortised accounting to instruments with less than three months residual maturity. If the fund manager has any concerns about the credit quality of an issuer of an instrument with less than three months residual maturity, then some other estimate of its market price should be used.

The second bullet accommodates the pricing practices of CNAV funds, which apply amortised accounting to instruments with less than 397 days residual maturity, subject to ensuring this does not result in a 'material discrepancy'. In practice, a material discrepancy is assessed by comparing the amortised price of the portfolio with an alternative estimate of its market price. That alternative estimate comprises actual market prices where they are available, and model prices where they are not - for example, prices modelled off of an issuer's interest rate curve. That alternative estimate of the market price is called the 'shadow price'. If the shadow price differs by more than 0.5% (or 50bps) from the amortised price, then the CNAV fund abandons amortised pricing in favour of the shadow price. This is consistent with pricing its shares to two decimal places, as described above.

Research by the Investment Company Institute⁵ shows that the average shadow price of CNAV funds between 2000-2010 was well within the 0.5% (50bps) limit for using amortised accounting – even during the darkest days of September 2008.

Therefore, CNAV and VNAV funds both make use of amortised accounting to calculate their NAV, due to the lack of market prices at the very short end of the yield curve. The use of amortised accounting is subject to certain reasonableness checks, including the calculation of a shadow price in the case of CNAV funds. However, and due to the lack of market prices, the shadow price is partly made up of model prices.

The impact of accumulating and distributing shares

Like any other investment fund, MMFs can offer either accumulating or distributing shares. Distributing shares in MMFs make daily declarations of net income (and, usually, make monthly distributions) whereas accumulating shares retain net income within the fund, which manifests as an increase in its NAV and therefore in its share price.

Investors' preference for distributing or accumulating shares is driven by a combination of taxation issues (i.e. whether investors have a tax-driven preference for income or for capital gains) and operational issues (i.e. whether investors find it convenient/inconvenient to process the receipt of income). Very crudely, Anglo-Saxon investors tend to prefer distributing shares, whereas Continental European investors tend to prefer accumulating shares.

EU-domiciled⁶ CNAV and VNAV funds may offer both distributing and accumulating shares. This impacts the tendency of those shares to maintain either a constant or a variable price. This is best illustrated by example.

Assume a CNAV and a VNAV fund each offer both distributing and accumulating shares, and have 100m shares in issue. Assume that the NAV of the funds (gross of income) changes between T1 and T5 as shown below, and all of that change is attributable to instruments with more than three months residual maturity. (Therefore: changes in the NAV fully impact the share price of the VNAV fund; but since the NAV never changes by as much as 0.5% (50bps), the share price of the CNAV fund is based on amortised pricing throughout. This somewhat artificial assumption means that, over the period, shares in the CNAV fund will be constant, whereas shares in the VNAV fund will be variable.) Assume that the annualised yield of the funds is 2%, which results in net income of EUR5,000 per day. (Therefore: distributing shareholders will enjoy a daily declaration of income; whereas accumulating shareholders will experience a daily increase the share price by an equal amount.) Assume further that the shares of the VNAV fund round to six decimal places, as do the accumulating shares of the CNAV fund. Then the share price of those funds will be as follows:

	NAV	CNAV Fund		VNAV Fund	
		Distributing	Accumulating	Distributing	Accumulating
T1	100,000,000	1.00	1.000050	1.000000	1.000050
T2	99,999,000	1.00	1.000100	0.999990	1.000090
T3	99,950,000	1.00	1.000150	0.999500	0.999650
T4	99,940,000	1.00	1.000200	0.999400	0.999600
T5	99,980,000	1.00	1.000250	0.999800	1.000050

This example illustrates three points:

- ▶ First, the accumulating shares of a CNAV fund have a variable price! However, the variability is solely due to the daily accrual of net income. In an economic sense (i.e. net of income) those accumulating shares still tend to have a constant price.
- ▶ Second, accumulating and distributing shares in a VNAV fund are variable to differing degrees! Again, that is solely due to the daily accrual of net income in the case of accumulating shares. In an economic sense, accumulating and distributing shares in a VNAV fund provide the same total return.
- ▶ Third, and focussing on behavioural (as opposed to economic) issues: accumulating shares 'appear' to be less volatile.

⁵ http://www.ici.org/pdf/ppr_11_mmf_pricing.pdf

⁶ US-domiciled MMFs only offer distributing shares, due to taxation issues.

Disclaimer

This publication has been produced by HSBC Global Asset Management (UK) and has been approved for issue in the UK by HSBC Global Asset Management (UK) Limited, who are authorised and regulated by the Financial Services Authority. The commentary and analysis presented in this document reflect the opinion of HSBC Global Asset Management (UK) on the markets, according to the information available to date. They do not constitute any kind of commitment from HSBC Global Asset Management (UK). Consequently, HSBC Global Asset Management (UK) will not be held responsible for any investment or disinvestment decision taken on the basis of the commentary and/or analysis in this document. All data from HSBC Global Asset Management (UK) unless otherwise specified. Any third party information has been obtained from sources we believe to be reliable, but which we have not independently verified.

www.assetmanagement.hsbc.com/uk

Copyright HSBC Global Asset Management (UK) Limited 2011. All rights reserved.