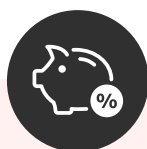


# DANMARKS NATIONALBANK

15 SEPTEMBER 2021 — NO. 22

## The pension sector's alternative investments



### Alternative investments have passed kr. 500 billion

Alternative assets now comprise 14 per cent of the sector's overall assets. These have provided diversification and stable returns but have altered companies' solvency and liquidity.

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### Continued strong focus in the coming years

Companies have made pre-commitments to future investments of around kr. 250 billion. Although sizeable, most companies have room to invest even more in alternatives if deemed appropriate in terms of risk and return.

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### Increasing need for risk management

Alternatives impact solvency and especially liquidity in times of large market movements. Strong management of short- and long-term risks is thus increasingly important when companies pursue future alternative investments.

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The Danish pension sector manages savings of around kr. 3,800 billion, making it important for the functioning and stability of financial markets.<sup>1</sup>

### Pension companies have increased their holdings of alternative assets

Companies generally have long-term stable funding in the form of customers' savings and regular pension contributions. Stable funding allows companies to invest in long-term capital projects of similar illiquidity and time horizon.

Accordingly, companies have increased their investments in alternatives to around kr. 500 billion in an attempt to boost returns and diversify risks in the current low yield environment, see chart 1.<sup>2</sup> On top of this, companies have made pre-commitments for additional kr. 250 billion for investment mainly in alternatives, partly reflecting the sector's commitment to reach green investments of kr. 500 billion by the end of the decade.<sup>3</sup>

### New risks to financial stability

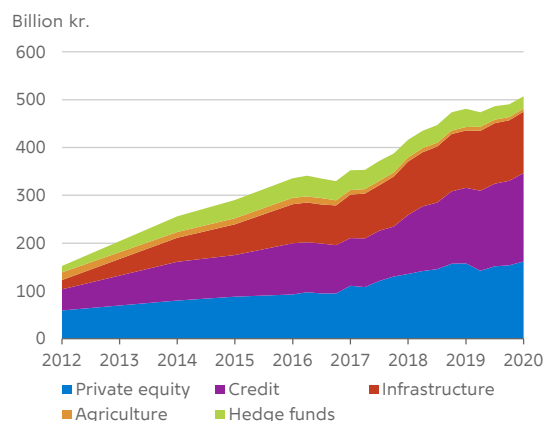
The liquidity of the sector becomes tighter if highly liquid government bonds are replaced by illiquid alternatives. It is important that companies manage intraday liquidity needs. Having too little liquidity during market stress or uncertainty can reverse companies' traditional countercyclical behaviour towards acting procyclically.

### Room remains while natural limits exist

Alternatives do not pose a large threat to the system through solvency or liquidity – at least not at the current levels of investments. On aggregate, the sector still has substantial room for further investments in alternatives as most companies are not solvency constrained nor liquidity constrained. However, room is not unlimited and substantial commitments to further investments have already been made.

Large and growing stock of alternative investments

Chart 1



Note: Sector aggregate distribution of alternative investments, 2012-2020.

Source: Danish FSA 2012-2015, FHI quarterly accounts and balance sheet reporting 2016-2020.

### Increased focus on management

Should the proportion of illiquid investments in companies' portfolios increase in the coming years, a side-effect will be fundamental changes to liquidity and solvency. Liquid resources will constitute a smaller proportion of assets, while the growth in illiquid assets will increase the risk-based solvency capital requirements of Solvency II.

In the long term, companies' solvency and profitability will naturally be highly dependent on the performance of their alternative investments. Solvency and liquidity will thus require careful management e.g. through the regular stress tests that companies perform. Using these internal stress tests to analyse a combination of liquidity and solvency in adverse scenarios will only become more important as the proportion of alternative investments grows.

1 Pension companies in this analysis include life insurance and pension companies, excluding ATP.

2 The treatment of real estate is not consistent among data sources. The FHI reporting template of the Danish FSA, used in these graphs, does not directly include real estate. In contrast, the industry trade association, Forsikring og Pension, includes real estate and reports alternatives of around kr. 600 billion of which kr. 250 billion is real estate.

3 See Forsikring og Pension (2020), Pensionsbranchen offentliggør milliardinvesteringer i grøn omstilling.

## Illiquid and gaining importance

### Not traded on an exchange

Alternative investments do not have a clear definition although they are often characterised as not being traded on an exchange. As such, alternatives are less liquid and a market price is not directly observable. Alternatives include, but are not limited to, unlisted equity, infrastructure, direct credit, and real estate, see box 1.

As such, the alternatives cover both well-known assets from other parts of the financial system, e.g. direct lending, and newly developed opportunities such as wind farms.

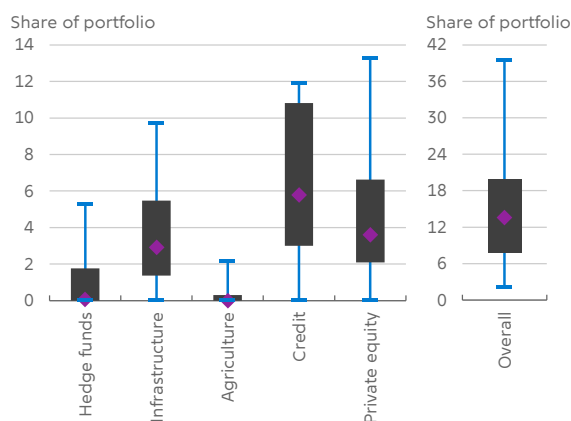
### Constituting a significant part of portfolios

As of end-2020, the pension sector had alternative investments of around kr. 500 billion following strong investment growth for both market rate and average rate products, see chart 1. Most companies hold alternatives, with the median company having 14 per cent, see chart 2. The mere share of alternatives implies that the performance of this asset class will be important for the sector in honouring future benefits while also introducing new risks and opportunities.

It is important to note that, although alternatives constitute a large share of total assets across the sector, there are large differences. One company has more than 36 per cent of its assets in alternatives, while others have close to none. Further, there are large differences across the types of alternatives. This reflects the combination of different business models, solvency and liquidity constraints, see chart 3.

Market rate products attribute net investment returns directly to members and generally do not offer financial guarantees. Average rate products have target long-term returns which are revised for each year's new contributions. Target returns may be guaranteed, conditional or unguaranteed. Higher guarantees mean lower investment freedom and vice versa.<sup>4</sup>

**Big investments but large differences** Chart 2



Note: Company level percentage share of total assets of selected alternative asset classes. Distribution across companies. Minimum, 25th percentile, median, 75th percentile and maximum. Data as of year-end 2020.

Source: FHI quarterly accounts and balance sheet reporting.

### Typical illiquid investments

Box 1

*Unlisted equity:* Capital investment in companies where the shares are not traded on an exchange. Investments can be made directly, via a private equity fund or via a venture capital fund.

*Hedge funds:* Funds that invest within a specialised area of competence e.g. high yield bonds. Can be highly leveraged.

*Real estate:* Development or leasing of residential or commercial real estate. Can also be via a real estate fund.

*Infrastructure:* Toll roads, bridges, wind farms etc. Can be in a public-private partnership or with state-guaranteed minimum income.

*Credit:* Direct lending to firms similar to bank loans, or a loan portfolio purchased from a bank.

*Agriculture:* Farms, farmland and forestry.

<sup>4</sup> Historical performance relative to long-term target returns is reflected in the balance between guaranteed benefits and bonus reserves. Companies with higher bonus reserves can take more investment risk. Bonus reserves act as buffers for poor investment returns and losses.

Guaranteed average rate products with high guarantee costs and low bonus reserves are restricted in their ability to invest in alternatives due to solvency. Other average rate portfolios – unguaranteed or with sufficient bonus reserves – have more freedom. In terms of market rate products, commercial providers are not constrained by solvency, but must maintain some liquidity in the event of transfer of a large corporate scheme. Market rate products from labour-market providers are the least constrained and are thus able to invest in the most illiquid alternatives, such as infrastructure.

The differences in allocations to alternatives might also reflect entry hurdles when going into alternatives in terms of investment size and requirements of specialised skills and expertise. One example of a highly specialised market is private credit or direct lending, which can have similar payoff profiles as bonds but with a higher risk, while sharing many characteristics of the sector's traditional investments.

Preliminary evidence finds that unsecured loans granted by Danish nonbanks to Danish non-financials appear less risky which indeed suggests careful management by the lender, see box 2. However, whether that holds true for unlisted credit provided by pension companies remains unclear.

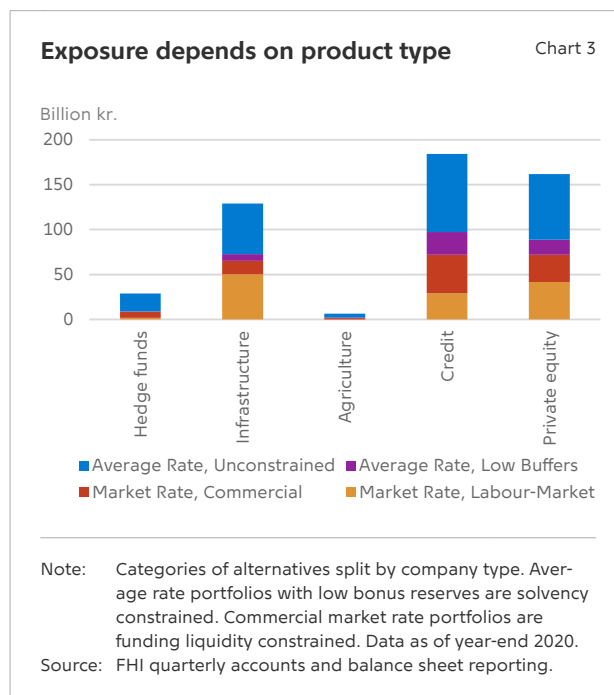
## Promise higher returns and diversification

### Historically low government bond yields

Pension companies receive payments from their customers and in return pay benefits upon retirement. Accordingly, they invest the payments such that they can honour their promised payments long into the future. Traditionally this has been accomplished by buying long-term government bonds. However, the yield on these bonds has been close to or below zero in recent years, making them unattractive in terms of expected returns.

### Alternatives promise higher returns

In contrast, alternative investments promise higher returns while some share the attributes of bonds. Companies invest in alternatives for higher expected returns, such as private equity and hedge funds, and higher expected long-term yields, such as direct lending and infrastructure. Due to the illiquidity,



investors require an extra return for investing in these assets instead of an easier-to-sell asset. As pension companies have long-term liabilities, they are well positioned to harvest this so-called illiquidity premium over time. In some respects, an alternative asset can even replicate the cash flows of a bond, e.g. real estate generating rental income. It can therefore be a rather good alternative to buying a government bond.

Gauged from realised returns, the asset class performs rather well. Holdings of unlisted equity have produced stable returns, and have in periods even outperformed holdings of both government bonds and listed equity, see chart 4. Accordingly, these assets have helped companies boost investment returns despite the low yield environment. In addition, the indications of low or even negative correlations to the two big traditional investments, government bonds and listed equity, imply that alternatives provide some diversifying effects, making the portfolio value more resilient over time and in times of crisis.

One major caveat when it comes to evaluating the performance of alternatives is their relatively short history. The illiquidity premium and received cash flows are yet to prove resilient over the long term as even more money is chasing these types of investment, see chart 8. A case in point is wind farms:

## Unsecured Danish nonbank corporate lending to Danish NFCs<sup>1</sup>

Box 2

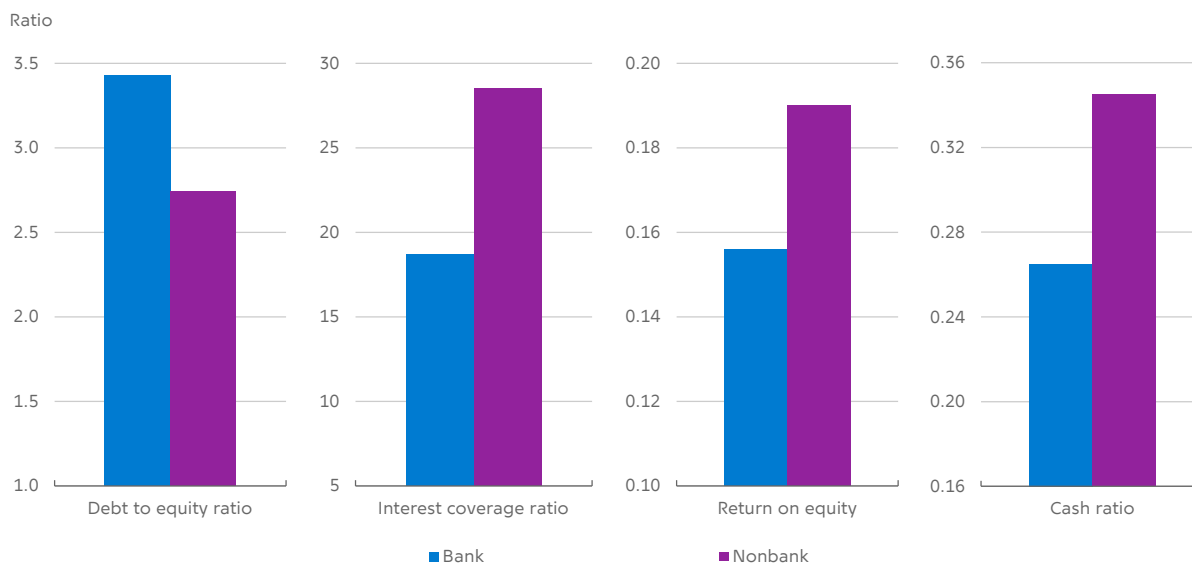
Corporate lending by nonbank financial intermediaries – a market where pension companies are active either directly or through the funds that they invest in – has gained importance in many countries' financial systems since the global financial crisis of 2007-2008. Between 2009 and 2017, Danish nonbanks granted on average 13 per cent of total unsecured credit to Danish non-financial corporations (NFCs).

Compared to firms borrowing primarily from traditional banks, NFCs with at least 50 per cent of their total external funding from nonbanks have significantly better financial ratios and may thus be less risky from the creditor's perspective. The chart highlights this by contrasting four important financial ratios across the two types of borrower groups. Firms financed primarily by nonbank credit rely less on debt financing than those borrowing from traditional banks as measured by their debt-to-equity ratios. At the same time, the firms choosing nonbank loans are better able to service their debt as their interest coverage ratios are higher. More-

over, nonbank borrowers are more profitable and liquid compared to bank borrowers, as highlighted by their return on equity and cash ratios. Importantly, firm size and sectoral distribution are approximately the same for bank and non-bank borrowers.

The evidence presented above suggests that Danish firms borrowing from Danish nonbanks are on average more financially sound than firms relying on bank credit. The lenders thus have a relatively low credit risk exposure while the direct loans offer a higher return than e.g. traded bonds. A survey by the Danish FSA shows that a majority of pension companies in 2019 expected to keep or expand their lending business. It is, however, unclear whether pension companies, and the funds they invest in, will continue to support this part of the market as credit provider if it comes under stress or if interest rates increase, thus making other investments more attractive.<sup>2</sup>

### Average firm financial ratios split by type of lender



Note: The dataset combines firm-level balance sheets and lender loan-level accounts. The chart considers only unsecured loans supplied to non-financial corporations. Estimates are significantly different from one another and from zero.

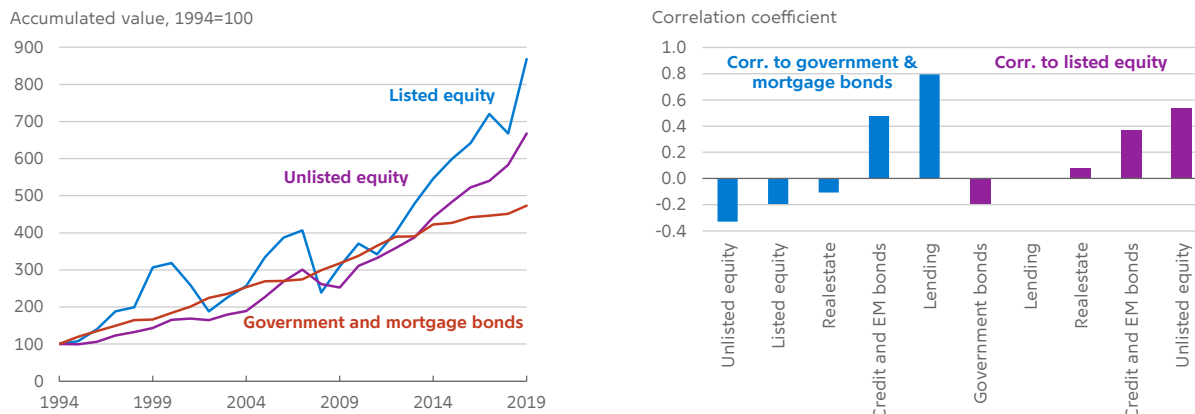
Source: Tax filings by credit granting institutions in Denmark, FIRE register and own calculations.

<sup>1</sup> By Dominic Cucic and Denis Gorea, Economics and Monetary Policy, Danmarks Nationalbank.

<sup>2</sup> See *Temaundersøgelse om pensionskabers investeringer i illikvid kredit*, Danish FSA (2021).

**Historically alternatives have provided high and stable returns and offered diversification opportunities**

Chart 4



Note: Average yearly returns and correlation based on yearly sector aggregate returns for the years 1995-2019. Yearly returns provide an indication of the correlation sign but may underestimate the strength of the correlation.  
Source: Companies' annual reports, Danish FSA, *Markedsudviklingen for pensionsvirksomheder*, and own calculations.

although fixed electricity prices are guaranteed for the first e.g. 15 years, it is uncertain what prices will be when the initial period runs out. As the wind farm ages, the variable, uncertain cash flows beyond the original 15-year period become more important to the valuation. The achievable long-term returns are thus somewhat uncertain.

**Increasing allocations to unlisted and illiquid assets introduces new risks to financial stability**

Although the new business areas support the economy and at the same time create value for customers in the form of returns and diversification, the transition into more alternatives introduces a number of potential risks to financial stability.

Since the fair values of alternatives are estimated rather than observed, they will always entail some degree of subjectivity. In other words, companies will have diverging values for the same asset. These differences can have a clear impact on the perceived wealth of customers and could result in mistrust in companies and the system.

Illiquid assets can be expected to sell at a sizeable discount in a stressed situation, exacerbating any potential solvency problems.

At the same time, the overall liquidity of the sector becomes tighter if investments in highly liquid government bonds are replaced by illiquid alternatives.

Although of little concern under normal conditions, the impact on liquidity can be considerable during periods of market stress. This can reduce companies' capacity to buy when others are forced to sell, thus reducing the sector's ability to purchase desirable assets at large discounts, and as a side-effect stabilise financial markets somewhat. It may also pose problems, should companies need to access liquidity via repo markets using a reduced portfolio of eligible bonds.

The following pages will address valuations, solvency and liquidity to illustrate the potential risks in a situation where large investments in alternatives are funded by selling bonds. As such this is an extreme case, as future investments are likely to partly replace maturing alternative investments or be funded by incoming contributions. However, it serves as a useful illustration of the potential effects of additional investments in alternatives.

## Valuation of alternative investments

Whereas listed assets have an observable market price, the value of alternatives is estimated by IFRS fair value, see box 3.

### Stable returns

Fair value returns of companies' alternative investments have historically demonstrated greater stability than market returns. Chart 5 illustrates that between 2015 and 2020, pension companies' listed equity had a higher average return than unlisted equity but also a much higher standard deviation.<sup>5</sup>

This is, however, not evidence that unlisted assets are more or less risky than listed assets. Rather, it is evidence that the assessment of risk and return via fair value is less volatile compared to markets. Some unlisted assets may be more risky than similar listed assets.

Going forward, the volatility of unlisted assets may change as companies increase the frequency of valuations, e.g. daily, to support risk models and investment decisions.

### Values hard to estimate when uncertainty high

The reported fair value of pension companies' unlisted equity increased steadily in 2015-2018, contrasting the more volatile movements of their listed equity, see chart 5.

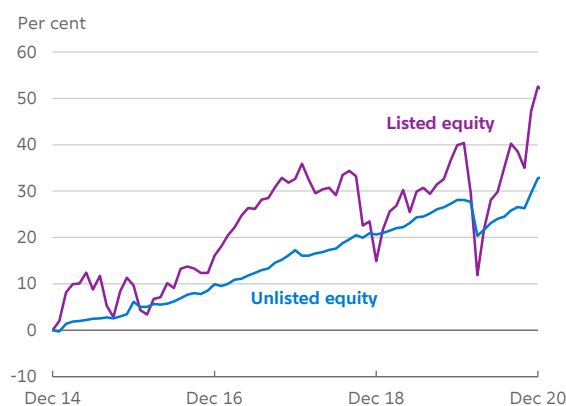
With the outbreak of covid-19 and the following lockdowns, chart 6 shows decreased earnings expectations and increased uncertainty which should have resulted in a lower fair value.

From companies' reported fair values at end-March 2020 it is clear that an adjustment took place. Whether the adjustments were large enough and quick enough is hard to judge.

Both listed and unlisted equities recovered again later in 2020, reflecting decreasing macroeconomic uncertainty, stabilising earnings expectations and recovering investor risk appetite.

**Historically unlisted equity has been more stable than listed equity**

Chart 5

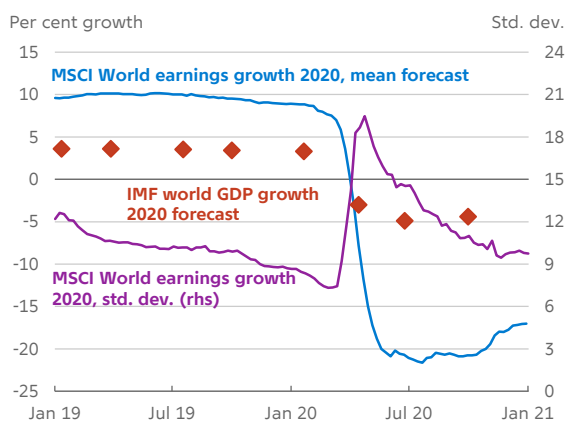


Note: Cumulative monthly returns of listed and unlisted equity portfolios of Danish pension companies. Listed returns are calculated as changes in underlying market values. Unlisted returns reflect changes in fair values. Both include portfolio rebalancing but exclude currency effects.

Source: Danmarks Nationalbank.

**Both listed and unlisted equity prices adjusted to worsening fundamentals**

Chart 6



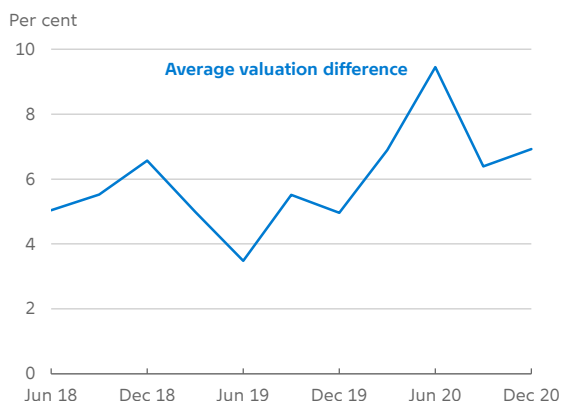
Note: Earnings growth forecast and standard deviation among forecasts for MSCI world stock index.

Source: Refinitiv, Institutional Brokers' Estimate System and IMF World Economic Outlook (WEO).

<sup>5</sup> IFRS 13 and its fair value principles came into force 1 January 2013.

### Valuation differences of shared investments spiked during lockdown

Chart 7



Note: Average valuation differences for multiple companies' holdings of the same underlying assets. Includes six real estate investments, three infrastructure investments, and one directly held, unlisted equity.

Source: Solvency II Quarterly Reporting Template.

This episode illustrates that fair value and market prices can fall in tandem when adjusting to changing economic fundamentals.

In addition, the episode illustrates that economic uncertainty creates valuation uncertainty via the risks, assumptions and future expectations that feed into a fair value assessment. This is reflected in the increased, although contained, fair value differences of companies' direct holdings of unlisted assets in the early stages of the 2020 lockdowns, see chart 7.

### IFRS fair value principles

Box 3

The objective of fair value assessment is an exit price in an orderly sale in orderly markets that reflects market information and market participants at a given date. Fair value should maximise the use of relevant observable inputs and minimise the use of unobservable inputs.

International Financial Reporting Standard (IFRS) 13 fair value has a valuation hierarchy. Level 1 assets have observable market values, level 2 assets' values are estimated based on observable inputs, and level 3 assets use unobservable inputs in their valuation techniques.<sup>1</sup> Generally, pension companies' alternatives are level 3.

For levels 2 and 3, fair value techniques must reflect risk and uncertainty in a credible manner, creating a trade-off between the timeliness and relevance in the sensitivity of fair values to market movements. Fair value must incorporate the risk and uncertainty for which a buyer would require compensation. With unlisted assets, a company must assess the risks and uncertainties relevant to the specific asset. The resulting fair value should thus, like markets, reflect changes in earnings expectations and risk premiums for individual assets.

IFRS guidance is clear that fair value should not reflect a forced or distressed sale. It is less clear whether fair value should, according to the IFRS 13 standard, reflect temporary market dislocations. Companies must apply judgment to assess whether the market information being used is reliable.<sup>2</sup>

Markets react quickly to reflect investors' risk preferences and varying aversion to uncertainty. In comparison, companies' FV techniques are slower as they are subject to audit, disclosure and regulatory scrutiny to ensure that methods and assumptions are credible and robust while capturing all material risk and uncertainty. This introduces a time lag for incorporating new risks, new uncertainties, and unforeseen events. However, when the effects on earnings and other assumptions of macroeconomic events, such as covid-19 and lockdowns, become clear, they should be incorporated. While accounting models cannot include all material emerging risks, companies' risk and stress test models can aim to do so.

1. Fair value accounting for investment property is per International Accounting Standard (IAS) 40.

2. IFRS 13, paragraphs 9, 22, 61, 65, 67, B2, B15-B16 and B41-B44.



## Solvency considerations

Alternatives have the potential to fundamentally change individual companies' solvency – both in normal and in stressed times – as solvency risk capital requirements increase and the assets become more exposed to movements in fair values.

### Investments expected to shift solvency

It can take several years to make a successful alternative investment, and therefore the expected growth can be gauged from the pre-committed investments as reported in annual reports, see chart 8. As e.g. private equity comes with a risk charge over and beyond the one for government bonds, any shift from one to the other will imply solvency changes.

Simply adding the amounts of pre-committed future investments in alternatives to the company portfolios, leaving all else aside, implies a sizeable solvency change for some companies, see chart 9.

Although all companies remain highly solvent, their additional investments may bring them closer to a point where stress or mis-estimation of fair value could trigger solvency problems.

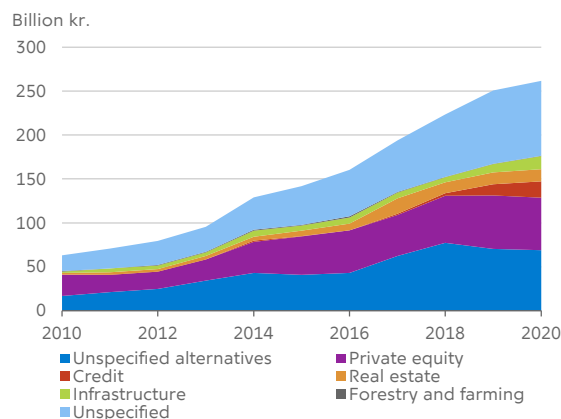
### Stress can substantially lower solvency

Estimating the impact on solvency from losses on alternatives suggests that the average company can manage even substantial fair value losses – also when taking account of pre-committed investments.<sup>6</sup> However, the estimates suggest that stress of 20-30 per cent may cause some companies to get very close to a solvency ratio of 100 per cent especially if adding the pre-committed investments to their portfolios, see chart 10.

At the same time, the results suggest that solvency is robust to fair value mis-estimation as seen in the case of a 10 per cent fair value reduction, see chart 10.

**Substantial commitments to future investments**

Chart 8

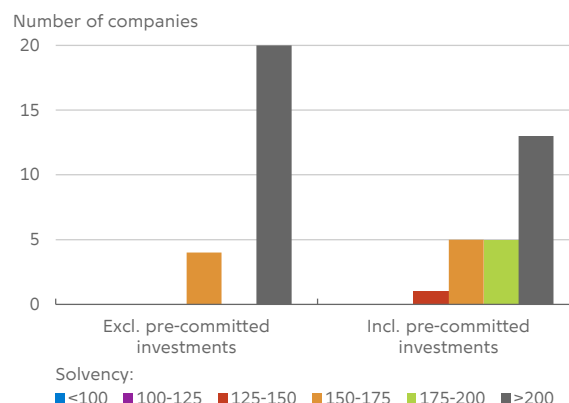


Note: Committed but not yet made investments as reported in annual reports over the period 2010-2020. When possible, commitments have been split into the type of alternatives. "Unspecified alternatives" covers the case when the report simply states alternative investments. "Unspecified" is for a mix of different investment types, of which the lion's share can be expected to be alternatives.

Source: Companies' annual reports.

**Future investments can reduce solvency for many companies**

Chart 9



Note: Company solvency ratios as of end-2020 and including the pre-committed investments. Solvency is recalculated by increasing market risk capital charges proportionally for pre-committed investments and recalculating the SCR.

Source: Companies' annual reports, Solvency II Quarterly Reporting Template and own calculations.

<sup>6</sup> The stress scenario does not contain any write-down or price depreciation of other assets, and is thus relatively mild as alternatives are isolated whereas it is normal for e.g. equity to fall in tandem with private equity.

### Some companies have more degrees of freedom than others

The analysis illustrates that some companies will never really be solvency constrained, e.g. if they have market rate products and average products with large bonus reserves, whereas others can relatively quickly get in a situation where solvency makes binding constraints on their future investments in alternatives.

## Liquidity risk requires management

Historically, the sector has had ample liquidity, which has allowed it to buy when others were forced to sell. This has enabled companies to purchase assets at attractive prices.

Sufficient sector liquidity is in the interest of companies, customers and society so that companies are not constrained from purchasing assets they deem valuable in good and, especially, bad times. Ideally, companies should not feel liquidity constrained in any scenario.

At the same time, companies have an obligation to act in customers' best interests e.g. to pursue high returns within a specific risk frame, to ensure their customers a high level of secure future benefits while reflecting customers' investment preferences. This is at odds with holding mostly highly liquid assets such as negative-yielding government bonds.

### Portfolio share of bonds has decreased

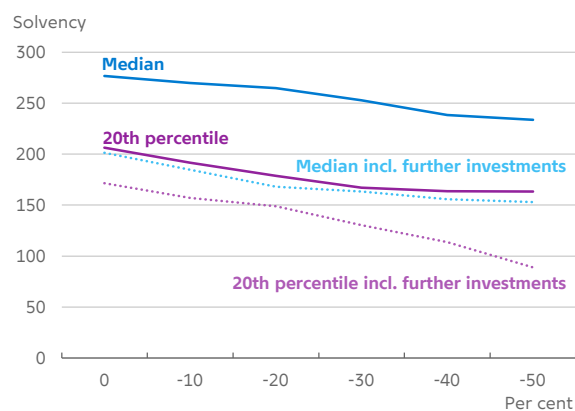
The sector holds substantial amounts of liquid assets – highly rated government and mortgage bonds – that can be used to manage intraday liquidity needs via repos. However, increased focus on equities and alternatives has reduced the overall liquidity of investment portfolios as the proportion of liquid assets has decreased as evident for average rate products, see chart 11.

### Acute liquidity needs have been stable

Companies' traditional liquidity needs arise from the balance between inflows and outflows of customers' contributions, rental income and dividends, expenses and benefit payments. As most companies are still under build-up, these flows are net positive and do not cause any liquidity strains – at least not in the near future.

Stress can lower solvency markedly

Chart 10

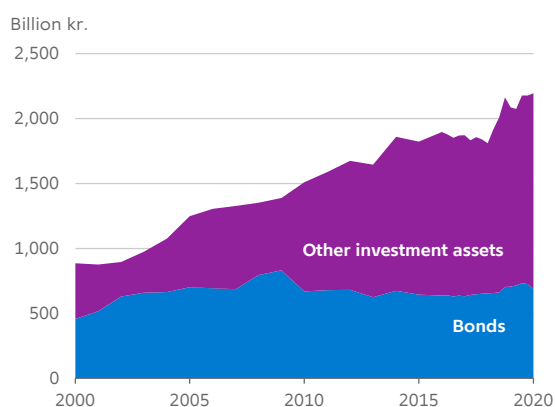


Note: Company solvency ratios at year-end 2020 under stress (solid lines) and including the pre-committed investments (dotted lines). For pre-committed, solvency is recalculated by increasing market risk capital charges proportionally and recalculating the SCR. Stresses are modelled as losses to the fair values of companies' alternative investments.

Source: Danmarks Nationalbank, The Danish FSA, Solvency II Quarterly Reporting Template, companies' annual reports, FHI quarterly accounts and balance sheet reporting and own calculations.

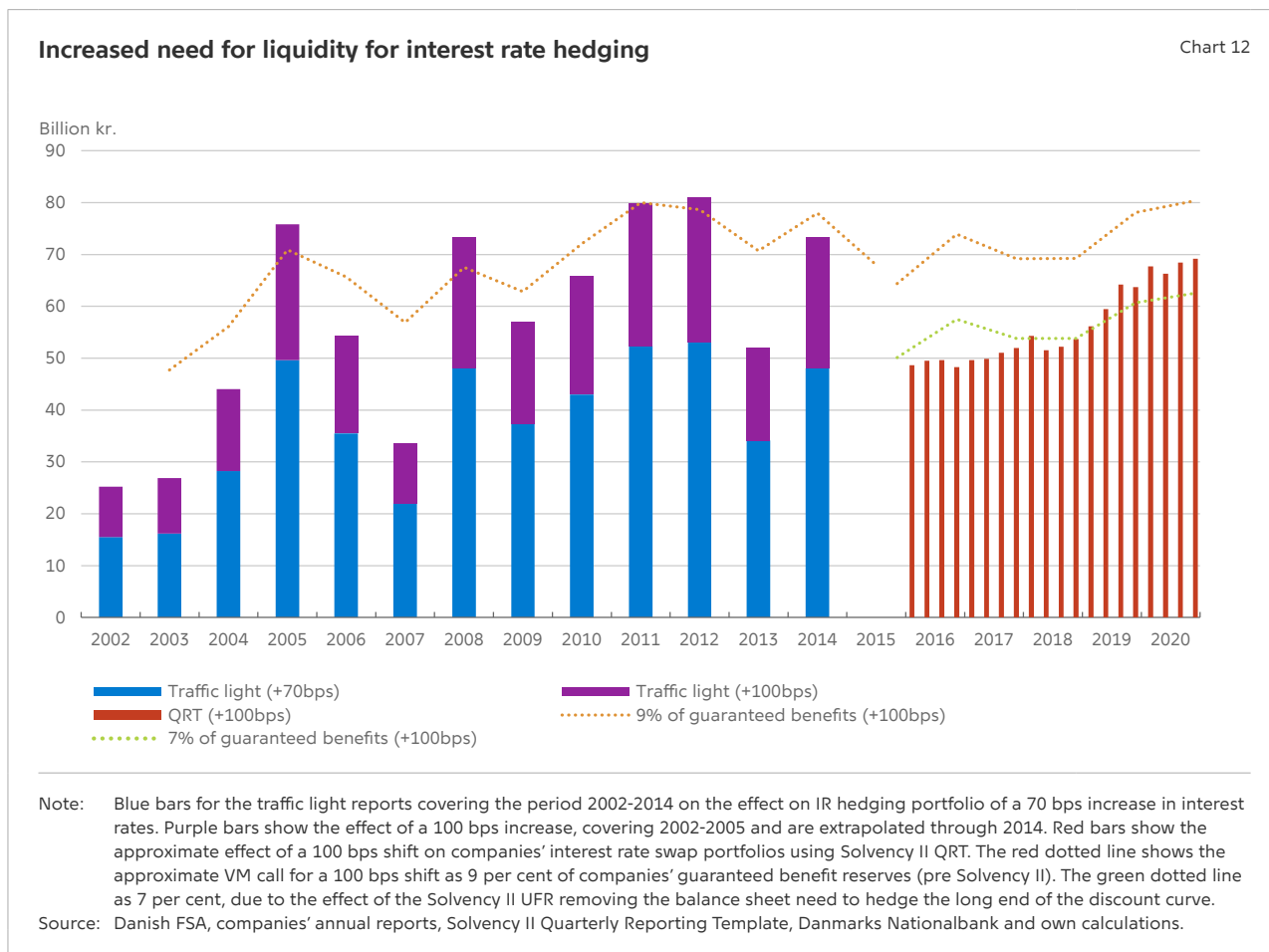
Decreasing share of the most liquid assets

Chart 11



Note: Decomposition of total investment assets of average rate products over the period 2000-2020. Based on sector aggregate balance sheet.

Source: Companies' annual reports and FHI quarterly accounts and balance sheet reporting.



In contrast, the use of derivatives for hedging and efficient portfolio management creates the potential for large intraday liquidity needs. An analysis from Danmarks Nationalbank estimates a kr. 100 billion liquidity need in case of a 100 bps interest rate increase.<sup>7</sup> On top of this comes variation margin from other derivatives such as currency and equity options. Gauged from the old traffic light reports and companies' Solvency II QRT reporting, the liquidity needed to cover variation margin calls on interest rate swaps remains high, see chart 12.<sup>8</sup>

Overall liquidity needs will increase as the sector matures and starts having net outflows, i.e. when benefits outpace contributions.

#### Rising rates can cause liquidity problems

In a case of rapidly increasing interest rates, the sector will need liquidity to cover its variation margin on interest rate swaps. At the same time, the holdings of Danish and German government bonds, used to access intraday liquidity via repos, will depreciate in value.

7 Danmarks Nationalbank, Pension companies will have large liquidity needs if interest rates rise, Danmarks Nationalbank Analysis No. 23, 19 November 2019.

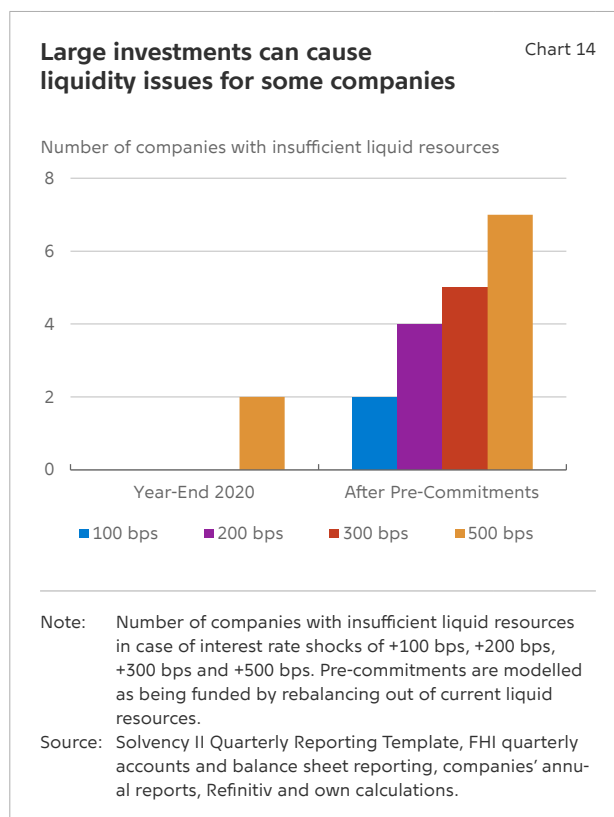
8 Note that the dotted lines in chart 12 are based on the assumption that the amount of interest hedging is linear in the value of guarantees. However, on the one hand, falling interest rates have increased the reason for hedging over the period. On the other hand, the phasing out of guaranteed average rate products, could be a reason for less hedging.



Chart 13 shows that, on aggregate, the sector holds ample liquidity even in an extreme stress scenario.

The differences in business models, the most important being market rate or guaranteed products, has a large impact on an individual company's need to hedge against interest rate changes and thus on variation margin calls. An evaluation of companies' available liquidity for margin calls reveals large differences among companies as illustrated by the wide distribution in chart 13. Although the distribution shifts down as interest rates increase, the largest change is for the companies that have ample liquidity.

However, including the pre-committed investments into the analysis shows that further investments have the potential to significantly increase the number of companies that will be liquidity constrained, see chart 14. The analysis assumes that the need to hedge against interest rate movements using swaps is constant, although it may change if e.g. new alternative investments have long-term, stable cashflows or are funded by selling bonds.





## Room remains for more

The two main components that can limit companies' investment possibilities are solvency and liquidity as already analysed. Combining the results, chart 15 shows how companies' pre-commitments to further investment in alternatives can affect their solvency and liquidity positions. At the current level of investments, all companies have ample liquidity and high solvency.<sup>9</sup>

However, the picture changes somewhat when the pre-committed investments are added to their portfolios. Including the pre-committed investments results in seven companies moving

from a solvency ratio above 200 per cent to between 150 and 200 per cent. At the same time, five companies could encounter liquidity problems if rates increase, with two of those not having sufficient liquidity to cover the variation margin call for a 100 bps increase in interest rates. Although a worst-case scenario, as investments are likely to be at least partially funded with incoming contributions and to replace maturing investments, the results illustrate the potential limitations to future investments in alternatives.

On aggregate, room remains for future investments as most companies are not constrained by solvency nor liquidity even following a kr. 250 billion shift from bonds into alternatives.

<sup>9</sup> This assumes that companies can access intraday liquidity by repoing bonds. For more on this see Danmarks Nationalbank, Pension companies will have large liquidity needs if interest rates rise, Danmarks Nationalbank Analysis No. 23, 19 November 2019.

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