ZAIS Insights

June 2024

Adjusting to higher for longer

Bernhard Eschweiler, PhD
Senior Economic Advisor

Bernhard advises ZAIS on macroeconomic risks and prospects related to credit markets and is a regular contributor to ZAIS Insights.

Summary

- Since the 1980s most macro forces pushed US bond yields lower
- This trend has reversed not just because of Fed tightening
- 10-year US Treasury yields to average 4% over the next cycle …
- … with the risk tilting to the upside
- The economic adjustment to higher yields for longer is not yet finished

After four decades of trend decline, 10-year US Treasury yields have moved up to levels last seen in the 2000s (see Chart 1). Some of the rise in long-term yields is due to Fed tightening, but we argue that other yield drivers have changed as well.

As a result, we think yields are unlikely to fall anywhere near the levels of the 2010s even if and when the Fed starts to cut interest rates.

Chart 1: 10-year US Treasury yield

% p.a.

Source: Board of Governors of the Federal Reserve. [1]

In this paper, we show that not only the Fed but also the balance of savings and investment in the economy, as well as growth and inflation fundamentals, are key for determining the level of long-term yields.

Since the 1980s, most of these forces have put downward pressure on yields. Going forward, we think several forces will put lasting upward pressure on yields.

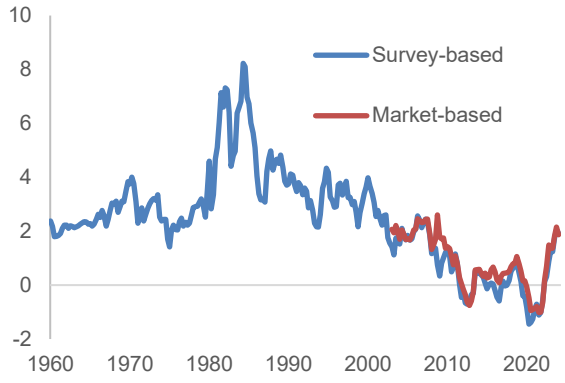
In our base scenario, we estimate that macro and policy trends over the next 5 to 10 year business cycle will be consistent with a 10-year Treasury yield of around 4%. The risk is that higher macro and policy volatility pushes the 10-year Treasury yield to 6%.

In any case, we expect higher yields for longer and believe financial markets and the economy still have some adjustment ahead. This may not lead to a crisis but will make the going tougher, especially for weaker credits and the government.

Real yields and inflation expectations

We start our analysis by dividing nominal yields into real yields and inflation expectations. This can be done in two ways, subtracting either survey-based 10-year inflation expectations or 10-year inflation adjusted yields from nominal 10-year yields. The implied real yields are fairly similar but the survey-based real yield has a much longer track record which is important for our analysis (see Chart 2).

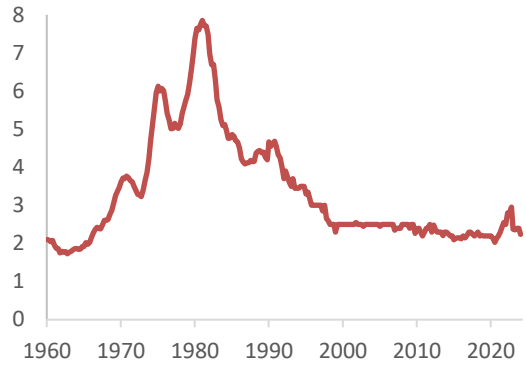
Chart 2: Real 10-year US Treasury yields
% p.a.



Source: Board of Governors of the Federal Reserve & Federal Reserve Bank of Philadelphia. [2]

As seen in Chart 2, real yields are volatile but there are also clear trends. Most notable is the trend decline in real yields from around 8% in the early 1980s to about zero in the decade after the great financial crisis (GFC). Survey-based inflation expectations followed a similar pattern, but are less volatile and had already stabilized in the early 2000s (see Chart 3).

Chart 3: 10-year inflation expectations
% p.a.



Source: Federal Reserve Bank of Philadelphia. [3]

Overall, nominal 10-year Treasury yields fell from around 14% in the early 1980s to about 2.5% in the decade after the GFC.[4] Of that, roughly 60% can be attributed to the decline in real yields and 40% is due to the decline in inflation expectations.[5] The recent rise in nominal yields, however, appears mostly due to a jump in real yields to about 2%.[6] Inflation expectations increased temporarily, but are back to the pre-COVID level.[7]

In our view, inflation expectations are both adaptive and rational, i.e., shaped by people's actual inflation experience as well as their assessment of the inflationary implications of monetary policy and major economic and political developments.

We interpret, thus, the recent decline of inflation expectations as a function of the actual disinflation process that started in mid 2022,[8] as well as a sign of people's

confidence that the Fed will push inflation towards 2%.

Real yield drivers and changes

Before we continue on the outlook for inflation expectations, however, we first take a closer look at the drivers of real yields. In our framework, we view real yields as determined by three main categories.

1. The potential real GDP growth rate and the premium for inflation risk or, more broadly, macro volatility. We proxy the latter with actual five-year inflation volatility and assume that both potential growth and the inflation-risk premium are positively correlated with real yields.
2. The flow of funds between the government, the private sector and the rest of the world. We proxy these flows (in % of GDP) with government net savings (fiscal balance), private net savings (savings minus investment) and foreign net lending (net capital inflows) and assume all three are negatively correlated with real yields.
3. Monetary policy in the form of the real Fed funds rate (adjusted by one-year inflation expectations) and quantitative policy measures (QPM) proxied with the Treasury purchases following the GFC (in % of GDP). We assume that real yields are positively correlated with the real Fed funds rate and negatively correlated with expansionary quantitative policy measures.

Table 1 shows the average real yield over the last four decades as well as the last three quarters, plus the values of the components outlined above and our estimations of their contributions to real yields. These estimated contributions are based on our regression analysis, which explains about 95% of the average real yield changes over the last four decades and confirms our views about the directional impact of each variable on real yields, as outlined in our assumptions above. Our following four observations are all based on the figures outlined in Table 1.

Table 1: Real yield and components
% period averages

	1980s	1990s	2000s	2010s	Latest*
Real yield	5.2	3.3	2.0	0.1	1.9
Pot. growth**	3.1	3.1	2.6	1.8	2.2
*& contrb.****	*2.3*	*2.2*	*1.9*	*1.3*	*1.6*
Inflation risk**	2.5	0.8	0.8	1.2	2.6
*& contrb.****	*1.5*	*0.5*	*0.5*	*0.8*	*1.7*
Gov. net sav.**	-4.2	-3.5	-3.4	-6.6	-6.5
*& contrb.****	*1.0*	*0.8*	*0.7*	*1.6*	*1.4*
Prv. net sav.**	3.1	2.2	0.4	5.1	2.5
*& contrb.****	*-0.7*	*-0.5*	*-0.0*	*-1.1*	*-0.5*
For. net lend**	1.5	1.4	4.6	2.4	3.2
*& contrb.****	*-0.4*	*-0.4*	*-1.3*	*-0.7*	*-0.9*
Real Fed rate**	4.6	2.0	0.7	-1.4	2.8
*& contrb.****	*1.2*	*0.5*	*0.2*	*-0.4*	*0.7*
Fed QPM**	0.0	0.0	0.1	8.4	15.7
*& contrb.****	*0.0*	*0.0*	*-0.0*	*-1.4*	*-1.9*
Real yield estimate	*4.9*	*3.2*	*2.0*	*0.1*	*2.1*

* 2023H2 & 2024Q1; ** Variable value; *** % pts contribution of the variable to the real yield level.

Source: See detailed source descriptions and outline of the regression analysis in footnote 9 [9]

First, falling potential growth and inflation-risk premium have been powerful drivers of the decline in real yields over the last four decades, lowering real yields together by nearly two percentage points.

Second, there have been large swings in the flow of funds but their aggregated impact pushed real yields only slightly lower over the last four decades. Government net savings improved in the 1990s and 2000s but slipped massively in the 2010s. Private net savings fell until the 2010s but then rebounded strongly in the 2010s.

We see a negative correlation between government and private net savings (i.e., private net savings rise when government net savings decline), which gives some validity to the *Ricardian Equivalence Theorem* and the *Crowding Out Effect*, but their respective degrees change over time, suggesting that other factors are at work, as well.[10]

Foreign net lending increased sharply in the 2000s when reserve accumulation by foreign countries, especially in Asia, was running hot, but moderated in the 2010s.[11] The rise in foreign net lending in the 2000s more than offset the fall in private net savings and contributed significantly to the overall decline in real yields during that decade.

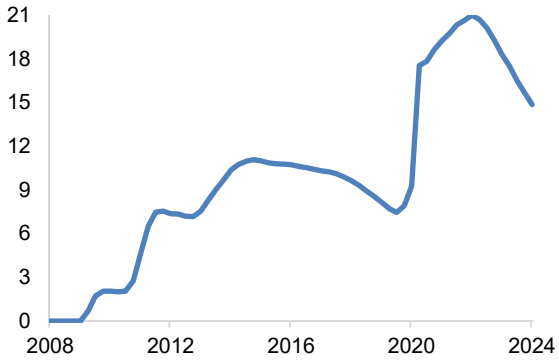
Third, monetary policy was the most powerful force in driving real yields lower over the last four decades. In the 2010s, monetary policy alone contributed nearly two percentage points to the decline in real yields, thanks in particular to the Fed's quantitative policy measures. Without the Fed's super-easy policy stance, real yields in the 2010s would have been close to the levels in the 2000s.

Of course, the Fed's policy stance cannot be seen in isolation but should be viewed as a function of the broader macro trends, especially the decline in inflationary pressures. The use of quantitative policy measures was the Fed's main tool to stimulate the flow of credit to the economy and maintain financial stability at a time when the Fed funds rate was at the effective (i.e., zero percent) lower boundary.[12]

Fourth, the recent surge in real yields was driven in order of magnitude by the rise in the real Fed funds rate, the increase in the inflation risk premium and the decline in private net savings. What seems to have prevented an even further rise in real yields is the still very elevated level of Fed Treasury holdings stemming from earlier quantitative policy measures (especially during the COVID period, see Chart 4[13]) and an increase in foreign net lending, which we attribute to the safe-haven appeal of the US in times of high geopolitical uncertainties.

Chart 4: Cumulated Fed Treasury holdings since the start of QE in 2009

% of GDP



Source: Board of Governors of the Federal Reserve and Bureau of Economic Analysis. [14]

On the surface, current real yields are back to the levels last seen in the 2000s. Yet the composition is very different as seen in Table 1 and some components are unlikely to stay at current levels in the longer term. We also like to bring inflation expectations back into the equation to complete the outlook for nominal yields. We see five broad themes shaping real and nominal yields over the next cycle.

First, fiscal deficit to stay high

We expect government net savings (fiscal deficit) as a share of GDP to stay at the current level. In our view, there is neither political will nor public or financial market pressure to deal with the bloating deficit and the high and rising level of debt. The Congressional Budget Office even expects the deficit of the Federal government to rise further as a share of GDP, thanks to

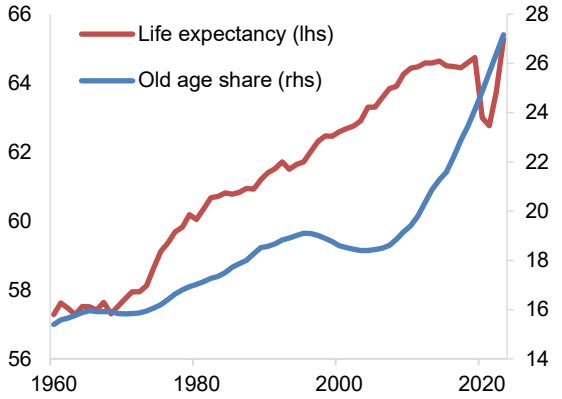
mounting mandatory and net interest outlays.[15]

In our view, a negative feedback loop is starting, as the government has to refinance maturing debt at higher interest rates which puts added upward pressure on the deficit and the interest on government debt. And this cycle spins faster the higher the debt-GDP ratio, which has already reached the 100% threshold.[16]

Second, private net savings are unlikely to offset fiscal deficit

We expect private net savings to rise once the excess savings from the COVID period[17] are exhausted, but not by much. Demographics is one factor that is likely to cap private net savings. The share of old people is growing rapidly, which means there are fewer people who can save, while increases in life expectancy have moderated, which implies for working-age people that the savings needed for retirement no longer have to rise as fast as they did in prior decades (see Chart 5).

Chart 5: Life expectancy and old-age share*
Years (lhs) and % (rhs)



* Life expectancy is calculated at the age of 15 and the old age share is the share of people 65 and older versus the working-age population (15-64).
Source: United Nations. [18]

Similar to the government sector, we also see a negative feedback loop developing for interest expenses in the private sector. So far, the private sector benefitted from the low interest rates on the debt it locked in before the Fed started to hike interest rates.[19] We expect that this effect will gradually fade and eventually turn in the opposite direction as more debt matures.

Another factor in our view is the increased investments needed to decarbonize the economy. This affects both the government and the private sector. There are good estimates of the investments needed to achieve the zero-emissions targets but we are not sure how soon and to what extent this objective will materialize.[20] Still, we believe that climate-related investments will cause a bias to reduce both government and private net savings.

Third, foreign inflows likely to ease

We believe the current high level of foreign net lending (inflows) is due to increased geopolitical uncertainties. In our base scenario, we assume that foreign net lending returns to the pre-COVID level of around 2% of GDP. The risk is clearly that global tensions will last much longer and lead to more safe-haven inflows. On the other hand, we believe the need for emerging economies to build more reserves is fading, while the pressure to diversify reserves into other currencies and asset markets is increasing.

Fourth, inflation should normalize but with an upward bias

We do not have a strong view on potential growth[21] and think it will stay close to the current level, which is in line with estimates by the Congressional Budget Office and the Fed over the next 10 years, and within the broad range seen over the last 20 years.[22]

We are also confident that inflation will moderate further because we think the Fed

will remain committed to inflation control. However, we do not expect a return to the low inflation environment of the 2010s.

In our view, labor market conditions will stay tighter thanks to demographics and the disinflationary forces stemming from the deleveraging dynamic following the GFC, as well as favorable global supply conditions (notably from Asia) are no longer in place.

Thus, while inflation had a bias to fall below 2% in 2010s, we think it will have a bias to push above 2% going forward and believe that this will be reflected in higher inflation expectations and risk premia than in the last two decades.

Fifth, Fed has to focus more on inflation

As stated before, we are convinced that the Fed will stay committed to inflation control, but while the Fed was trying to push inflation up towards 2% in the last decade, we think it has to make a bigger effort now to keep inflation from moving above 2%.[23] To us, that means that the real Fed funds rate will have to be positive.

On the other hand, we think the Fed will continue its *Ample Reserve Regime* to control interest rates.[24] That implies that the period of quantitative tightening (QT) will come to an end in the foreseeable future.[25]

It is even possible that the Fed at some point will start to buy securities again to keep reserves sufficiently ample. In other words, we believe the real-yield depressing effect of the quantitative policy measures is likely to prevail, although not at the peak levels seen during COVID.

As a result, we think the Fed will have to target a higher real Fed funds rate than its own projections currently imply, to neutralize at least parts of the stimulating impact of the prevailing quantitative policy measures.[26]

The risk is tilted toward higher yields

Table 2 shows our base scenario, which summarizes our five outlook themes, for real and nominal 10-year Treasury yields based on the framework outlined in Table 1 plus two alternative (low and high yield) scenarios.

Table 2: Yield scenarios*
% p.a.

	Current	Base	Low	High
Pot. growth**	2.2	2.0	2.0	2.0
*& contrb.****	*1.6*	*1.4*	*1.4*	*1.4*
Inflation risk**	2.6	1.8	1.3	2.3
*& contrb.****	*1.7*	*1.1*	*0.8*	*1.4*
Gov. net sav.**	-6.5	-6.5	-5.5	-7.5
*& contrb.****	*1.4*	*1.5*	*1.3*	*1.7*
Prv. net sav.**	2.5	3.0	3.5	2.5
*& contrb.****	*-0.5*	*-0.6*	*-0.7*	*-0.5*
For. net lend**	3.2	2.0	3.0	1.0
*& contrb.****	*-0.9*	*-0.6*	*-0.8*	*-0.3*
Real Fed rate**	2.8	1.5	0.5	2.5
*& contrb.****	*0.7*	*0.4*	*0.1*	*0.6*
Fed QPM**	15.7	12.0	15.5	9.0
*& contrb.****	*-1.9*	*-1.7*	*-1.9*	*-1.5*
Real yield	1.9	1.5	0.2	2.9
Inflation expec.	2.3	2.5	2.0	3.5
Nominal 10-year Treasury yield	4.3	4.0	2.2	6.4

* 5-to-10 year horizon or business cycle average; ** Variable value; *** Contribution of the variable to the real yield level.

Source: Same as Table 1 and ZAIS's own scenario projections.

The base scenario projects that the nominal 10-year Treasury yield should average around 4% for the next 5 to 10 years, which is close to current levels, even though we do expect some Fed easing. Compared to the 2010s, we anticipate upward pressure from most components. However, our estimates suggest that yields would be significantly higher if the Fed were to unwind all its Treasuries holdings from earlier quantitative policy measures.

In the "low" yield scenario, real and nominal yields fall back to the levels last seen in the 2010s. That requires improvements on all scores. Most importantly, inflationary

pressures have to decrease much further to allow the Fed to cut the real Fed funds rate sharply and keep the quantitative policy measures at the current level. Such a scenario cannot be ruled out but we assign it a low probability, given our view on the change in underlying inflation dynamics.

Instead, we think risks are biased to the upside, especially if underlying inflation pressures become entrenched and the Fed has to maintain a tighter policy stance. This situation could worsen further if the balance of the flow of funds deteriorates as well. We estimate that the 10-year Treasury yield could exceed 6% under these conditions.

From tailwinds to headwinds

As outlined in the previous ZAIS Insight "Resilient but not Invincible", a large share of the outstanding debt in the economy is still based on interest rate terms set before the Fed started to tighten policy.[27] If our yield outlook is right, overall interest payments in the economy will rise as maturing debt is refinanced and new debt comes to the market.

In our view, that may not lead to a crisis, but it would be a fundamental change from an environment in which interest rate conditions provided powerful tailwinds to a state in which interest rate conditions become at least moderately restrictive.

We think the household sector is best placed to handle the adjustment and the government will feel the pinch the most, while the business sector falls somewhere in between. Importantly, we anticipate more bifurcation between strong and weak credits.

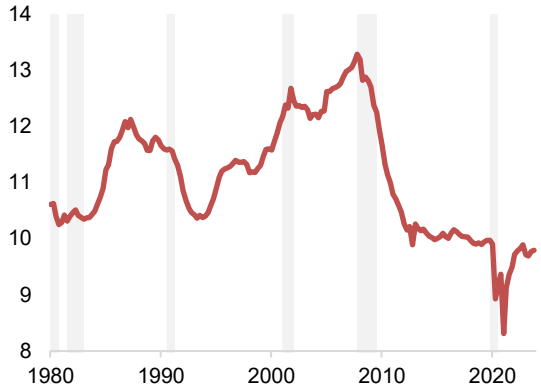
Household sector not at risk

Our positive view on the household sector reflects the post-GFC deleveraging and the robust labor-market and income conditions.[28] We think this will keep debt-service payments on existing mortgages at a manageable level even as effective interest rates gradually rise (see Chart 6).

Homebuyers, however, will probably struggle if mortgage rates stay higher for longer, which means that housing construction is unlikely to become a powerful engine of growth.[29]

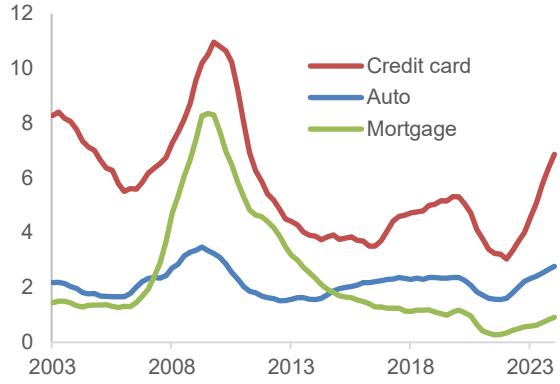
In contrast to mortgages, there are clear signs of distress in credit card loans and, to a lesser extent, auto loans (see Chart 7).

Chart 6: Household debt service payments
% of disposable income



Source: Board of Governors of the Federal Reserve [30]

Chart 7: Transition into delinquency
90+days, % balance of respective total



Source: Federal Reserve Bank of New York [31]

We see this as a reflection of three factors: weaker debtor fundamentals,[32] shorter term structures (credit card loan interest rates are variable) and, in the case of credit card loans, a much larger increase in interest rates.[33]

As we argued in the ZAIS Insight "Diverging Household Health" last year, adverse financial conditions impact lower-income households more than wealthy ones.[34] Thus, we see some further upside risk to credit card and auto loan delinquency rates. However, credit card and auto loans account for a much smaller share of overall household debt and are, thus, unlikely to create systemic stress.[35]

Business sector adjustment more volatile but not systemic

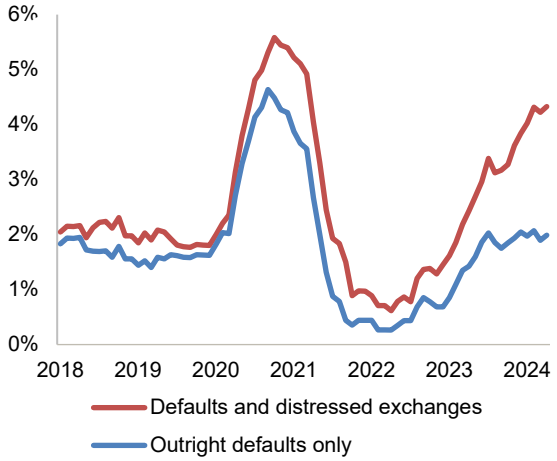
We are not expecting higher for longer to create an overall systemic problem in the business sector either, but we think the adjustment process will be more volatile and create more individual distress situations compared with the household sector.

We see four factors that make the business sector somewhat more vulnerable to higher for longer than the household sector: first, less effort to restrain leverage since the GFC[36]; second, shorter debt maturities, especially compared to household mortgages; third, more varied credit fundamentals; and fourth, idiosyncratic challenges.

A leading example is the leveraged loan sector, given its floating-rate nature. Last year, we predicted that the leveraged loan default rate would rise to at least 4% within 18 months.[37] Currently, the leveraged loan default rate is around 2% but when combined with distressed exchanges, which have become a popular way of resolving distress situations to avoid outright default, the total has climbed to 4.3% (see Chart 8).

Chart 8: Leveraged loan defaults

% of total issues

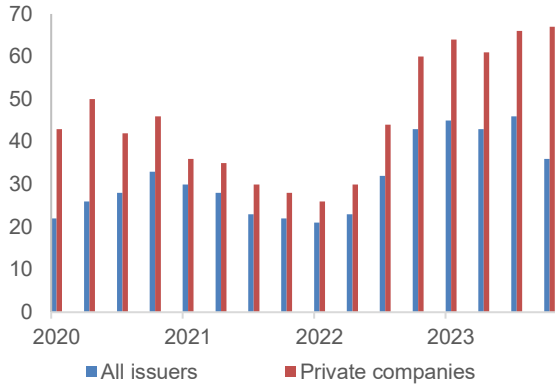


Source: Pitchbook LCD [38]

The share of leveraged loan issuers with low interest coverage ratios of two or less has declined lately, which suggests to us that the worst of the adjustment in leveraged loans to higher interest rates is probably over (see Chart 9). However, we see continued risks from private companies which make up a high share of leveraged loan issuers with interest rate coverage ratios of two or less.[39]

Chart 9: Leveraged loan issuers with interest coverage ratios ≤ 2x

% of issuers in group



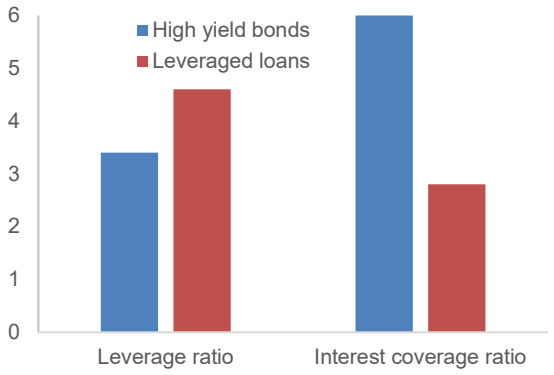
Source: JPMorgan [40]

We believe the high-yield bond market still has to go through some of the adjustment already seen in the leveraged loan market as debt matures, but less so given its better credit fundamentals.[41] Leverage ratios in

high yield bonds are about a quarter lower than in leveraged loans (see Chart 10).

Further, interest coverage ratios in high yield bonds are twice as high as in leveraged loans.[42] We expect interest coverage ratios in high yield to decline but less so and from a higher starting level, compared to leveraged loans.[43]

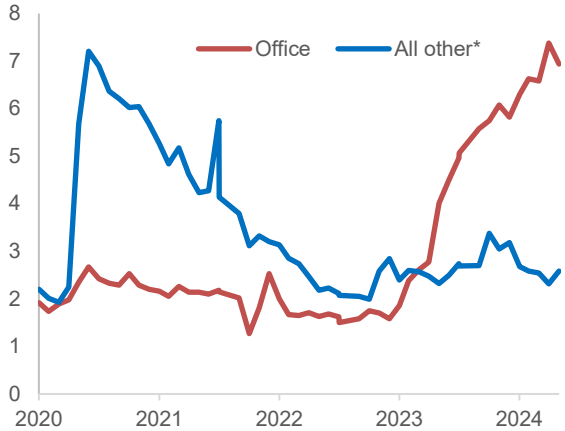
Chart 10: Leverage and interest coverage
% of issuers in group



Source: JPMorgan[44]

The challenges created by the rise of working-from-home for the office sector present a special case. In a prior ZAIS Insight "Dipping a Toe Back into CMBS" we pointed out that higher interest rates and tighter lending standards raised the hurdle for debt refinancing of commercial real estate.[45]

Chart 11: CMBS delinquency rates
% of issuers in group



* Industrial, multifamily, retail and lodging.

Source: Trepp [46]

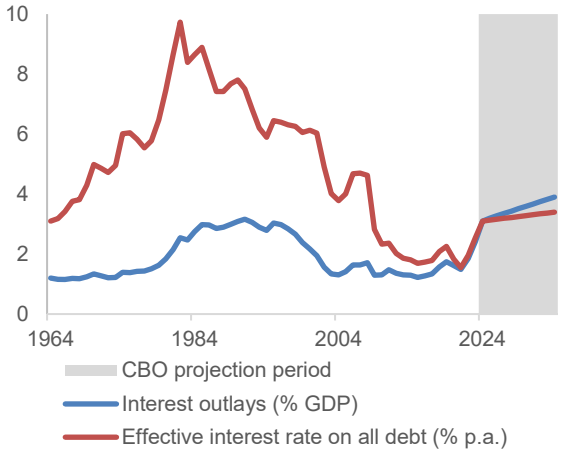
We argued that many office properties struggle to generate sufficient net operating income growth to refinance their maturing debt, given the particular challenges in the sector. The result has been a surge in office CMBS delinquencies compared to other property types, which we believe has still some way to go, due to the dispersion in office qualities and credit fundamentals (see Chart 11).

Government debt is the biggest risk

The consequences of higher for longer for the government are well outlined in the latest outlook of the Congressional Budget Office (CBO)[47]. The CBO assumes an average 10-year Treasury yield of around 4% until 2034, similar to our base-case scenario.

As a result, the CBO expects interest outlays to rise from 2.4% of GDP in 2023 to nearly 4% of GDP by 2034, well above the previous highs when the effective interest rate paid on federal debt was more than double what the CBO forecasts for the next 10 years (see Chart 12).

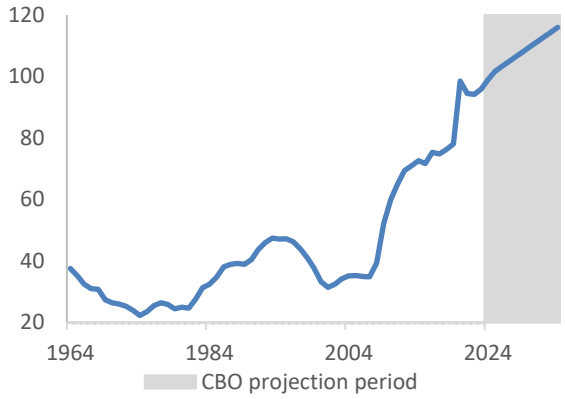
Chart 12: Federal interest outlays and effective interest rate
Percent



Source: Office of Management and Budget, Congressional Budget Office and Federal Reserve Bank of St. Louis [48]

The difference is explained by the much higher debt-to-GDP ratio now, compared to 40 years ago (see Chart 13). The CBO expects this dynamic to continue over the next 30 years with interest outlays reaching 6.4% of GDP and the debt/GDP ratio climbing to 166% by 2054.[49]

Chart 13: Federal debt held by the public
% GDP



Source: Office of Management and Budget, Congressional Budget Office and Federal Reserve Bank of St. Louis [50]

If and when such a dynamic could lead to a crisis is hard to judge and depends also on other factors, such as the financial and regulatory structure, the flow of funds inside the economy and with the rest of the world, the reserve currency status and the ability of the central bank to monetize the debt without creating run-away inflation. Japan, for example, has not yet experienced a crisis despite the government debt/GDP ratio rising from less than 50% in 1980 to over 250% now.[51]

On the other hand, the ingredients for a potential government debt crisis are there. Turning a blind eye on the sustainability problems of government debt and hoping that Japan's experience will apply to the US or that economic growth will rise materially while interest rates will decline significantly would be a mistake, in our view.

Eliminating the risk of a crisis means adjusting taxes and non-interest outlays in such a way that it stabilizes the debt-to-GDP ratio. The IMF estimates that the US government would have to improve its primary fiscal balance (excluding interest outlays) by 4% points of GDP over the next five years in order to stabilize this ratio by 2029.[52]

We cannot know whether and when policy makers will respond to this risk and take action. It is difficult for politicians to reconcile election cycles and long-term debt sustainability objectives.

As a result, while we expect more credit and default-risk dispersion in the private sector, we think the systemic risk is with the government sector also, given its scale, concentration and binary risk profile.

More information

As always, we are available to discuss our views with you. Please contact your Client Relations representative at +1 732 978 9722 or zais.clientrelations@zaisgroup.com

[1] Board of Governors of the Federal Reserve System (US), Market Yield on U.S. Treasury Securities at 10-Year Constant Maturity, Quoted on an Investment Basis [GS10], retrieved from FRED, Federal Reserve Bank of St. Louis; May 3, 2024.

https://fred.stlouisfed.org/series/GS10

[2] Board of Governors of the Federal Reserve System (US), Market Yield on U.S. Treasury Securities at 10-Year Constant Maturity, Quoted on an Investment Basis [GS10], retrieved from FRED, Federal Reserve Bank of St. Louis; May 3, 2024.

https://fred.stlouisfed.org/series/GS10

Federal Reserve Bank of Philadelphia; Survey of Professional Forecasters; 10-year CPI Inflation Rate (CPI10); Median Responses; May 10, 2024.

https://www.philadelphiafed.org/surveys-and-data/cpi10

Board of Governors of the Federal Reserve System (US), Market Yield on U.S. Treasury Securities at 10-Year Constant Maturity, Quoted on an Investment Basis, Inflation-Indexed [FII10], retrieved from FRED, Federal Reserve Bank of St. Louis; May 15, 2024.

https://fred.stlouisfed.org/series/FII10

[3] Federal Reserve Bank of Philadelphia; Survey of Professional Forecasters; 10-year CPI Inflation Rate (CPI10); Median Responses; May 10, 2024.

https://www.philadelphiafed.org/surveys-and-data/cpi10

[4] See Chart 1 again.

[5] ZAIS calculation based on the nominal 10-year Treasury yield (same as in footnote 1) and 10-year inflation expectations (same as in footnote 3). The real yield is the nominal yield minus inflation expectations.

[6] See Chart 2 again.

[7] See Chart 3 again.

[8] U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers: All Items in U.S. City Average [CPIAUCSL], retrieved from FRED, Federal Reserve Bank of St. Louis; May 15, 2024.

https://fred.stlouisfed.org/series/CPIAUCSL

[9] We estimate the real yield level as a linear function of the following variables with coefficients (standard errors in parenthesis) based on a quarterly regression from 1990 to 2024.

0.720 * Potential real GDP growth (0.047)

0.626 * 5-year inflation volatility (0.107)

-0.233 * Gov. net savings % GDP (0.075)

-0.214 * Private net savings % GDP (0.080)

-0.282 * Foreign net lending % GDP (0.055)

0.256 * Real Fed funds rate (0.040)

-0.690 * Natural log of Fed Treasury holdings linked to QPMs since 2009 % GDP (0.056)

Note that the Fed Treasury holdings impact real yields in our analysis in level terms and not in flow terms but with a diminishing scale factor expressed through the natural logarithm. The following data sources were used for the regression.

Real yield (% p.a.):

Board of Governors of the Federal Reserve System (US), Market Yield on U.S. Treasury Securities at 10-Year Constant Maturity, Quoted on an Investment Basis [GS10], retrieved from FRED, Federal Reserve Bank of St. Louis; May 3, 2024.

https://fred.stlouisfed.org/series/GS10

Federal Reserve Bank of Philadelphia; Survey of Professional Forecasters; 10-year CPI Inflation Rate (CPI10); Median Responses; May 10, 2024.

https://www.philadelphiafed.org/surveys-and-data/cpi10

Potential real GDP growth (% oya):

U.S. Congressional Budget Office, Real Potential Gross Domestic Product [GDPPOT], retrieved from FRED, Federal Reserve Bank of St. Louis; April 24, 2024.

https://fred.stlouisfed.org/series/GDPPOT

5-year inflation volatility (% 5-year standard deviation of quarterly CPI % over year ago):

U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers: All Items in U.S. City Average [CPIAUCSL], retrieved from FRED, Federal Reserve Bank of St. Louis; , May 15, 2024.

https://fred.stlouisfed.org/series/CPIAUCSL

Net government savings (% of GDP, 4-quarter average, 1 quarter lagged):

U.S. Bureau of Economic Analysis, Net Federal Government Saving [FGDEF], retrieved from FRED, Federal Reserve Bank of St. Louis; May 14, 2024.

https://fred.stlouisfed.org/series/FGDEF

U.S. Bureau of Economic Analysis, Net State and Local Government Saving [SLDEF], retrieved from FRED, Federal Reserve Bank of St. Louis; April 25, 2024.

https://fred.stlouisfed.org/series/SLDEF

U.S. Bureau of Economic Analysis, Gross Domestic Product [GDP], retrieved from FRED, Federal Reserve Bank of St. Louis; April 25, 2024.

https://fred.stlouisfed.org/series/GDP

Net private savings (gross savings minus investment % of GDP, 4-quarter average, 1 quarter lagged):

U.S. Bureau of Economic Analysis, Gross Private Saving [GPSAVE], retrieved from FRED, Federal Reserve Bank of St. Louis; April 25, 2024.

https://fred.stlouisfed.org/series/GPSAVE

U.S. Bureau of Economic Analysis, Gross Private Domestic Investment [GPDI], retrieved from FRED, Federal Reserve Bank of St. Louis; May 21, 2024.

https://fred.stlouisfed.org/series/GPDI

U.S. Bureau of Economic Analysis, Gross Domestic Product [GDP], retrieved from FRED, Federal Reserve Bank of St. Louis; April 25, 2024.

https://fred.stlouisfed.org/series/GDP

Net foreign lending (% of GDP, 4-quarter average, 1 quarter lagged):

Board of Governors of the Federal Reserve System (US), Rest of the World; Net Lending (+) or Borrowing (-) (Capital Account), Transactions [RWLBACQ027S], retrieved from FRED, Federal Reserve Bank of St. Louis; April 25, 2024.

https://fred.stlouisfed.org/series/RWLBACQ027S

U.S. Bureau of Economic Analysis, Gross Domestic Product [GDP], retrieved from FRED, Federal Reserve Bank of St. Louis; April 25, 2024.

https://fred.stlouisfed.org/series/GDP

Real Fed funds rate (% p.a.):

Board of Governors of the Federal Reserve System (US), Federal Funds Effective Rate [FEDFUNDS], retrieved from FRED, Federal Reserve Bank of St. Louis; May 3, 2024.

https://fred.stlouisfed.org/series/FEDFUNDS

Accumulated Fed Treasury holdings starting from 2009Q2 (% of GDP, 4-quarter moving average):

Board of Governors of the Federal Reserve System (US), Assets: Securities Held Outright: U.S. Treasury Securities: All: Wednesday Level [TREAST], retrieved from FRED, Federal Reserve Bank of St. Louis; May 17, 2024.

https://fred.stlouisfed.org/series/TREAST

Board of Governors of the Federal Reserve System (US), Assets: Securities Held Outright: Mortgage-Backed Securities: Wednesday Level [WSHOMCB], retrieved from FRED, Federal Reserve Bank of St. Louis; May 17, 2024.

https://fred.stlouisfed.org/series/WSHOMCB

[10] The Ricardian Equivalence Theorem states that increased government spending financed through debt causes the private sector to save more in expectation of higher taxes in the future, leaving aggregated demand unchanged.

https://en.wikipedia.org/wiki/Ricardian_equivalence

The Crowding Out Effect is a phenomenon that occurs when increased government involvement in a sector of the economy substantially affects the remainder of the economy. The classic example is expansionary fiscal spending reducing investment spending by the private sector. The government spending is "crowding out" investment because it is demanding more loanable funds and thus causing increased interest rates and therefore reducing investment spending.

https://en.wikipedia.org/wiki/Crowding_out_(economics)

[11] Total global foreign exchange reserves rose from 1.8 trillion USD in 1999 to 8.2 trillion USD in 2009. IMF; COFER data; March 2024.

https://data.imf.org/?sk=e6a5f467-c14b-4aa8-9f6d-5a09ec4e62a4

[12] Federal Reserve Bank of St. Louis; FRAESER; Timeline Federal Reserve Monetary Policy; 2008-2014 | Large-scale Asset Purchases.

https://fraser.stlouisfed.org/timeline/monetary-policy-history#65

[13] The level of Fed securities holdings is currently still higher than the peak levels seen in the 2010s (see Chart 4 and respective sources in footnote 14).

[14] Board of Governors of the Federal Reserve System (US), Assets: Securities Held Outright: U.S. Treasury Securities: All: Wednesday Level [TREAST], retrieved from FRED, Federal Reserve Bank of St. Louis; May 17, 2024.

https://fred.stlouisfed.org/series/TREAST

Board of Governors of the Federal Reserve System (US), Assets: Securities Held Outright: Mortgage-Backed Securities: Wednesday Level [WSHOMCB], retrieved from FRED, Federal Reserve Bank of St. Louis; May 17, 2024.

https://fred.stlouisfed.org/series/WSHOMCB

U.S. Bureau of Economic Analysis, Gross Domestic Product [GDP], retrieved from FRED, Federal Reserve Bank of St. Louis; April 25, 2024.

https://fred.stlouisfed.org/series/GDP

[15] Congressional Budget Office; The Budget and Economic Outlook: 2024 to 2034; February 2024.

https://www.cbo.gov/publication/59946

[16] Same source as footnote 15.

[17] U.S. Bureau of Economic Analysis, Personal Saving Rate [PSAVERT], retrieved from FRED, Federal Reserve Bank of St. Louis; May 17, 2024.

https://fred.stlouisfed.org/series/PSAVERT

[18] United Nations; World Population Prospects 2022.

https://population.un.org/wpp/

[19] ZAIS Group; Resilient but not invincible; April 2024.

https://www.zaisgroup.com/resilient-but-not-invincible.html

[20] International Energy Agency; Net Zero by 2050; May 2021.

https://www.iea.org/reports/net-zero-by-2050

International Monetary Fund; Reaching Net Zero Emissions; June 2021.

chrome-www.imf.org/external/np/g20/pdf/2021/062221.pdf

[21] Calibrating different scenarios for potential growth requires a detailed analysis and projection of the different growth factors (labor and capital) as productivity estimates including total factor productivity, which exceeds the scope of this report. Also, we believe that potential growth factors are unlikely to change significantly over a 5-to-10 year horizon. As a result, we assume potential growth to be the same across all scenarios.

[22] U.S. Congressional Budget Office, Real Potential Gross Domestic Product [GDPPOT], retrieved from FRED, Federal Reserve Bank of St. Louis; April 24, 2024.

https://fred.stlouisfed.org/series/GDPPOT

Board of Governors of the Federal Reserve System; FOMC Projections materials, accessible version; March 20, 2024.

https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20240320.htm

[23] ZAIS GROUP; News and Insights; The Inflation Trap; February 2024.

https://www.zaisgroup.com/the-inflation-trap.html

[24] Board of Governors of the Federal Reserve System; Plans for reducing the size of the Federal Reserve's balance sheet; May 1, 2022.

https://www.federalreserve.gov/monetarypolicy/policy-normalization.htm

Federal Reserve Bank of New York; Balance Sheet Basics, Progress, and Future State; Speech by Julie Remache, Deputy SOMA Manager and Head of Market and Portfolio Analysis on the Open Market Trading Desk; February 7, 2024.

https://www.newyorkfed.org/newsevents/speeches/2024/rem240207

[25] As of June 2024, the Fed has already reduced the monthly redemption cap of Treasury securities from $60 billion to $25 billion.

https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20240612.htm

[26] The latest FOMC projections put the Fed funds rate at 2.8% and the inflation rate at 2% in the long run, implying a real Fed funds rate of 0.8%.

Board of Governors of the Federal Reserve System; FOMC Projections materials, accessible version; June 12, 2024.

https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20240320.htm

[27] ZAIS GROUP; News and Insights; Resilient but not Invincible; April 2024.

https://www.zaisgroup.com/resilient-but-not-invincible.html

[28] Board of Governors of the Federal Reserve System (US), Households and Nonprofit

Organizations; Debt Securities and Loans; Liability, Level [TCMILBSHNO], retrieved from FRED, Federal Reserve Bank of St. Louis; May 24, 2024.

https://fred.stlouisfed.org/series/TCMILBSHNO

U.S. Bureau of Economic Analysis, Gross Domestic Product [GDP], retrieved from FRED, Federal Reserve Bank of St. Louis; May 24, 2004

https://fred.stlouisfed.org/series/GDP

U.S. Bureau of Labor Statistics, Unemployment Rate [UNRATE], retrieved from FRED, Federal Reserve Bank of St. Louis; May 21, 2024.

https://fred.stlouisfed.org/series/UNRATE

[29] ZAIS GROUP; News and Insights; Housing Slump supports Agency CRT notes; November 2023.

https://www.zaisgroup.com/housing-slump-supports-agency-crt-notes.html

[30] Board of Governors of the Federal Reserve System (US), Household Debt Service Payments as a Percent of Disposable Personal Income [TDSP], retrieved from FRED, Federal Reserve Bank of St. Louis; May 21, 2024.

https://fred.stlouisfed.org/series/TDSP

[31] Federal Reserve Bank of New York; Household Debt and Credit Report; 2024-Q1.

https://www.newyorkfed.org/microeconomics/hhdc

[32] Federal Reserve Bank of New York; Household Debt and Credit Report; 2024-Q1.

https://www.newyorkfed.org/microeconomics/hhdc

[33] The interest rate on credit card loans jumped from 14.5% in 2021 to 21.5% in 2024 Q1.

Board of Governors of the Federal Reserve System (US), Commercial Bank Interest Rate on Credit Card Plans, All Accounts [TERMCBCCALLNS], retrieved from FRED, Federal Reserve Bank of St. Louis; May 21, 2024.

https://fred.stlouisfed.org/series/TERMCBCCALLNS

[34] ZAIS GROUP; News and Insights; Diverging Household Health; February 2023.

https://www.zaisgroup.com/diverging-household-health.html

[35] Credit-card and auto loans are 9% and 6% respectively of total household debt.

Federal Reserve Bank of New York; Household Debt and Credit Report; 2024-Q1.

https://www.newyorkfed.org/microeconomics/hhdc

[36] Business sector debt in % of GDP is currently at the same level as at the peak during the financial crisis in 2009, while household sector debt in % of GDP has declined by more than a quarter.

Board of Governors of the Federal Reserve System (US), Nonfinancial Corporate Business; Debt Securities and Loans; Liability, Level [TCMILBSNNCB], retrieved from FRED, Federal Reserve Bank of St. Louis; May 23, 2024.

https://fred.stlouisfed.org/series/TCMILBSNNCB

Board of Governors of the Federal Reserve System (US), Nonfinancial Noncorporate Business; Debt Securities and Loans; Liability, Level [TCMILBSNNB], retrieved from FRED, Federal Reserve Bank of St. Louis; May 25, 2024.

https://fred.stlouisfed.org/series/TCMILBSNNB

Board of Governors of the Federal Reserve System (US), Households and Nonprofit Organizations; Debt Securities and Loans; Liability, Level [TCMILBSHNO], retrieved from FRED, Federal Reserve Bank of St. Louis; May 24, 2024.

https://fred.stlouisfed.org/series/TCMILBSHNO

U.S. Bureau of Economic Analysis, Gross Domestic Product [GDP], retrieved from FRED, Federal Reserve Bank of St. Louis; May 24, 2004

https://fred.stlouisfed.org/series/GDP

[37] ZAIS GROUP; News and Insights; More leveraged loan defaults in the pipeline; August 2023.

https://www.zaisgroup.com/more-leveraged-loan-defaults.html

[38] Pitchbook LCD – Morningstar LSTA US Leveraged Loan Index; LLI Default Rates; May 2024.

https://www.lcdcomps.com/lcd/idx/index.html?rid=10&menu=index-us

[39] See Chart 9 again.

[40] JPMorgan; 4Q2023 Leveraged Loan Credit Fundamentals; Global Credit - North America – High Yield & Leveraged Loans; April 10, 2024.

https://markets.jpmorgan.com/jpmm/research

[41] Historically, credit quality in high-yield used to be somewhat weaker compared to leveraged loans, which is visible in higher average default rates since 2008.

JPMorgan; Default Monitor; Global Credit - North America – High Yield & Leveraged Loans; May 1, 2024.

https://markets.jpmorgan.com/jpmm/research

[42] See Chart 10 again.

[43] Interest coverage ratios in high yield reached 6 at the peak in 2021 versus just a touch above 4 for leveraged loans.

JPMorgan; 4Q2023 High Yield Credit Fundamentals; Global Credit - North America – High Yield & Leveraged Loans; March 14, 2024.

https://markets.jpmorgan.com/jpmm/research

JPMorgan; 4Q2023 Leveraged Loan Credit Fundamentals; Global Credit - North America – High Yield & Leveraged Loans; April 10, 2024.

https://markets.jpmorgan.com/jpmm/research

[44] JPMorgan; 4Q2023 Leveraged Loan Credit Fundamentals; Global Credit - North America – High Yield & Leveraged Loans; April 10, 2024.

https://markets.jpmorgan.com/jpmm/research

[45] ZAIS GROUP; News and Insights; Dipping a toe back into CMBS; October 2023.

https://www.zaisgroup.com/dipping-a-toe-back-into-cmbs.html

[46] TREPP Loan Performance Report; Retrieved 30+ days delinquency percentage for compendium deal list.

https://www.trepp.com/trepptalk/cmbs-delinquency-rate-dips-back-below-5-in-may-2024

[47] Congressional Budget Office; The Budget and Economic Outlook: 2024 to 2034; February 2024.

https://www.cbo.gov/publication/59946

[48] Office of Management and Budget and Federal Reserve Bank of St. Louis, Federal Outlays: Interest as Percent of Gross Domestic Product [FYOIGDA188S], retrieved from FRED, Federal Reserve Bank of St. Louis; May 21, 2024.

https://fred.stlouisfed.org/series/FYOIGDA188S

Congressional Budget Office; The Budget and Economic Outlook: 2024 to 2034; February 2024.

https://www.cbo.gov/publication/59946

[49] Congressional Budget Office; The Long-Term Budget Outlook: 2024 to 2054; March 2024.

https://www.cbo.gov/publication/59711

[50] U.S. Office of Management and Budget and Federal Reserve Bank of St. Louis, Gross Federal Debt Held by the Public as Percent of Gross Domestic Product [FYPUGDA188S], retrieved from FRED, Federal Reserve Bank of St. Louis; May 21, 2024.

https://fred.stlouisfed.org/series/FYPUGDA188S

Congressional Budget Office; The Budget and Economic Outlook: 2024 to 2034; February 2024.

https://www.cbo.gov/publication/59946

[51] International Monetary Fund; World Economic Outlook Data Base; April 16, 2024.

https://www.imf.org/en/Publications/WEO/weo-database/2024/April

[52] International Monetary Fund; World Economic Outlook; April 16, 2024.

https://www.imf.org/en/Publications/WEO/Issues/2024/04/16/world-economic-outlook-april-2024

Important Information

Confidentiality

The information presented herein has been prepared and provided by and is confidential and proprietary to ZAIS Group, LLC, ZAIS Group (UK) Limited and their affiliates and subsidiaries (collectively, "ZAIS"). Accordingly, this material is not to be reproduced in whole or in part or used for any purpose except as authorized by ZAIS, is to be treated as strictly confidential and is not to be disclosed directly or indirectly to any party other than the recipient. By accepting receipt of this document, the recipient agrees to comply with this restriction and confirms its understanding of the limitations set forth in these disclaimers.

Source of Information

Unless otherwise noted, the source of information for the charts, graphs, and other materials contained herein is ZAIS. The charts, tables, and graphs contained in this document are not intended to be used to assist the reader in determining which securities to buy or sell or when to buy or sell securities. Additional information is available upon request.

Nature of Information Provided

This information has been prepared solely for informational purposes and is not an offer to buy or sell or a solicitation of an offer to buy or sell any security or instrument or to participate in any trading strategy which may or may not be made available. Any such offer of securities would, if made, be made pursuant to definitive final private offering documents, which would contain material information not contained herein (including certain risks) or material that differs from the information contained herein and to which current and prospective investors are referred. Any decision to invest should be made solely in reliance upon such private offering documents. In the event of any such offering, this information shall be deemed superseded, amended and supplemented in its entirety by such private offering documents. Information contained herein does not purport to be complete and is subject to the same qualifications and assumptions, and should be considered by investors only in the light of the same warnings, lack of assurances and representations and other precautionary matters, as disclosed in an applicable private offering memorandum and subscription agreement. No representation or warranty can be given with respect to the terms of any offer of securities conforming to the terms hereof. There is no guarantee that the strategies set forth herein will be successful. The information should only be considered current as at the date specified herein and is subject to change at any time and without notice. Statements made herein that are not attributed to a third party source reflect the views and opinions of ZAIS.

Opinions

Certain information contained herein represents ZAIS's current reasonable opinion and is based on unaudited and forecast figures which have been derived from multiple sources and have not been subject to specific due diligence. The information has been provided in good faith but is not guaranteed and is subject to uncertainties beyond ZAIS's control and should not be relied upon for the purposes of any investment decision. ZAIS makes no representations or warranties and accepts no liability whether in contract, tort or otherwise for (1) the information not being full and complete, (2) the accuracy of any opinion, (3) the basis on which any comparison has been drawn or the facts selected to make such comparison and (4) the assumptions underlying any opinions. ZAIS does not undertake to update its opinions. No opinion of this nature can be, and this information does not purport to be, full, complete, comprehensive or to contain all relevant information. Statements made herein that are not attributed to a third party source reflect the views and opinions of ZAIS.

Forward-Looking Statements

These materials may contain statements that are not purely historical in nature but are "forward-looking statements". In some cases, you can identify forward-looking statements by terms such as "anticipate," "believe," "could," "estimate," "expect," "intend," "may," "plan," "potential," "should" and "would" or the negative of these terms or other comparable terminology. These forward-looking statements include, among other things, projections, forecasts,

estimates or hypothetical calculations with respect to income, yield or return, future performance targets, sample or pro forma portfolio structures or portfolio composition, scenario analysis, specific investment strategies or proposed or pro forma levels of diversification or sector investment. These forward-looking statements are based upon certain assumptions, some of which are described herein. Prospective investors are cautioned not to place undue reliance on such statements. No representation is made by ZAIS as to the accuracy, validity or relevance of any such forward-looking statement and the recipient agrees it is solely responsible for gathering its own information and undertaking its own projections, forecasts, estimates and hypothetical calculations. Actual events are difficult to predict, are beyond ZAIS's control, and may substantially differ from those assumed. All forward-looking statements included herein are based on information available on the date hereof or such date specified and ZAIS does not assume any duty to update any forward-looking statement contained herein. Some important factors which could cause actual results to differ materially from those in any forward-looking statements include, among others, the actual composition of the investment portfolio, any defaults to the investments, the timing of any defaults and subsequent recoveries, changes in interest rates, changes in currency rates and any weakening of the specific obligations included in the portfolio. Accordingly, there can be no assurance that estimated returns or projections can be realized, that forward-looking statements will materialize or that actual returns or results will not be materially lower or higher than those presented. The value of any investment, and the income from it, may fall as well as rise. Accordingly, there can be no assurances that an investor will receive back all or any of the original capital invested. Further, the eligible investments may be leveraged and the portfolio of eligible investments may lack diversification thereby increasing the risk of loss.

ZAIS Group (UK) Limited

ZAIS Group (UK) Limited is a company registered in England with number 08908933 and whose registered office is c/o Dixon Wilson, 22 Chancery Lane, London WC2A 1LS, United Kingdom. ZAIS Group (UK) Limited is an appointed representative of Infinity Asset Management LLP, which is authorized and regulated by the Financial Conduct Authority in the United Kingdom. ZAIS Group (UK) Limited's status as an appointed representative of Infinity Asset Management LLP does not imply a certain level of skill or training. Investors will not benefit from the rules and regulations made under the Financial Services and Markets Act 2000 for the protection of investors, nor from the Financial Services Compensation Scheme in the United Kingdom. Nothing herein excludes any liability which ZAIS is not permitted to exclude by applicable law.

Regulatory Registrations and Authorizations

ZAIS Group, LLC's registrations with the Securities and Exchange Commission (the "SEC") and the Commodity Futures Trading Commission (the "CFTC"), and ZAIS Group (UK) Limited's status as an appointed representative of Infinity Asset Management LLP (which is authorized by the United Kingdom's Financial Conduct Authority ("FCA"), does not imply a certain level of skill or training.