BofA SECURITIES

Global Economic Viewpoint

Is refinancing the kryptonite of monetary policy?

Mortgage structure matters for monetary policy

We look at a cross-section of countries to understand how the composition of the mortgage market – in particular the proportion of ARMs (adjustable-rate mortgages) vs FRMs (fixed-rate mortgages) – affects both 1) the conduct of monetary policy and 2) how monetary policy feeds back into refinancing decisions. We explore the effects of refinancing on both consumption and the housing market.

Monetary policy is more effective under ARMs

Monetary policy transmits faster into consumption under an ARMs system. Long periods of low interest rates induce households to refinance to lock in low coupons and switch into FRMs, which boost consumption. This makes monetary policy path-dependent and weakens the power of the mortgage channel. Monetary policy transmits faster in Canada, Australia, NZ, Korea, Sweden and Norway and less so in the Euro Area and US.

Refinancing is the father of the lock-in effect in the US

Since mortgages are not portable in the US, refinancing coupled with rising demand for housing, driven by urban migration, explains the tight housing market and resilient property prices. We expect this trend to continue unless a recession strikes.

US, Euro Area resilient, Canada, Australia, Korea at risk

The flipside of a less powerful mortgage channel is that consumption in the US, Euro Area and even UK seems resilient thanks to strong employment and a tight housing market. This is consistent with our 'high for longer' call for policy rates. Canada, Australia, NZ, Korea, Sweden and Norway – all countries with high leverage and shares of ARMs – are the most vulnerable as monetary tightening is hitting consumption.

FX: High beta might have to wait

FX implications go against high beta currencies, because of a relatively faster transmission of monetary policy through housing in these economies. This points to upside USD and EUR risks. This is consistent with FX performance so far this year.

Rates: US resilience meets periphery vs core differential

The US economy's resilience should support the 3.75%-4.25% range in 10y UST, leading to a higher 3y1y rate. In the Euro Area, we are concerned about wider periphery-core spreads if monetary policy misfires. In the UK we have turned neutral on the front end. We like front-end flatteners in Australia and steepeners in Japan.

MBS: All good in US, attractive IG mezz in EMEA/APAC

Mortgage credit spreads should be stable to tighter as fundamentals remain strong on a low debt service ratio and high home equity. In EEMEA/APAC, credit deterioration is likely but manageable among ARM-dominated countries like Spain, the UK and Australia.

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Refinancing and monetary policy: Brothers in ARMs

Monetary policy and the structure of housing finance

Monetary policy went through significant structural changes across countries over the last 15 years. Central banks no longer control just short-term interest rates. Non-conventional strategies like Quantitative Easing and Yield Curve control are now an important part of the toolkit.

In addition, the transmission mechanisms of monetary policy have been subject to important structural changes. An extended period of low interest rates and more recently a global pandemic induced companies and families to change their spending patterns as well as take advantage of refinancing opportunities.

In this report, we conduct a cross-country comparative analysis to shed light on a particular transmission channel that is at the center of the debate: the structure of housing finance. We focus on the US, Canada, UK, Euro-Area, Norway, Sweden, Australia, New Zealand, and Korea.

We seek to address key questions frequently asked by our clients:

- How does the composition of the mortgage market, in particular the proportion of ARMs (adjustable-rate mortgages) vs FRMs (fixed-rate mortgages) affect the conduct of monetary policy, as well as households' spending decisions?
- How much did the long period of low interest rates affect the composition of the mortgage market?
- How important is refinancing and urban migration in explaining the resilience of the housing market? Is there a link between the fixed-floating composition and housing prices?
- Which countries are more vulnerable to a correction in the housing market?
- Is there a mortgage-dominance effect? How important is the political economy when it comes to hiking interest rates? Can this trigger political backlash and populist reaction from governments?
- What are the asset pricing implications for each country of the interplay between the structure of housing finance and monetary policy?

Even though we focus on a particular transmission channel, namely the structure of the mortgage market, monetary policy affects the economy through many other channels, such as the more general credit channel, expectations, exchange rate, etc. Moreover, we focus exclusively on residential housing, although we acknowledge the importance of commercial real estate as a subset of the housing channel.

It is therefore worth to clarify that the conclusions in this report refer to how the mortgage channel works with the understanding that the transmission of monetary policy through other channels is endogenously affected by changes in the way the mortgage channel operates through time.

How does monetary policy impact the housing sector?

Housing is a highly rates-sensitive sector. There are three traditional channels through which monetary tightening impacts the housing sector. First, it leads to higher mortgage rates, due to increases in both risk-free rates and mortgage spreads. This weighs on housing activity, specifically residential investment. Second, the increased debt-service burden from the pickup in mortgage rates is a drag on consumer spending. This channel is usually referred to as the cash-flow channel. Third, to the extent that weaker demand lowers home prices, the resulting negative wealth effect is an additional headwind to consumer spending.

Central banks face a delicate balancing act when assessing the impact of rate hikes on the housing sector. On the one hand, they want to see some slowdown in housing activity because housing is arguably the most important sector for the transmission of monetary policy to the real economy. On the other hand, they are wary of the systemic risk the sector poses to the economy via its impact potential impact on consumers and the financial sector, as evidenced during the global financial crisis (GFC).

The role of fixed vs. floating rate mortgages

The composition of the mortgage market in terms of the proportion of ARM vs FRM is crucial for the conduct of monetary policy. Monetary policy is more powerful through the mortgage channel the higher the fraction of ARM, the higher the fraction of home ownership and the higher the fraction of mortgage-financed houses. In this case, the impact on household cash-flows is faster and more direct, affecting therefore consumption decisions.

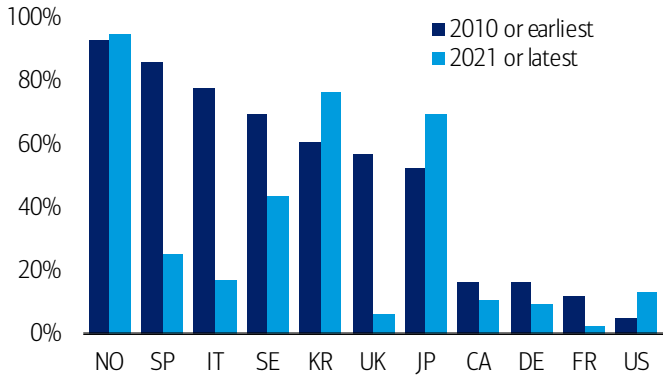
When most homeowners are on FRM, as is the case in the US, monetary transmission is partially blunted. The debt burden remains unchanged for these households during a hiking cycle, and only rises for households that bought their homes after the increase in mortgage rates. In other words, the effective mortgage rate – the average rate across all consumers – rises much less than the spot mortgage rate. This puts a floor under consumer spending and lowers the risk of a vicious cycle of foreclosures and fire sales, which was an important feature of the 2007-09 housing crash. Therefore, home prices do not fall as much as they might have if floating rate mortgages were more prevalent.

We note, however, that housing activity is impacted by weak demand even when mortgage rates are typically fixed, because that is a function of new purchases (recall that GDP and its components such as residential investment are flow, rather than stock, variables). The upshot is that monetary tightening is a substantial headwind to the housing sector, but the knock-on effects on consumer spending are smaller when fixed-rate mortgages are more common.

Refinancing and path-dependent monetary policy

Just in the US, refinancing rose to $2.6 trillion in 2020-2021 when the Fed lowered interest rates to zero. Long periods of low interest rates induce households to refinance to lock in low coupons and switch into FRMs, which boost consumption. This effect makes monetary policy path dependent and weakens the power of the mortgage channel. Path dependency arise because the history of interest rates and its effects on refinancing and consumption affects how powerful the mortgage channel can be in the future. Therefore, the impact of monetary policy ends up depending on the history of

Exhibit 1: Amount of gross lending with a variable interest rate (fixation period of up to 1 year, %)
The fraction of FRM increased across countries compared to 10 years ago



Source: European Mortgage Federation, Haver, BofA Global Research

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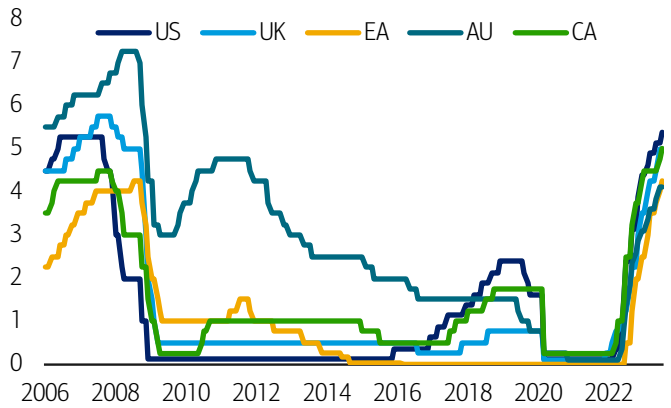
Exhibit 2: Global policy rates (%, EOP)
Policy rates for the major economies



Source: Haver, BofA Global Research

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interest rates. Moreover, the power of monetary policy becomes highly asymmetric depending on the increase in the fraction of FRM.

The extended period of very low interest rates at a global level induced a significant amount of refinancing as households took advantage of low long term interest rates. Even though the effect of refinancing was pretty strong in the US, it was a global phenomenon, as the fraction of FRMs increased across countries compared to 10 years ago (see Exhibit 1 and Exhibit 2). As interest rates move structurally lower, FRMs becomes more attractive than ARMs, which explains both the increase in refinancing and the drop in the fraction of ARMs across countries.

As highlighted before, refinancing modifies the way monetary policy affects the economy, making it very asymmetric, so it is worth to explore this mechanism in more detail.

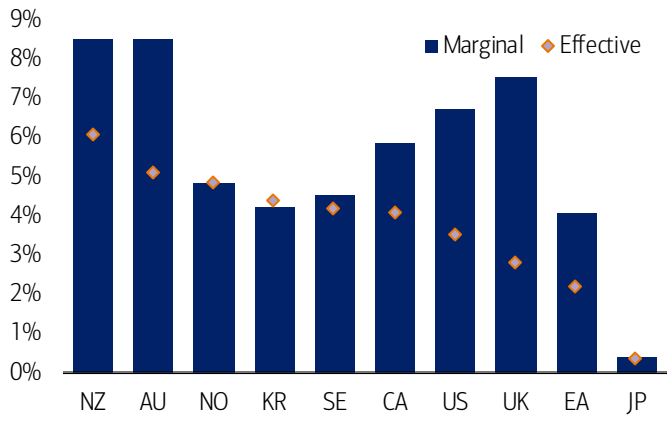
When central banks adopt easy monetary policy for an extended period, households refinance their mortgages, which releases purchasing power that boosts consumption, in particular for durable goods. The implementation of quantitative easing (QE) through the purchase of long-term government bonds and MBS exacerbates this effect, as it affects directly long-term rates. As we will see below, this effect was documented for US, Euro Area and Sweden.

However, once a big share of mortgages has been refinanced and/or converted to FRM and households locked in low long-term rates, monetary policy loses power, because obviously households don't have an incentive to refinance as monetary policy is tightened and interest rates move higher. The gap between the effective and the marginal mortgage rate captures (together with the fraction of ARMs in the total pool of mortgages) the degree of inaction of monetary policy in a tightening cycle (see Exhibit 3). Monetary policy only affects the marginal buyer.

With monetary policy being impaired to affect consumption through this channel, interest rates need to be increased more or remain high for longer, affecting disproportionally other sectors of the economy, such as the banking or the corporate sector.

We have seen this in the US, where house prices and consumption held quite well despite the sharp and swift tightening of monetary policy, while at the same time the banking system was severely affected by the Fed tightening. Interest rate increases reduces refinancing and therefore increases the duration of FRM and MBS, which amplify bank losses in a rising interest rates environment (see Exhibit 4).

Exhibit 3: Global marginal and effective mortgage rates (%)
The gap between the effective and the marginal mortgage rate captures the degree of inaction of monetary policy in a tightening cycle



Source: Haver, National statistical agencies and central banks, BofA Global Research

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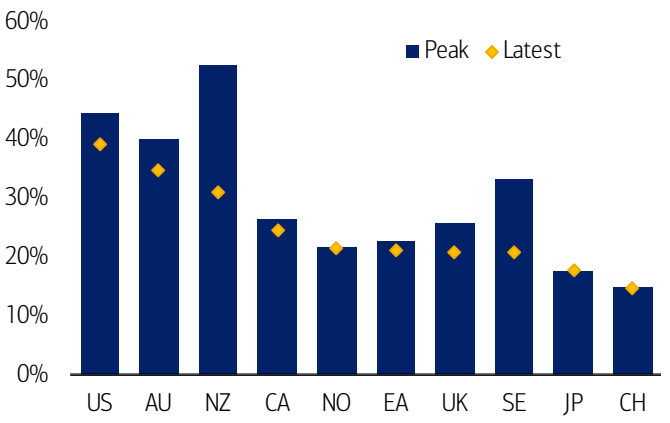
Exhibit 4: Global home price growth (%chg from 2019 to post-pandemic peak and latest)
Home price growth has held up quite well since the pandemic



Source: Haver, BofA Global Research

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Beyond the clear examples of Silicon Valley and First Republic, banks underperformed the rest of S&P by approximately 15% since the start of the tightening cycle. On the contrary, an ARMs-based system impacts households rather than banks when interest rates rise, impacting banks through default risk only.

An important corollary of this asymmetric behavior is not only that monetary policy is less powerful to cool off the economy, but it will be also less powerful to fight the next recession if it comes soon enough such that the pool of mortgages locked at low interest rates is big enough to prevent another round of refinancing when the Fed lowers interest rates to fight the recession. Of course, other channels can compensate for a more muted mortgage channel as central banks increase interest rates to affect the economy mostly through the credit channel.

The normalization of the power of monetary policy though this channel can take several years until the marginal flow of mortgages accrues at higher rates and affect materially the effective mortgage rates of the economy. This refinancing effect could potentially even affect the level of the natural rate of interest, at least from a cyclical perspective.

It can be argued that monetary policy can affect the economy through the housing market through wealth effects, which is obviously true. However, the asymmetric behavior of monetary policy is mostly driven by refinancing, not by lack of wealth effects when interest rates move lower. In addition, as discussed below, those wealth effects can be limited by the effect of marginal supply of homes when the central bank ease interest rates.

Wealth effect include also financial wealth that is very sensitive to interest rates, which is an important channel in the US given the households' exposure to the equity market. Once again, this channel might continue working, but is separate from the mortgage channel which is the focus of this report.

Refinancing as a threat to financial stability

Refinancing also has financial stability implications. As refinancing increase the fraction of FRMs, this increases the duration mismatch of financial institutions, effectively making them absorb additional risks.

This makes the hiking cycle more disruptive, since weaker banks with huge maturity mismatches, in particular those relying on unsecured deposits, are more prone to go under. Financial stability concerns might end up limiting the room of maneuver for the Fed in a hiking cycle. Proper regulatory oversight is of first order importance to avoid that outcome.

Low interest rates and the lock-in effect

Refinancing affects not only the way monetary policy impacts the economy, in particular consumption, but also it plays a crucial role in the short-term equilibrium prices of houses.

This is particularly important in the US. Since households don't want to lose the benefits of the advantageous mortgage terms locked in during the times of low interest rates, they are less willing to move, effectively reducing the supply of houses for sale in the secondary market. The reason why this happens in the US is because mortgages are not portable, different from the cases of Canada or the UK. This is usually known as the lock-in effect. This effect also impacts negatively on labor mobility. Fonseca and Liu (2023)[1] estimate that for the US, a 1% increase in mortgage rates reduce annual moving by 70bp, which is by 9% of the annual moving rate.

[1] Fonseca, Julia and Liu, Lu, Mortgage Lock-In, Mobility, and Labor Reallocation. Berkeley Haas. 2023.

Resilient House prices: urban migrations meet lock-in effects

This effect, combined with the increase in the demand for housing resulting from the post pandemic urban migration, explain the observed resilience in house prices. The data on Existing Home Sales (EHS) is consistent with this phenomenon. EHS dropped from 6 million per year in 2021 to 4 million in the last 12 months. Not surprisingly, rental rates skyrocketed as both buyers and sellers prefer to hold the option value of transacting in the future at more favorable expected terms.

However, it is worth highlighting that a drop in EHS is what we should expect when monetary policy tightens, but the interesting point here is that EHS are dropping while home prices are holding up well relative to pre-pandemic levels, preventing wealth effects to impact negatively on consumption.

It can be argued that as interest rates start to fall, there will be a construction boom driven by the lack of sufficient supply of homes due to the lock in effect. However, that argument relies of a drop in interest rates that is not associated with a recession that hits employment heavily.

Even if interest rates move lower in a soft-landing scenario, the marginal increase in house prices associated with lower interest rates will stimulate the supply of existing homes too. That supply curve is most likely very elastic to marginal increases in home prices and becomes even more elastic if the expectation is that the increase in construction will driven homes prices lower, limiting therefore the wealth effects of lower interest rates.

Higher rates and resilient house prices deteriorate affordability

The combination of a rapid increase in house prices on the back of the massive monetary/fiscal stimulus during the pandemic and the subsequent increase in interest rates post pandemic impacted negatively on affordability for marginal buyers despite the recovery in income. However, affordability was positively impacted for inframarginal owners with outstanding mortgages as a consequence of refinancing. The dynamics of affordability varies somewhat across countries but is roughly similar in trend terms.

Most likely affordability should improve over time if interest rates peak and eventually move lower, in particular for those countries where a soft landing materializes, like we expect in the US. House prices are unlikely to fall significantly from here given the increase in demand due to recent urban trends and the retraction of supply due to lock-in effects, but most likely will stabilize at the time the marginal cost of mortgages drop in line with monetary easing going forward. On the contrary, in a hard landing scenario, where employment and income suffers significantly, affordability is less likely to improve going forward.

Consumption response to refinancing decisions

Refinancing releases purchasing power that borrowers, in particular those who are liquidity constrained, can use to finance consumption on other goods and services different from housing. However, from a general equilibrium perspective, if a refinancing opportunity triggered by an interest rate shock represents a positive shock for borrowers, it also means a negative shock for savers/lenders, so refinancing has a positive net effect on consumption if the marginal propensity to consume of borrowers is higher than that of savers/lenders.

In other words, the mortgage refinancing channel is basically a redistribution channel, as it transfers purchasing power from savers/lenders to borrowers. This point is emphasized by Auclert (2019)[2], since borrowers are domestic residents while some of the lenders are foreign residents with higher propensity to spend on foreign than domestic goods.

[2] Auclert, Adrien. "Monetary Policy and the Redistribution Channel." American Economic Review. 2019.

This relative marginal propensity to consume between borrowers and lenders only works if changes in interest rates are perceived as transitory since permanent changes should induce an offsetting change in lenders than would match the change in borrowers' consumption.

Empirical evidence for the US and Euro Area goes in line with this proposition. For instance, in a study for the US, Di Maggio et al. (2017)[3] find that a reduction of 50% in mortgage payments increases the consumption of durable goods, in particular car purchases, by up to 35%. Di Maggio et al. (2019)[4] shows that QE policies boosted not only refinancing but equity extraction, with added an extra kick to consumption, with QE1 increasing the consumption of durable goods by 12%. Di Maggio et al. (2017 and 2019) show that the increase in car purchases is bigger for low income, liquidity constrained borrowers. Beraja et al. (2019)[5] and Wong (2019)[6] shows that the cash-flow impact of changes in interest rates is more significant on young borrowers who tend to be more credit constrained.

Interestingly, as shown in Beraja et al. (2019), the refinancing channel is the weakest in regions where house prices are depressed the most, as refinancing requires positive home equity and adequate income and credit score.

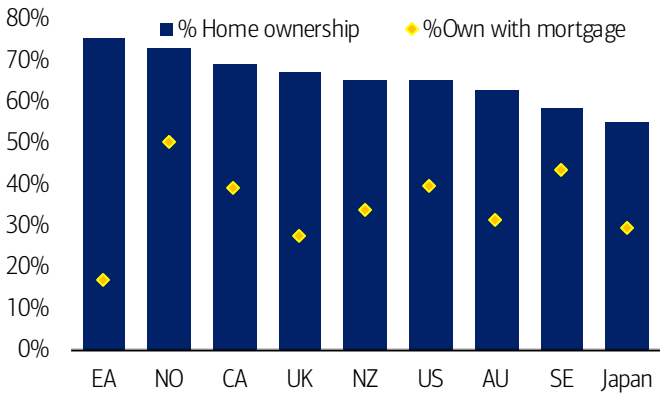
Wong (2019) shows that the response of young cohorts is almost double the average person since they tend to have larger loans than older people. She also finds that the consumption response is mostly driven by homeowners with mortgages, as opposed to homeowners without a mortgage and renters are significantly less responsive to lower interest rates. For the US, the fraction of households that own homes with mortgages is close to 40% (see Exhibit 5).

Cloyne et al. (2020)[7] have similar findings for the US and UK, despite the different composition of the mortgage market in terms of ARMs vs FRMs. The similar response in the US and the UK seems to indicate that the impact is higher for credit constrained households, and also that the general equilibrium effect of monetary policy on income seems to be quantitatively more important than the cash-flow effect.

For the case of Sweden, Floden et al. (2020)[8] find that the cash-flow channel, which is more significant for liquidity constrained households, is empirically relevant. They find that it is bigger in size for high (vs low) debt/income households and ARMs contracts (vs FRMs contracts). La Cava et al. (2016)[9] have similar findings for Australia, as well as Jappelli et al. (2018)[10] for Italy.

[3] Di Maggio et al. "Interest Rate Pass-Through: Mortgage Rates, Household Consumption, and Voluntary Deleveraging." American Economic Association. 2017.
[4] Di Maggio, et al. "How quantitative easing works: Evidence on the refinancing channel." MIT. 2019.
[5] Beraja, et al. "Regional heterogeneity and the refinancing channel of monetary policy." The Quarterly Journal of Economics. 2019.
[6] A. Wong. "Refinancing and The Transmission of Monetary Policy to Consumption" UW Madison. 2019.
[7] Cloyne et al. "Monetary Policy when Households have Debt: New Evidence on the Transmission Mechanism" The Review of Economic Studies. 2020.
[8] Floden et al. "Household Debt and Monetary Policy: Revealing the Cash-Flow Channel". The Economic Journal. 2020.
[9] La Cava et al. "The Household Cash Flow Channel of Monetary Policy" Reserve Bank of Australia. 2016.
[10] Jappelli et al. "Interest rate changes, mortgages, and consumption: evidence from Italy". Economic Policy. 2018.

Exhibit 5: Home ownership and mortgage share
For the US, the fraction of households that own with mortgage is near 40%



Source: OECD, BofA Global Research

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Housing matters for inflation

Housing is an important component of the CPI basket. The weights can vary from close to 35% in US and 30% in UK to 20% in Spain for headline inflation and somewhat higher percentages for core inflation.

However, inflation is not measured in the same way across countries, which makes comparing inflation numbers across countries quite challenging. Recall that a proper measure of inflation focuses on the cost of the flow of consumer goods and services. For regular services and nondurable goods this is not a problem as the flow of benefit can be directly measured. However, when it comes to owner occupied housing (and other durable goods) measuring the service flow is more difficult.

Statistical agencies measure housing inflation in basically four ways. At one extreme, Australia and New Zealand measures housing inflation by simply including the cost of new homes purchased. The problem with this is that it is including the cost of an investment rather than a flow of services in the CPI. It also means a big rise in "inflation" when the housing market booms. Moreover, lack of price movements at the peak of the boom makes inflation stickier and induce higher rates for longer.

Others, such as Canada and Sweden measure housing inflation by looking at the costs of ownership, including mortgage payments. The result, particularly for countries with a lot of variable rate mortgages, is that inflation can rise as the central bank hikes rates.

At the other extreme, a number of countries in Europe simply don't include the cost of home ownership in their gauge of housing inflation. Only rents are counted and hence the overall weight of housing in the indices is low.

A fourth approach, used by countries like the US, uses imputed rents-Owners' Equivalent Rent (OER)-to measure the price of services from owned housing. The Bureau of Labor Statistics collects data on rental units and then matches them up to owner occupied units. This is complicated and can involve some measurement error.

In a recent report (See: Global Economic Weekly- Housing costs and the CPI), we argued that the US approach is better than in many other countries. And we show that "true" inflation is sticky high in the US but may be overestimated in some other economies.

Cross-country comparison shows heterogeneity

Looking across developed markets, we see that the prevalence of fixed-rate mortgages has impacted the degree of monetary transmission. The heat map in Exhibit 6 does a cross-country comparison of several key metrics to characterize the two-way interaction between housing and monetary policy.

Interestingly, the heatmap below can be used with different objectives in mind, all very important to characterize the two-way causality between the structure of housing finance and monetary policy.

We will tackle the cross-country comparison from 3 angles: consumption resilience, power (or lack thereof) of monetary policy and vulnerability to a housing correction. Not surprisingly, the 3 dimensions are inter-related, since a higher fraction of FRMs locked at low levels of interest rates makes consumption more resilient and monetary policy less powerful.

The 10 metrics that we use for the analysis and its interpretation are the following:

Proportion of mortgage loans with floating rate or to be refinanced within 12 months: The higher this proportion, the more powerful and symmetric is the impact of monetary policy on housing and spending.

Proportion of households with mortgage: The higher the proportion of households with mortgages, the stronger the impact of monetary policy on housing.

Marginal mortgage rate: The higher the marginal mortgage rate, the higher the negative impact on the flow of new mortgages and therefore on house prices and residential investment, conditional on a given fraction of ARMs.

Additional central bank hikes priced in: The more hikes pending, the less likely that housing prices will stabilize in the near future. The closer central banks are to end the hiking cycle, the more likely it is that house prices stabilize.

Household debt service to disposable income ratio: This ratio is a measure of liquidity risk. The higher this ratio, the more impactful is monetary policy but also the more vulnerable is consumption.

Household debt to disposable income ratio: This ratio measures the leverage of the average household, and it is a proxy of credit risk.

House price increase (4Q19 to latest): This measure captures potential overvaluation of housing during the pandemic driven by record loose monetary and fiscal policy. It

Exhibit 6: Latest data for the major economies
A cross-country comparison of several key metrics

	NO	AU	SE	CA	NZ	KR	UK	US	JP	EA
Mortgage loans with floating rate, %	94%	63%	75%	33%	58%	72%	40%	15%	65%	30%
% of HH with mortgage	51%	32%	44%	39%	34%	-	28%	40%	30%	17%
Mortgage rate, %	4.8%	8.5%	4.5%	5.9%	8.5%	4.2%	7.5%	6.7%	0.4%	4.1%
Additional CB rate hikes priced (ppts)	29	16	33	14	11	17	50	0	3	16
HH debt service ratio	13%	16%	13%	14%	5%	14%	9%	8%	8%	6%
HH debt-to-disposable income ratio	227%	197%	180%	171%	168%	166%	130%	94%	113%	104%
House prices increase Q4 2019-latest	19%	31%	18%	38%	35%	16%	25%	41%	13%	14%
Effective mortgage rate	5%	5%	4%	4%	6%	4%	3%	4%	0%	2%
Housing investment (% chg since Q4 2019)	2%	1%	6%	-6%	6%	-1%	9%	-12%	-13%	4%
Real consumer spending (% chg since Q4 2019)	3%	6%	2%	5%	10%	3%	-2%	9%	1%	-1%

Source: BofA Global Research, Haver, Bloomberg
Note: For NZ we include mortgages with fixation period until year-end. In Sweden, we include household loans with fixation period until May-24. In the UK, we estimate 40% of mortgages are either floating rate or will be refinanced in the year to Oct-23. In some cases, we report BofA assessment. For EA, we report average of GE, IT, SP.

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therefore captures the risk of a correction in housing prices with subsequent negative wealth effects on consumption.

Effective mortgage rate: This measure captures the average cost of mortgages. The lower this effective mortgage rate, the less vulnerable is average consumption. The higher the difference between the marginal and the effective mortgage rate, the less effective is monetary policy, but the more resilient is consumption to tighter monetary policy.

Housing investment (% change since 4Q19): This measure captures how investment has reacted since the pandemic to the net change in monetary and fiscal policy as well as the price signals in the housing markets, driven by a combination of urban migration and lock-in effects.

Real consumer spending (% change since 4Q19): This measure captures the resilience of consumption since the pandemic and therefore shows how much tighter monetary (and fiscal) policy is affecting aggregate spending.

Some general results: Monetary policy is more effective under ARMs

As discussed before, monetary policy transmits through the mortgage channel faster into consumption under an ARM system, in particular if combined with high levels of household debt and high fraction of households with mortgages that spend a high fraction of disposable income on servicing debt. Under these criteria, monetary policy transmits faster in Canada, Australia, NZ, Korea, Sweden and Norway and less so in Euro Area, US and Japan.

US, Euro Area resilient, Canada, Australia, Korea at risk

The other side of the coin of less powerful monetary policy is that consumption in the US, Euro Area and even UK seem resilient on the back of strong employment and tight housing market. This is consistent with our high for longer call for policy rates. Canada, Australia, NZ, Korea, Sweden and Norway, all countries with high leverage and fraction of ARMs, are the most vulnerable as monetary tightening is hitting consumption.

The good the bad and the ugly

The US economy is the most resilient, but monetary policy lost some power

The US stands out in terms of real consumer spending growth. Obviously, the strength of the US labor market and massive fiscal and monetary stimulus have been key drivers of consumption, but we think the dominance of FRMs also played a key role.

A large share of US households locked their residential mortgages into low fixed rates, benefiting from the extended period of subdued mortgage rates from the end of the GFC through late 2021. The other feature that lends resilience to the US housing market is the option to refinance, which is much less common in other countries. Combined with the fact that the typical tenor of residential mortgages is 30 years, the possibility of refinancing mortgages means that households who expect mortgage rates to be significantly lower even five or ten years down the line would be more willing to take out a mortgage at a high fixed rate, hoping to later lock in a lower rate that would apply to a large majority of their payments.

Both the debt-service ratio and the ratio of debt to disposable income are low in the US compared to many other G10 economies, due to strong income growth and a relatively modest rise in the effective mortgage rate. Nonetheless, hikes have weighed on housing activity significantly: real residential investment is down 23% from its peak in 1Q 2021. But home prices have held up well in the US, partly due to shortages in the supply of labor and materials, which contributed to keeping households' balance sheets pretty strong and resilient to the sharp tightening of monetary policy. As we discussed before, the savings from refinancing were used to increase the consumption of durable goods.

The lower sensitivity of the housing sector to the Fed tightening is consistent with our recent change of call to one of a soft landing, where consumption adjust downwards consistent with subpar growth but avoiding a technical recession. Also, the lack of power of mortgage channel is also consistent with our call of a gradual pace of cuts starting no earlier than 2Q24.

Euro Area is improving with caveats

In the Euro area, the share of fixed-rate mortgages has increased since the GFC in every major economy, including countries with predominantly floating-rate mortgages such as Italy and Spain. The share of fixed-rate mortgages is around 90% in the two biggest economies, Germany and France.

Despite significant heterogeneity, at the aggregate level we do not find evidence of slower pass-through than in the 2005 hiking cycle. Another element that dampens the impact of monetary policy through this channel is the relatively low fraction of households with mortgages and the strong resilience of the housing market, coupled with a low debt service to disposable income ratio.

The lending channels though are working strongly for the corporate sector. At the aggregate level, we think consumption is more vulnerable for lower income brackets. The relative predominance of floating rate loans in the European periphery relative to core, even if reduced since the financial crisis, remains one of the main risks for a monetary policy hard landing where the "weakest" economies suffer most.

UK is not as bad, as monetary policy has less effect on spending

In the UK, the share of mortgages with floating rates or rates that are fixed for less than two years has roughly halved from 76% a decade ago. Now the same figure, a proxy for the fraction of mortgages that are sensitive to interest rate changes is about 35%, much higher than in the US. However, the fraction of households that have a mortgage is rather low.

From that perspective, consumption seems resilient and the ratio of debt service to disposable income is not particularly high, but since the fraction of ARMs is relatively high, monetary policy impacted on consumption, which contracted more than in other countries. House prices corrected mostly in real terms (they are close to the peak in nominal terms) and we expect some moderate correction in real terms going forward.

Therefore, while the fixation period is still short relative to the other major developed markets, the change in the structure of mortgages has slowed the transmission of rate hikes. However, the corporate credit channel is working much stronger than residential housing. This is consistent with our BoE call on high for longer.

Sweden and Norway are vulnerable as monetary policy works fast

The fraction of ARMs both in Sweden and Norway is very high, which means that marginal and effective mortgage rates are similar, and so monetary policy affects consumption fast through the mortgage channel.

Sweden and Norway are going through consumer recessions, partly because of the increased burden from rising mortgage payments. Sweden suffered a deeper recession and correction in house prices than Norway as the latter had a bigger cushion of excess savings to smooth consumption. Both economies have very high debt to disposable income ratios, which make them vulnerable to a correction in house prices and a further contraction in consumption as tighter monetary policy filters through the system.

Japan is about the front end of the curve

With most mortgages being ARMs in Japan, the changes in Yield Curve Control (YCC) are not that relevant for the mortgage market, but changes in the front end will have a more direct impact on mortgage service.

However, the fraction of households with mortgages is close to 30% and mortgage rates are very low, so we don't expect a significant impact on consumption if BoJ decides to move away from negative short term rates.

Canada, Australia, NZ, and Korea the most exposed, but monetary policy works

Concerns about a housing slowdown and its impact on consumer health are greater in countries where floating rate mortgages are more prevalent. In addition to Sweden and Norway already discussed, these include Canada, Australia, New Zealand, and Korea.

Household leverage is particularly high in these coutnries. In Korea, the unique "Jeonse" rental system has created additional frictions in the housing market, which is impacting the banking system.

In Australia and New Zealand, interest rates are impacting on consumption despite tight labor markets. Although mortgages in New Zealand are longer duration than Australia, the fraction of mortgages impacted by refinancing in the next 12 months is very high, so monetary policy will continue pressuring house prices and residential investment in the coming months.

In Canada, the housing market responds quickly to monetary policy, house prices appreciated significantly from pre-pandemic levels and the debt service to disposable income ratio is very high in the cross-sectional comparison. So far, a strong labor market has supported consumption, but we expect higher mortgage costs to bite purchasing power at the same time the recession materializes.

Implications for the outlook

Consumption and house prices look resilient for those countries where FRMs dominates, ironically countries where monetary policy has lost some power, at least in terms of the mortgage transmission channel studied in this report.

Broadly, we find that policymakers are more concerned about consumer leverage in countries where ARMs are more common. This makes sense. But we do not think central banks are worried about another full-blown housing crisis. We agree with this somewhat sanguine assessment, in part because the housing sector is much more carefully regulated than in the early 2000s, and in part because the growing prevalence of fixed-rate arrangements – even in countries where floating-rate mortgages are more common – lends stability to home prices and consumer balance sheets.

However, there is no free lunch. The downside of weaker monetary transmission is that central banks might have to hike more to get inflation under control. This raises the risk of an accident, in not only the consumer and housing sectors but also other rates-sensitive parts of the economy such as business investment.

In addition, the significant gap between marginal and effective mortgage rates implies that monetary policy will be also less effective to fight the next recession, unless central banks are able to keep interest rates high for longer until the gap normalizes.

US: Consumer resilience

Michael Gapen
BofAS

The effective mortgage rate remains low

The Federal Reserve's aggressive tightening cycle over the past year has largely generated the expected slowdown in the most interest rate sensitive parts of the economy. In particular, as mortgage rates rose toward 7%, residential investment spending retrenched as new housing starts and existing home sales fell sharply. Residential investment declined at a 27% and 25% annualized rate of growth in 3Q and 4Q 22, respectively. In addition, spending by business on equipment and structures slowed and manufacturing production within IP fell at a 10.4% annualized rate in 4Q 22.

That said, the US economy has avoided a sharper slowdown due, in part, to the resiliency of consumer spending. Recessions are about imbalances – and their resolution – and it appears to us that the interest rate risk and liquidity risk brought about by the Fed's response to inflation has caused weakness on the Fed's balance sheet and the balance sheet of the banking sector. The Fed is earning losses as it pays out more on interest on reserves than it earns from interest receipts on securities holdings, while falling net interest margins and potential mark-to-market losses in hold-to-maturity portfolios of small and regional banks led to stress earlier this year.

However, the stronger balance sheets in the US economy belong to the consumer and corporate sector, where the preponderance of fixed rate mortgages have led to minimal reset risk for households and the prior terming out of corporate debt has reduced rollover risk. Though we believe resiliency in household spending is largely due to strong labor demand during the re-opening phase of the economy, high levels of excess saving, and substantial wealth effects, we see the structure of the US mortgage market and the pandemic-induced structural demand for housing as an important part of the story.

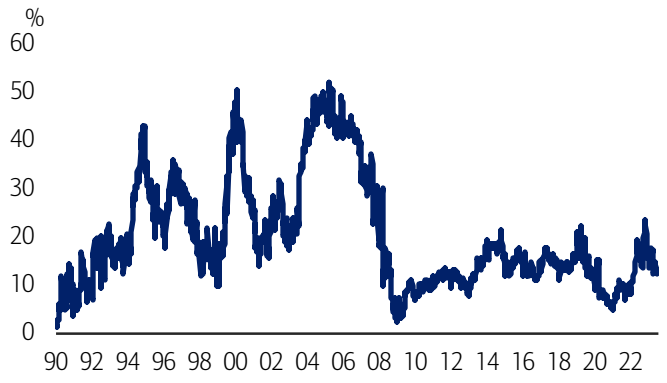
The US stands out from other developed economies in the dominance of the 30-year fixed rate residential mortgage. The key driver of the pre-eminence of the 30-year fixed rate mortgage is government policy, where government and quasi-government institutions provide guarantees for mortgages in the aftermarket, high levels of securitization, and the standardization of the underlying mortgage. As shown in Exhibit 7, the availability of a long-term fixed-rate mortgage product plus a prolonged period of low long-term interest rates following the 2008-09 global financial crisis has meant that about 90% of US mortgages by dollar volume are in a fixed-rate product.

During the COVID-19 pandemic, US homeowners took advantage of historically low mortgage rates to refinance and nearly all this activity was in fixed-rate mortgages. In early 2021, one year into the pandemic, 95% of the dollar volume of new loan applications were for fixed-rate mortgages.

The result is that the average US homeowner is less susceptible to higher mortgage rates. As shown in Exhibit 8, the effective mortgage rate fell to an all-time low of 3.31% in 1Q 22. At present – and despite the surge in mortgage rates to nearly 7.0% – the effective mortgage rate has only risen to 3.55%. Hence, while monetary policy tightening is effective in slowing down new starts and the marginal buyer, it is not quickly transmitted to the balance sheet of existing homeowners. Most outstanding mortgages in the US have a rate below current levels.

We also note ineffectual monetary policy is true in both directions: easing cycles are transmitted to existing homeowners slowly since households must refinance their existing mortgage to take advantage of policy rate easing. This was one factor behind

Exhibit 7: US: Adjustable-rate mortgages (%)
Share of dollar volume of loan applications



Source: MBA, Haver Analytics, BofA Global Research

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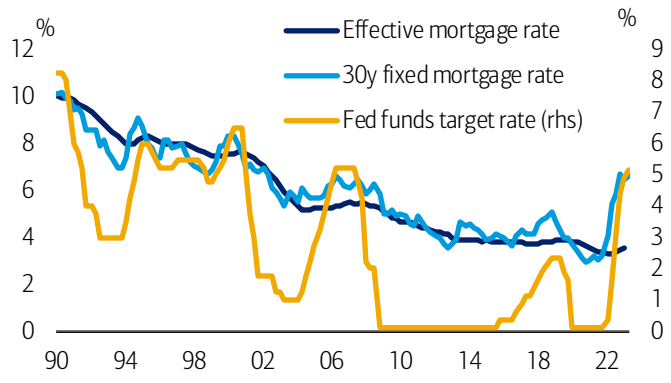
Exhibit 8: US: Effective mortgage interest rate (%)
The effective mortgage rate remains below pre-COVID levels



Source: BEA, FRB, MBA, Haver Analytics Research, BofA Global Research

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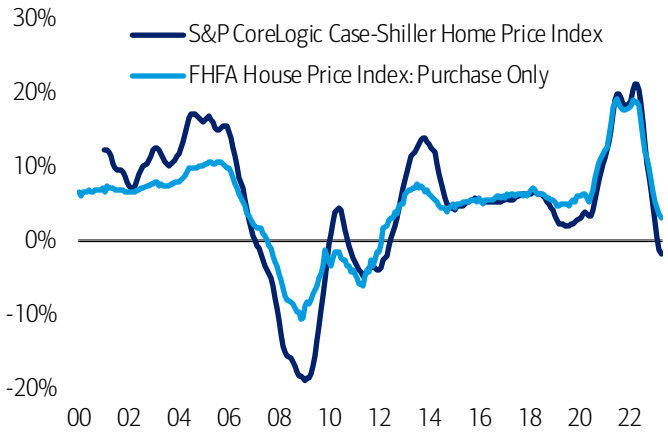
Exhibit 9: US home prices remain 40-50% above pre-COVID levels
Limited inventory has prevented larger declines in home prices



Source: FHFA, S&P CoreLogic Case-Shiller, Haver Analytics, BofA Global Research
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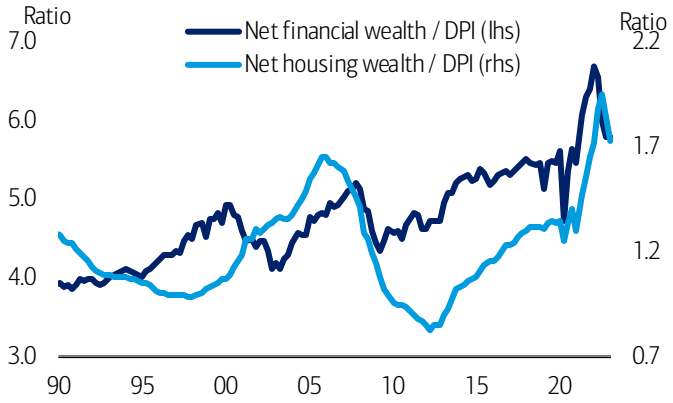
Exhibit 10: Net housing wealth and net financial wealth (ratio to disposable personal income (DPI))
Elevated home prices have supported wealth effects on consumer spending



Source: BEA, Federal Reserve, Haver Analytics, BofA Global Research
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the slow recovery in consumption following the 2008-09 recession; it took four years – and ten quarters after the Fed's policy rate hit the effective lower bound – for the effective mortgage rate to fall by 100bp from its pre-recession peak.

Home prices have held up

We also believe the prevalence of fixed-rate mortgages have supported resiliency in consumer spending though wealth effects. Rapid monetary policy tightening and the sharp rise in mortgage rates has caused a "freeze" in the housing market; inventory levels remain at historically low levels since most outstanding fixed-rate mortgages carry rates of interest well below the current mortgage rate. Homeowners would simply prefer to remain where they are, if possible, while demand for single family homes in lower density areas remains robust due to the effect of the pandemic on housing preferences, including, but not limited to, higher instances of remote work.

This combination has meant that housing has not played its normal cyclical role in slowing down US economic activity. Yes, residential construction spending has slowed, but in past business cycle slowdowns, high or rising inventory levels of new and existing homes led to home price declines. This was particularly true following the 2008-09 recession and the back-to-back recessions of the early 1980s. While home price appreciation has slowed, prices are roughly flat on a year-on-year basis and remain 40-50% above pre-pandemic levels. This has meant net housing wealth (housing assets less mortgage liabilities) as a share of disposable income, remains near record levels. Standard life cycle consumption models suggest that high net worth makes households more willing to consume more out of current income, pushing the saving rate lower.

Canada: Fast pass-through

Carlos Capistran
BofAS

Variable-rate mortgages are a risk

In Canada monetary policy is more effective than in most countries because the transmission mechanism through the mortgage market is relatively fast and reaches many people. Monetary policy impacts total demand in Canada through its impact on interest rates, domestic asset prices and the exchange rate. Canadians' households are highly indebted and about a third of mortgages have a variable rate, so that changes in the overnight rate target reach debtors relatively fast.

Canadian households are highly indebted

Canadian households are highly indebted when compared to those in other countries. The household's debt-to-GDP ratio peaked at 112% during the pandemic. Since then, the ratio has decreased to about 102% of GDP, but remains among the highest in developed countries. The debt-to-service ratio increased quickly when interest rates rose and reached almost 15% (Exhibit 11). The debt and the increase in the debt-to-service ratio is driven by mortgages as, according to the BoC, about two-thirds of Canadians own a house and more than half of those have a mortgage.

Mortgages are relatively short and with variable rates

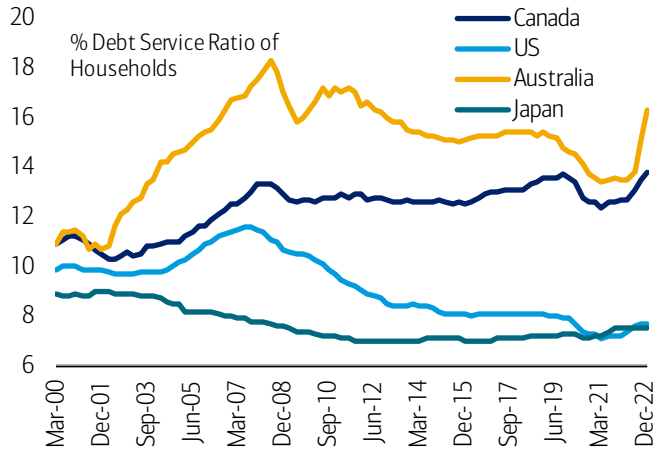
In Canada, 67% of mortgages have a fixed rate with a short duration (as short as six months and up to 10 years) (Exhibit 12). These mortgages are not immediately affected by interest rate changes, although they are at renewal. The other 33% of mortgages (held by about 10% of Canadians) have a variable interest rate that can be paid in variable or in fixed payments. Variable-rate mortgages increased during the recent low interest rate period (Exhibit 13). About three-quarters of variable-rate mortgages have fixed payments. When interest rates increase, the monthly payment in these remain the same but a smaller proportion of the payment goes to pay capital.

Variable-rate mortgages with fixed payments are a risk

Recently, the BoC has underscored the vulnerabilities stemming from variable rate mortgages with fixed payments when interest rates increase because at some interest rate these mortgages reach a point where the monthly payment covers only interest payment and no capital. That interest rate is known as the "trigger rate" (Exhibit 14, Exhibit 15). According to the BoC, in October 2022, half of the variable-rate mortgages with fixed payments (~13% of all mortgages) reached the trigger rate. This number certainly has increased throughout 2023.

With higher interest rates the mortgage eventually enters a "negative amortization" stage. When borrowers reach their trigger rate lenders offer different options. Some lenders will automatically increase the mortgage payment so that it continues to cover the interest part of the payment (like a variable-rate mortgage with variable payments). Other lenders allow for negative amortization, but these borrowers will need a new loan at the end of the original loan period, potentially with higher monthly payments than before. Finally, some lenders contact borrowers before they reach their trigger rate and offer options such as switching to a fixed-rate mortgage.

Exhibit 11: Debt to service ratio
As a result of higher rates, debt payments have increased in Canada



Source: BofA Global Research, BIS

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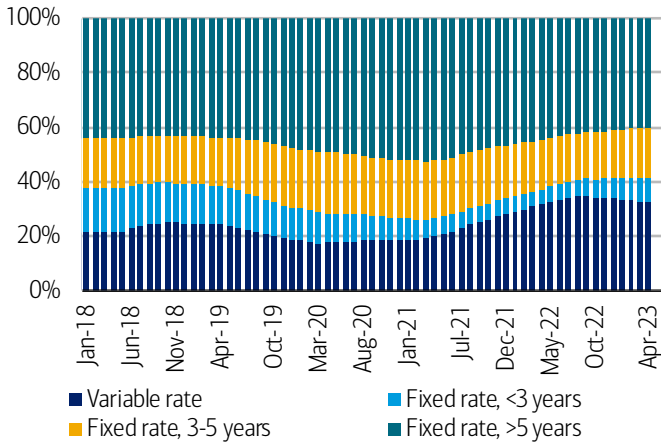
Exhibit 12: Mortgage outstanding balances in Canada by composition
Long-term mortgages have remained constant, while variable rate mortgages have increased considerably



Source: BofA Global Research, Bank of Canada

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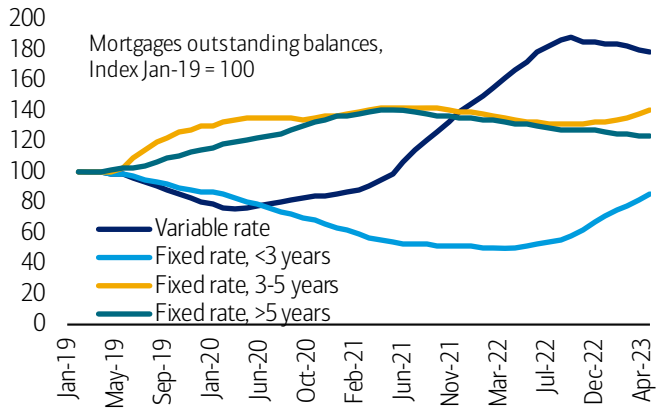
Exhibit 13: Mortgages' outstanding balances in Canada by composition
Variable rate mortgages increased rapidly with low interest rates



Source: BofA Global Research, Bank of Canada

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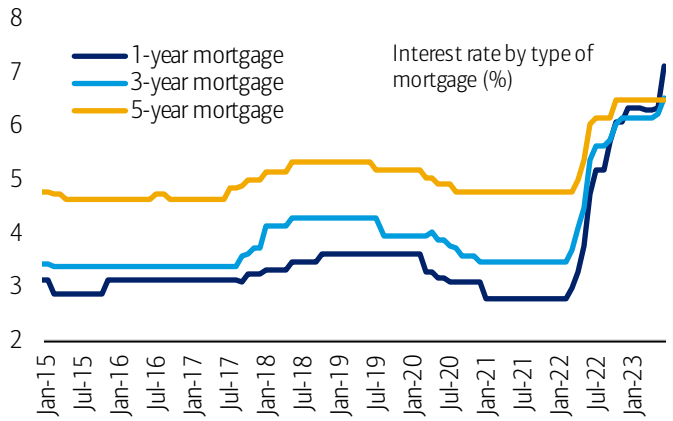
Exhibit 14: Mortgage rates have increased sharply
Higher interest rates have affected mortgage costs significantly



Source: BofA Global Research, Bloomberg

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The burden of higher payments is already important

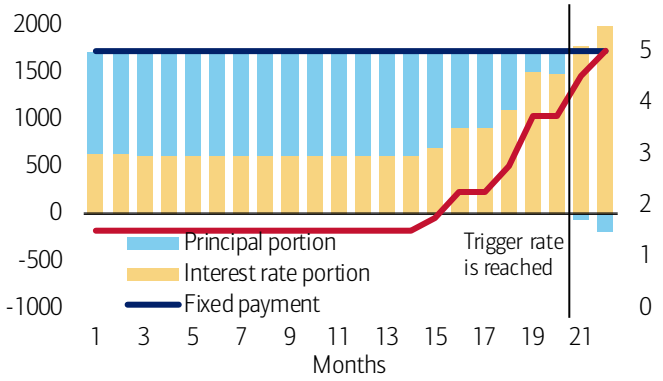
According to the latest CPI release, mortgage interest costs have increased 29.9% yoy, mainly due to the financial burden from the variable rate mortgages and the renewals of fixed rate mortgages.

According to the BoC, the average increase in fixed-rate mortgage payments at renewal will be greatest in 2025 and 2026, from 20 to 25%. And for variable-rate fixed-payment mortgages, homeowners will need to increase their payments by about 40% to maintain their original schedule. In view of these risks, Canada's main banking regulator, the Office of the Superintendent of Financial Institutions (OSFI), on July 11 proposed tougher capital rules for lenders to deal with the larger number of mortgages in negative amortization.

The housing market responds fast to interest rates

House prices increased substantially with low interest rates during the pandemic. Following the aggressive BoC hiking cycle to tame inflation which saw the overnight rate increasing from 0.25% to 4.50% in a few months up to January 2023, the housing market corrected significantly. However, the pause from January to June helped the housing market which began to recover (Exhibit 16).

Exhibit 15: An example of a variable-rate with fixed payment mortgage
As interest rate increases, more mortgages are reaching the trigger rate



Source: BofA Global Research, Bank of Canada
Note: An example of a mortgage of CA$50k with interest rate of 1.5%, and amortization period of 30 years. The variable rate changes one-on-one with the policy rate

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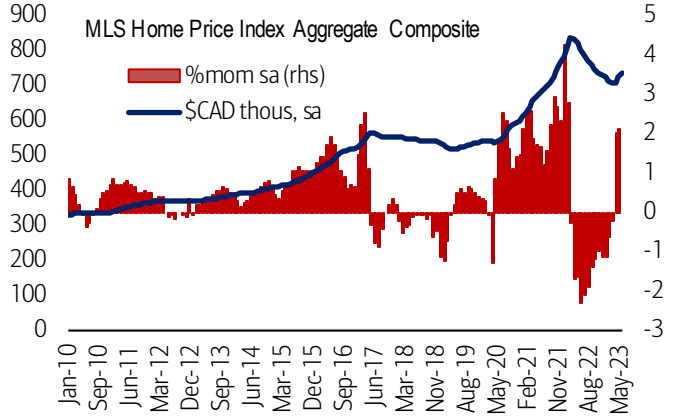
Exhibit 16: Home prices in Canada
House prices peaked recently as the BoC kept the policy rate on hold



Source: BofA Global Research, CREA

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That was one of the reasons the BoC decided to resume its hiking cycle in June and July, elevating the overnight rate to 5.00%. So far, many households may have successfully faced the rise in mortgage costs as employment has maintained momentum and wages have increased rapidly. However, a sharply softening in the labor market could imply a greater risk in the mortgage loan market, which could quickly produce a vicious cycle.

Recent hikes by the BoC are a risk for the economy

The BoC recently resumed its hiking cycle after a pause by hiking 25bp in June and again in July to put the overnight rate at 5.00%. Given the characteristics of the mortgage market in Canada and the indebtedness level of Canadian households we believe that the current high overnight rate poses a downside risk for economic activity and for the financial sector. When the fixed payments reset for mortgages with variable rates, the disposable income of many households will drop in a significant way.

The BoC estimates that the neutral level of the interest rate is in the range of 2% to 3%, so that the current 5% rate is quite restrictive. And indeed, inflation has come down substantially in part, as the BoC points out, due to the restrictive monetary policy. Given the economic and financial risks, we believe that a lower overnight rate kept for many months could have equally brought inflation down with fewer risks.

The strategy that the BoC is following could mean that cuts may come faster in Canada than in other DMs once the economy turns and inflation gets closer to the target. The BoC so far has not faced social or political backlash, but that may change in the following months as inflation falls and unemployment and financial stress increase.

Euro area: Heterogenous story

Ruben Segura-Cayuela
BofA Europe (Madrid)

Fewer variable rate mortgages

In the Euro area, around 70% of outstanding loans to households are now at a fixed interest rate but these are across 20 different mortgage markets. Heterogeneity across the region is high. For instance, the share of mortgages at a fixed rate stands at around 90% in France and Germany, but drops to 25% in Spain and Italy.[11]

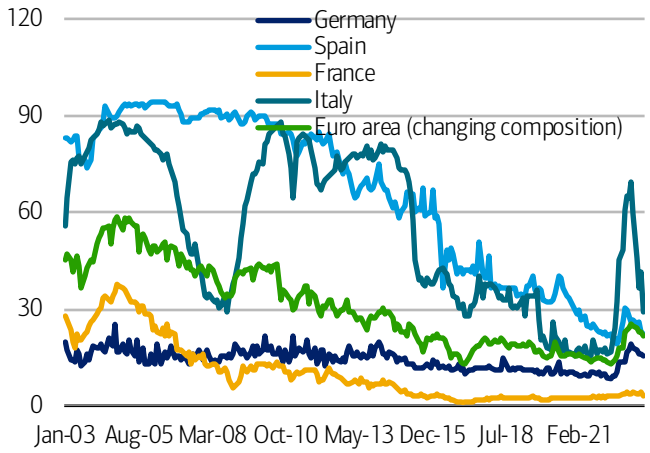
Exhibit 17 shows the evolution of the share of lending flows under a floating rate in the four main Euro area economies and the Euro area as a whole. Things have changed a lot since the beginning of the last proper hiking cycle (in 2005 – yes we ignore the unfortunate mini cycles that happened during the financial and sovereign crisis). There has been an increasing trend in fixed interest rates of newly issued loans. The share of fixed-rate newly issued loans to households for house purchase has gone from 57% in 2010 to not far from 80% recently. This has been the case in every major Euro area economy too, even in predominantly floating markets like Italy and Spain.

These differences matter for the transmission of monetary policy across the Euro area, but they can also explain how it has changed compared with past cycles. Indeed, recent work shows that, within the Euro area, countries with higher shares of flexible rate mortgages have seen a much more pronounced response of consumption to tighter monetary policy. [12] National differences in mortgage markets characteristics alone can explain up to a third of the cross-country heterogeneity of responses to monetary policy.

[11] Speech by Philip R. Lane, Member of the Executive Board of the ECB, at the SUERF, CGEG|COLUMBIA|SIPA, EIB, SOCIÉTÉGÉNÉRALE conference on "EU and US Perspectives: NewDirections for Economic Policy"

[12] Corsetti, G., Duarte B., J., Mann, S. (2022), "One Money, Many Markets", Journal of the European Economic Association, Vol. 20, Issue 1, February.

Exhibit 17: Share of floating rates in new flows
Share of floating rates has declined over time



Source: ECB

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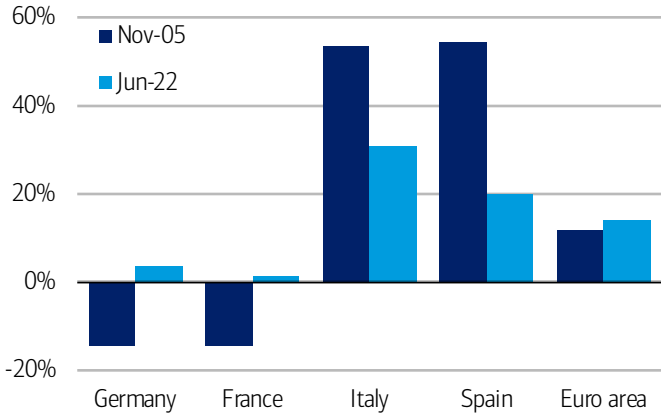
Exhibit 18: Pass-through to mortgage rates since the beginning of the hiking cycle
Overall pass-through has not change much, so far



Source: BofA Global Research, ECB

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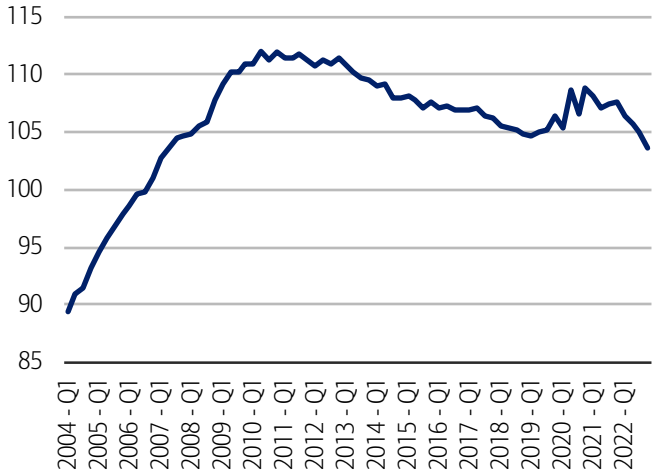
So far no clear differences on aggregate

We compare the pass-through of the change in policy rates since June 2022 with the same pass-through for a comparable period in the last proper policy hiking cycle. In other words, we look at the change in the average mortgage rate for the stock of mortgages in the 11 months after June 2022 and November 2005 (see Exhibit 18).

Pass-through at the Euro area has not changed significantly. Of the 400bps of increase in the policy rate since June 2022, 14% has so far being reflected in mortgage rates. In 2005, 12% of the 125bp had been reflected in mortgage rates. These numbers, though, mask significant heterogeneity, with a decent reduction in pass-through in Italy and Spain, where there has been a larger reduction in the share of floating rates.

Finally, another potential factor when thinking about the transmission of policy rates through this channel is the level of debt. Indeed, debt levels for Euro area households are now somewhat higher than they were back in 2005 (Exhibit 19).

Exhibit 19: Household debt to disposable income
Debt is now higher than in the previous cycle



Source: Haver

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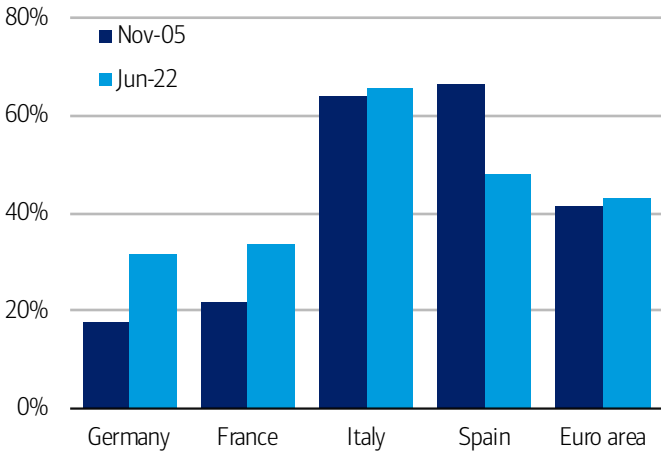
Exhibit 20: Pass-through to mortgage rates since the beginning of the hiking cycle
Overall pass-through has not change much, so far



Source: BofA Global Research, ECB

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No evidence of a slower pass-through

Other channels of the transmission of monetary policy are working strongly. This is the sharpest tightening cycle we have seen from the ECB, driving a faster increase in lending rates and, to a large extent, a faster deceleration of lending flows and tightening of credit standards. Additionally, the pass-through to household deposit rates has been slower, magnifying the impact on households of a fast enough pass-through of mortgage rates (but reducing the incentive to save more).

Carrying out a similar exercise to the one we did for the pass-through to mortgage rates, we show that, in the case of lending to non-financial corporations, pass-through has not changed that much relative to the 2005 hiking cycle. More importantly, while still far from the US, the Euro area is now less of a bank-based economy than it was in 2005. With bond markets transmitting policy rates much faster than bank lending, pass-through for companies has accelerated through this channel.

Unlikely to derail the path

With mixed evidence on whether the transmission of monetary policy is slower or smaller, we don't think the ECB will feel compelled to alter its path. In fact, there is an ongoing discussion between hawks and doves at the central bank on whether transmission has changed and in which direction. More importantly, this is a central bank likely facing 20 different speeds of transmission. This is the drawback of a monetary union but also a way of separating from political pressures in key countries.

The progressive transmission of higher policy rates into mortgage rates will increasingly weigh on households finances. This is part of our story on why we are not bullish the consumer. On the other hand, the smaller real income squeeze throughout 2023 and even more so in 2024 should act in the opposite direction.

We will continue to see some tensions at the bottom of the income distribution. The most vulnerable did not accumulate excess savings during the pandemic, were disproportionately affected by the energy and food price shock, and will now have to deal with the transmission of higher policy rates. Some countries, like Spain, have provided some small relief to the very bottom of the income distribution. When fiscal policy is already turning restrictive and will continue to do so in the next few years, fiscal space and political capital for more support than this will be limited.

UK: High for longer

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Transmission mechanism changing

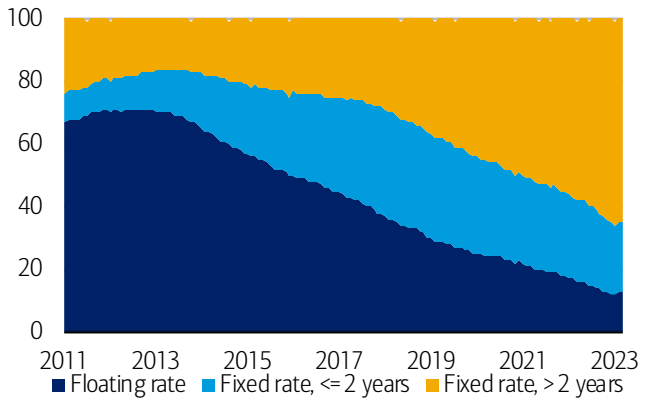
Three quarters of UK mortgages used to be floating rate or have an interest rate fixed for two years (Exhibit 21). Now two-thirds of mortgages have an interest rate fixed for five years, and nearly 90% fixed for two or more years. The UK has short mortgage fixation periods compared to the US, for instance. But the *change* in mortgage structure has likely slowed and cut transmission of interest rate changes to the economy.

Miles (2004) explains the myriad reasons why the UK does not have long-term fixed rate mortgages. Consumers seem to prefer mortgages with a lower initial payment, even if the longer-term costs are higher, while government intervention and regulation shifts the mortgages offered elsewhere.

Monetary policy has less effect on spending

In previous cycles rising Bank of England interest rates quickly changed mortgage and saving rates, cutting the disposable income of borrowers and raising the income of savers. Because borrowers have a higher marginal propensity to spend that shift in

Exhibit 21: Share of variable rate mortgages has fallen sharply
Distribution of mortgages by type of product, %



Source: Bank of England.

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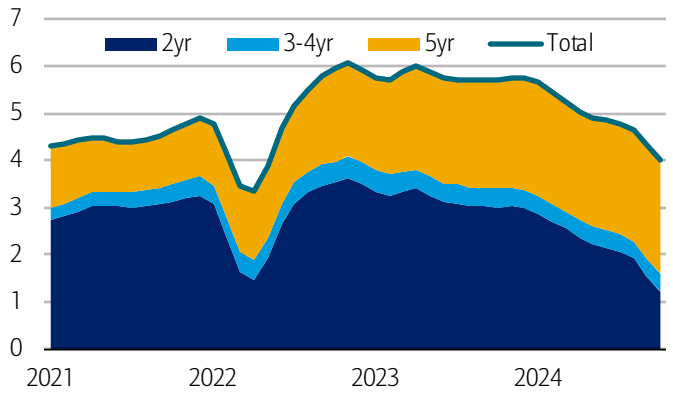
Exhibit 22: c. 6% of mortgages refinance per quarter in 2H 2023
BofAe % of mortgages refinanced each quarter



Source: BofA Global Research, Bank of England.

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income cut aggregate spending. Now less than 6% of mortgages refinance per quarter through 2H 2023 (Exhibit 22). Even when added to the 13% of mortgages (by value) on variable rates, cash flow effects now take much longer to play out.

The proportion of people buying a house with a mortgage also fell to 30% in 2020/21 compared to 43% in the early 1990s and 40% in 2006. We estimate that the peak cash flow effect of rate hikes has fallen by two-thirds (Exhibit 23). If the UK had the same proportion of variable rate mortgages and people with a mortgage as in 2006 then rate hikes would, in our view, almost certainly have caused a meaningful recession by now.

House prices surprisingly resilient

Miles (2004) reports that around one-sixth of the impact of higher interest rates on consumer spending comes via cash-flow effects, with a third via the effect of house prices on consumer spending. The remaining half of passthrough comes through substitution effects, the exchange rate and business spending. Transmission to construction activity in the UK tends to be smaller than other countries due to tight planning constraints (Barker (2006)), and also smaller via business investment because the UK invests relatively little. The split between cash flow effects and house prices is likely to be poorly determined because house prices in part capture cash flow effects. Consistent with reduced cash-flow effects house prices have proved resilient, falling 3.4% in nominal terms so far. This has likely been helped by low unemployment, savings built up during Covid and relatively low loan-to-value ratios. This macroeconomic context likely further reduces cash flow effects.

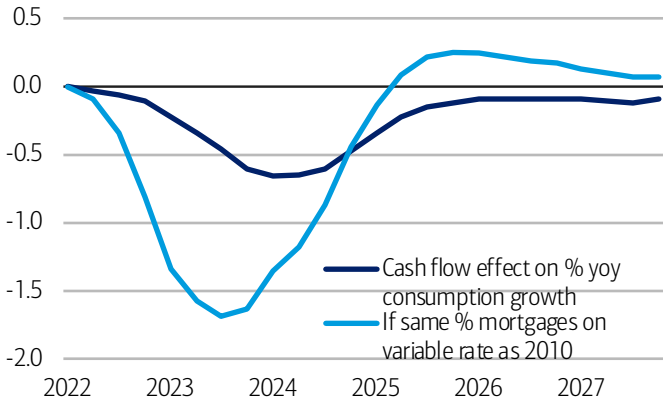
Buy-to-let an uncertainty

Some of the fall in people buying a house with a mortgage has been offset by rising buy-to-let properties. 8% of the housing stock is buy-to-let, with most of those mortgages interest only. The BoE estimates rental increases of 20% would be required to offset the average rise in mortgage payments. That compares to a roughly 60% increase in mortgage payments for owner-occupiers. How buy-to-let owners respond to higher rates is a large uncertainty in monetary policy passthrough, and may mean increased passthrough via rents or perhaps weaker house prices if investors sell.

Business lending stagnant, effect interest rate rising sharply

Bank loans make up 45% of corporate debt, down from 60% before 2008. More than 70% of corporate bank loans are floating rate. So the effective interest rate on corporate bank debt has risen four times as much as for households during this interest rate cycle. The fall in the share of bank loans in total corporate debt and any bond maturity extension since the financial crisis, however, likely also slows passthrough of rate hikes relative to previous cycles.

Exhibit 23: Cash flow effect cut by nearly two-thirds
BofAe cash flow effect of higher interest rates on real consumer spending



Source: BofA Global Research

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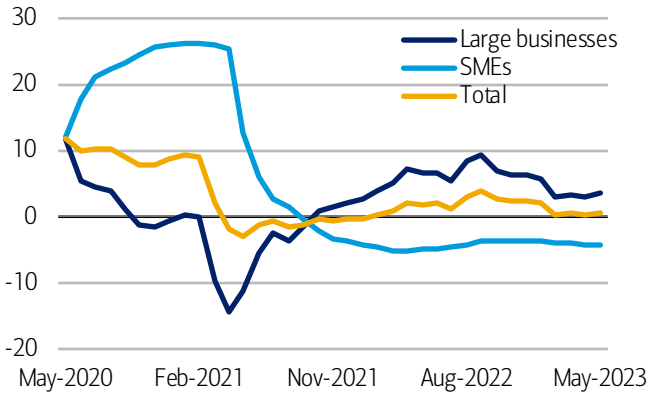
Exhibit 24: Business lending stagnating
Growth of bank loans, % yoy



Source: Bank of England

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Bank lending is stagnating in nominal terms. Higher interest rates appear to be translating into falling business investment. The Bank of England's Decision Maker Panel found in January that firms on average expected higher interest rates to cut investment 8% and employment 1.7%. Higher interest rates than in January would be likely to weaken those numbers, although employment has risen strongly since that survey.

Bank of England to stay the course

The changing transmission mechanism in the UK would likely have an impact on optimal Bank of England policy. Narrower and slower passthrough of rate hikes means more intense financial pressure on firms and fewer households to cut demand. In turn that means a greater conflict between the optimal interest rate for monetary policy purposes and for financial stability. This is one reason we expect the BoE to prefer a policy of high for longer. Mortgage holders are a key politically constituency, but fiscal support for all mortgage holders would be hard to justify given tight fiscal resources in our view. The UK phased out its last widespread mortgage subsidy schemes 20 years ago. Support for buyers of new homes has been a feature of post-financial crisis (Help-to-Buy) which we couldn't rule out being repeated.

Norway: Textbook monetary policy

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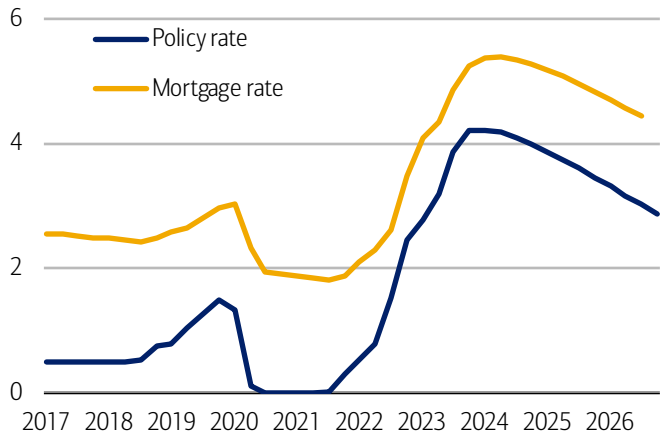
More than 90% of households in Norway are on variable-rate loans, so interest-rate hikes passthrough rapidly to mortgage interest payments (Exhibit 25).

Consumer spending in Norway has fallen slightly since the end of 2021, and by more than in the Euro-area and US, consistent with that faster passthrough of interest rate hikes to debt payments (Exhibit 35). But consumer spending has held up much better than in Sweden, and relatedly the saving rate has fallen sharply in Norway.

There are likely several drivers of that more resilient performance in Norway. First, employment has been very strong, with the employment rate rising to the highest since 2008, surging 2ppt above its pre-Covid level (Exhibit 26).

Norway also has relatively detailed data on households' excess saving through Covid. Increases in savings were spread across the income distribution (Exhibit 27). That could suggest fewer mortgagors are constrained now than pre-Covid, meaning a reduced propensity to cut consumption when cash flow worsens (Cloyne et al (2016)).

Exhibit 25: Rate hikes passing through to mortgage rates
Norges bank policy rate and average mortgage rate



Source: Norges Bank

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Exhibit 26: Highest employment rate since 2008
Employment rate, 15-74 year olds

Source: Bloomberg

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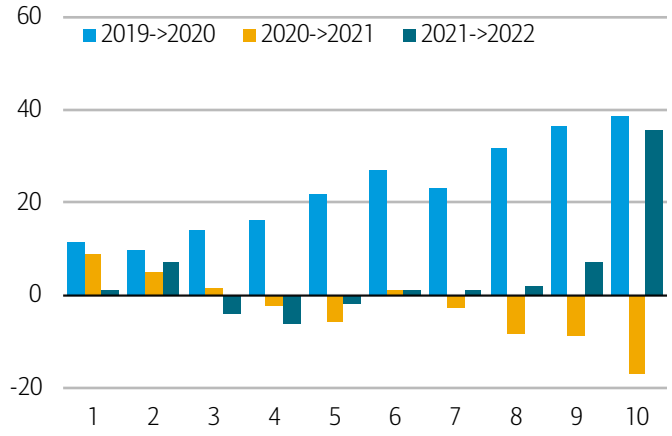
Norges Bank forecasts housing investment to fall 10.7% in 2023, a much smaller decline than in Sweden for instance, as real house prices fall 5.7% (Exhibit 28). In nominal terms, housing prices have so far proven resilient and so have transactions, likely on a combination of the strong labour market and relaxation of lending regulations.

The resilience of the Norwegian consumer to rate hikes stands out more when we note the continued rise in the household debt-to-income ratio since the financial crisis. Likely another part of the reason for Norway's relative resilience compared to Sweden, however, is relatively faster amortisation of the mortgage meaning debt-service ratios are expected to rise considerably less than interest burdens (Exhibit 29).

Exhibit 27: Bank deposits rose across the income distribution since Covid
Change in media bank deposits from the previous year by income deciles, NOK thousands



Source: Norges Bank

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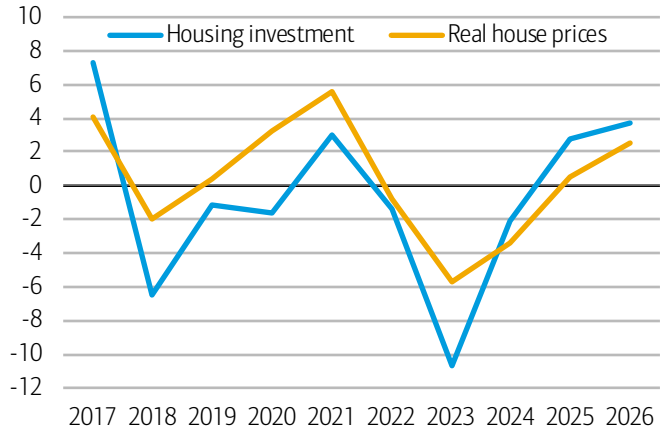
Exhibit 28: Housing investment falling
Housing investment and real house prices, % yoy



Source: Norges Bank

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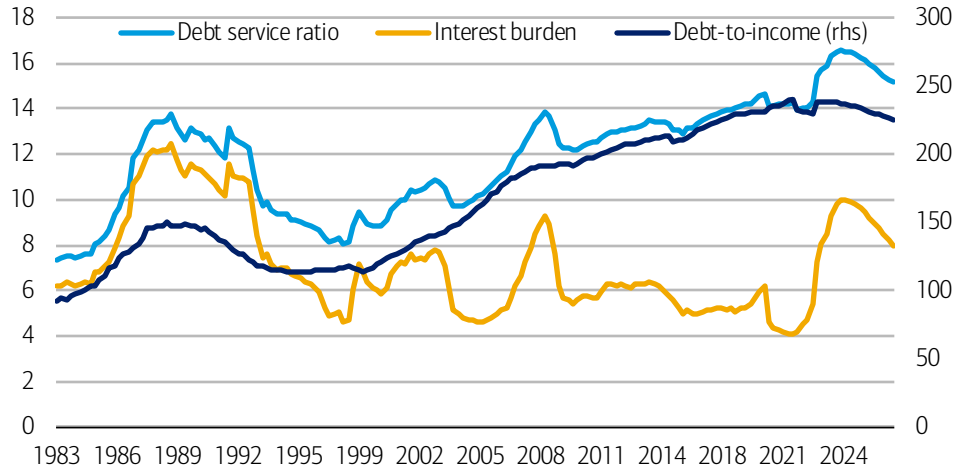
Exhibit 29: Household debt-to-income ratio has risen since financial crisis, and interest burden rising
Norges forecasts for household debt-to-income, debt service ratio and interest burden



Source: Norges

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Sweden: Fast and furious

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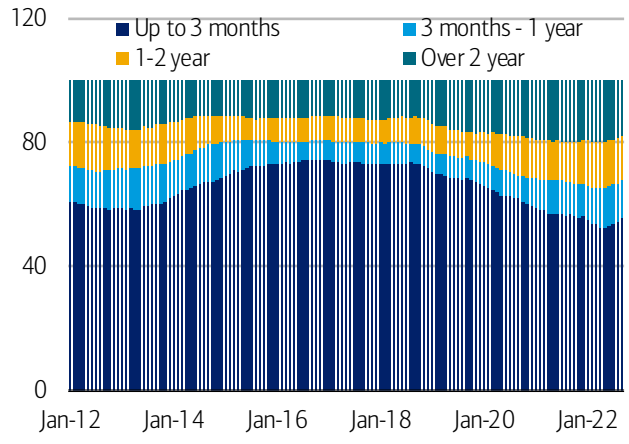
Short, fixed rate periods mean rapid passthrough

Floating rate mortgages rose to 60% of the stock of mortgage loans in 2015 from 10% in 1996, while the duration of fixed rate loans remains short (Exhibit 30). Sweden has an even shorter average residual fixed rate mortgage duration than the UK (Exhibit 31).

Changes in the repo rate by the Riksbank will likely feed through to Swedish households faster than in most other major economies. Rising debt-to-income ratios (increased by around a third since the financial crisis) mean that households' cash flow will be affected more by rate changes as well as faster.

Exhibit 30: Residual duration of mortgage fix
Swedish mortgages have a short-term fix rate period



Source: Riksbank

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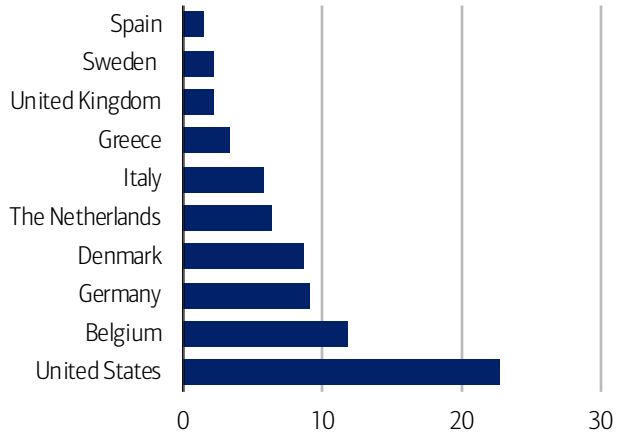
Exhibit 31: Average interest rate fix duration
Interest rate changes transmit relatively rapidly to Swedish households



Source: Riksbank

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Effective rates and corporate borrowing

With a large share of variable rate, or short-term fixed rate, mortgages effective interest rates for households have risen rapidly with the Riksbank's policy rate, and so has firms' (Exhibit 32). This is a very different picture to the UK, for instance, where effective corporate interest rates on bank loans have risen four times as much as for households.

The effective mortgage interest rates rise has cut house prices and construction. The Riksbank expects construction output to approximately halve (Exhibit 33).

A broad consensus during our recent Stockholm fieldtrip expects housing prices to resume their drop, but still to around their pre-pandemic levels (Stockholm investor fieldtrip notes: hope is inflation falls fast 14 June 23), which is in line with the Riksbank's base case. Put differently, consensus sees the Swedish housing market as a purely "consumer story" with very limited financial-stability risks, drawing a slight distinction between it and commercial real estate.

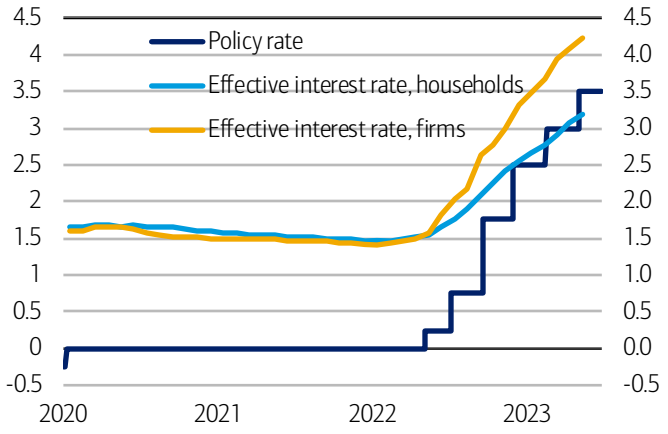
Consumer recession

The relatively rapid passthrough of higher interest rates to households, has led to a consumer recession in Sweden. Real consumer spending has fallen 3% since the end of 2021, compared to rises in the US, Euro-area and UK. Norway, which also has a large share of variable rate mortgages, has seen a small fall in consumer spending. Also notable is an increasing household saving rate in Sweden compared to large falls elsewhere. That is partly because Sweden's saving rate rose less through Covid, so it had less room to fall. But it may also reflect particularly rate sensitive households. Consumer confidence has recently been bouncing around its lowest levels since the early 1990s.

CRE key focus but banks likely to sustain lending

Sweden's Commercial Real Estate (CRE) sector remains in focus: its high leverage and high refinancing needs render it vulnerable to downside risks to property valuations and a worsening interest coverage ratio (ICR) outlook. A key takeaway from our recent Stockholm fieldtrip is that a broad consensus expects the risks around property markets to prove manageable and in any case non-systemic, while noting the heterogeneity of CRE companies. In addition, our Nordic Banks equity colleagues note banks have provided liquidity for market funding refinancing over the past year and have the capacity to sustain this trend, while they would expect regulators to be accommodative of concentration risks given the bigger picture (see Nordic Banks: 'Rate story' no longer a tailwind in Sweden 7 July 23.

Exhibit 32: Rate hikes passing through rapidly
Policy rate and average interest rate on outstanding debt stock



Source: Riksbank

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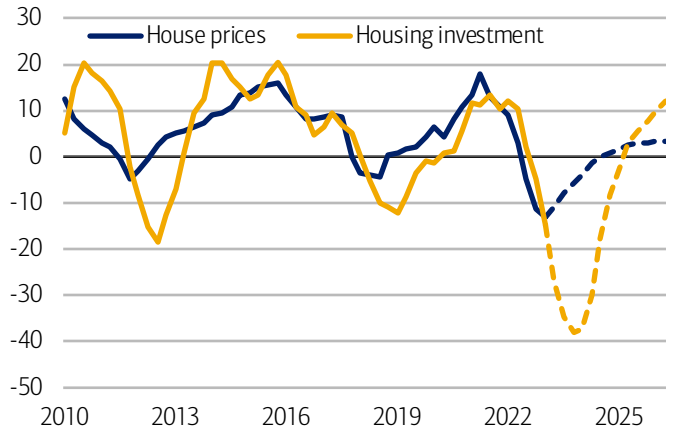
Exhibit 33: Housing investment falling sharply
Interest rate hikes cutting housing investment



Source: Riksbank

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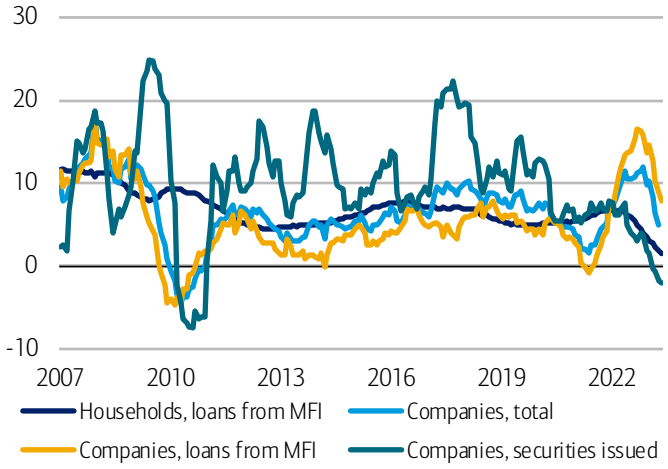
Exhibit 34: Borrowing growth slowing
Household and corporate borrowing, % yoy



Source: Riksbank

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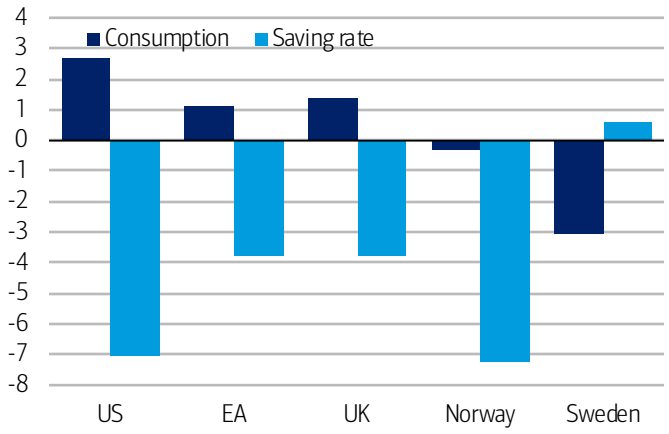
Exhibit 35: Swedish consumption weak compared to other countries, and saving rate higher than 2021
Consumption % change since 4Q 2021, and saving rate vs. 2021 average



Source: BofA Global Research, BEA, Eurostat, Statistics Norway, Statistics Sweden

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Japan: Mind the front end

Takayasu Kudo
BofAS Japan

The BoJ took another step toward normalizing policy at its 28 July monetary policy meeting (MPM) via the shift to greater flexibility on yield-curve control (YCC). We think an exit from its negative interest rate policy (NIRP) will come next, but mortgage rate and housing market trends will be key in considering the BoJ's path to normalizing policy.

Most mortgage loans in Japan are floating-rate

The stock of outstanding domestic mortgages in Japan amount to 34% of GDP. More than 65% of these loans have a variable rate, just over 10% have a fixed rate, and the remainder are hybrid loans with both fixed and variable-rate components (Exhibit 36). For all of these loans, the lending institution starts out by offering a "base rate," reflecting long- and short-term benchmark rates. This base interest rate is then typically discounted at the bank's discretion, taking into account a variety of factors including the borrower's credit status, to arrive at the final applicable loan rate. In Japan, benchmark interest rates have been stable during an extended period of insufficient funding demand, but applied loan rates have been coming down because of increases in the discounts offered.

Exhibit 36: Basic information of Japan's mortgage loans
The formation of mortgage rate is complex

	Floating rate	Hybrid-type*	Fixed rate
Share of existing mortgage loans (FY21)	65.7%	23.0%	11.3%
Share of new mortgage loans (FY21)	76.2%	13.5%	10.2%
Loan rate	Base rate - discount	Initially fixed, thereafter floating	Base rate - discount
Benchmark	Shor-term prime rate	Swap rate*	10yr JGB
An example of interest rate as of July '23*			
Benchmark interest rate	1.475%	0.61%	0.44%
Base rate	2.475%	3.590%	1.350%
Applied prime rate	0.370%	1.335%	1.295%

Source: BofA Global Research, MLIT, Japan Housing Finance Agency *benchmark interest rate is 10yr OIS swap rate, base rate and applied prime rate are "fixed-rate for the first 10yrs, floating-rate thereafter" **Before BoJ MPM on 28 July '23

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The impacts of the BoJ's recent YCC flexibilization will be limited

The BoJ's recent YCC flexibilization will unlikely have much of an impact on the mortgage market, given that the only loans affected by the rise in 10yr yields are new fixed-rate mortgages, which account for 10% of new mortgage loans, and the average term of Japan's mortgages is about 16 years.

We expect Japanese households to continue benefiting from low interest rates, and think the housing market is likely to continue its gradual recovery following weakness through 2022.

Short-term (esp. prime) rates critical

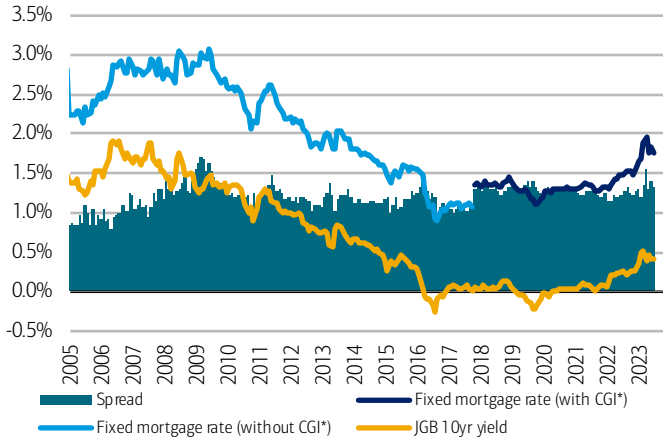
Most mortgages in Japan are floating rate, and an increase in short-term rates would have by far the greatest impact on mortgage rates. The most important yardstick is the short-term prime rates that financial institutions set as the benchmark for floating-rate mortgages, rather than the BoJ's policy rate. Short-term prime rates mostly track the BoJ's short-term policy rate, but they remained static after the introduction of negative interest rates in January 2016 (Exhibit 38).

We therefore think the short-term prime rate would likely remain unchanged even if the BoJ exits NIRP (our base case is an increase from -0.1% to 0.0% in mid-2024), meaning little impact on mortgage rates.

While not our base case, we think financial institutions would gradually raise their short-term prime rates if the BoJ were to continue hiking policy rates into positive territory after it exits NIRP. This would affect both new mortgages and all existing floating-rate mortgages (we estimate that a 0.1% rise in the short-term prime rate would increase existing mortgage rates by an average of 0.06%).

However, a 0.1% rise in the short-term prime rate would only increase households' interest payments by around 0.04% of annual disposable income. With variable rates extremely low at around 0.4%, we would not expect rising mortgage rates to drive a sharp decline in household spending or the housing market provided the pace of rate hikes remains gradual. We expect the BoJ to continue normalizing policy via further rate hikes provided this does not impede sustained inflation, while remaining sensitive to the negative indirect impact from worsening sentiment.

Exhibit 37: 10yr JGB yield and applied fixed-rate mortgage rates
New fixed-rate mortgage rates move in tandem with 10yr JGB yield



Source: BofA Global Research, Bloomberg, Japan Housing Finance Agency; Fixed mortgage rate is the lowest rate of "Flat 35" (21-35yrs, LTV 90%+) *Creditor Group Insurance

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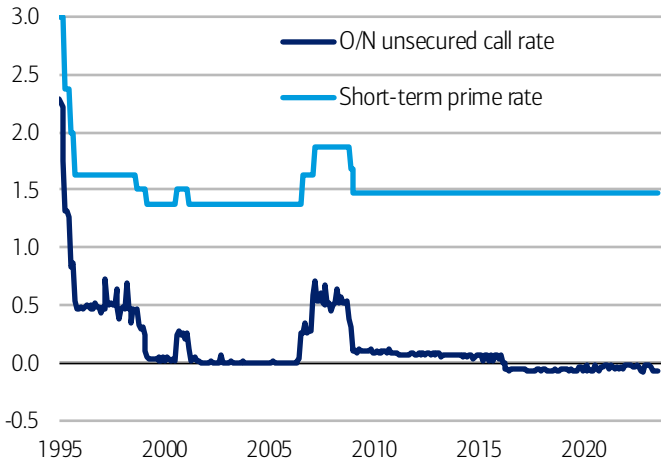
Exhibit 38: Trend in Short-term prime rate (%)
Short-term prime rate has remained unchanged since 2009



Source: BofA Global Research, Bloomberg

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Korea: Brace for impact

Benson Wu
Merrill Lynch (Hong Kong)

Assessing the vulnerability of household sector in Korea

Korea's household leverage remained one of the highest worldwide

Households in Korea have been building up debt since last decade, reaching 98% of GDP in 1Q23, one of the highest among global peers. Its household debt-to-disposable income ratio also reached 160.7%, as of 4Q22. Among various types of debt, mortgage debt has been the major driver, comprising 55% of total outstanding household debt, and witnessed a CAGR of 8% in 2015-2022 (Exhibit 40).

BoK's fast hiking cycle has weighed on household balance sheet and cash flow

BoK has hiked by 300bp from August 2021, and household debt (especially mortgage) condition is now under policymakers' close watch not only due to its elevated size, but also because of the risks brought by the property sector correction and rising debt burden. This hiking cycle had triggered notable correction in the property market since late-2022 (**Error! Reference source not found.**), and house sales price fell by around 8% compared with Aug 2021, while transaction contracted sharply by 50% in 2022.

With a home ownership rate of about 60%, Korea households have suffered from a contraction in balance sheet due to a drop in property downcycle. On the other hand, the higher mortgage payment is also squeezing disposable income, evident from surging debt-service ratio (of 14.3% in 4Q22, highest in record). We have seen nascent signs of rising mortgage defaults, the delinquency ratio for mortgage loan doubled to 0.21% from 0.11% in Aug 2021, though it is still well below the previous high level of 0.96% seen in 2013.

The unique lending system also posed additional risks amid property downturns

"Jeonse", the unique housing in Korea, could further amplify correction in household sector. In essence, jeonse is a rental system in which tenants pay a large lump-sum deposit (50-80% of property value) for around two years of rent, and landlords pay back the deposit when the contract ends. With the higher borrowing cost, tenants are switching to standard monthly rent payment for interest saving, leading to lower demand for jeonse. As a result, landlords are facing increasing difficulties to secure sufficient deposit from new renters to pay back the jeonse to existing tenants. This could force owners to dump properties at steep discounts and fuel the cycle.

Will the HH sector risk impacting BoK decisions?

Higher floating-rate loan exposure accelerated the policy impacts

We can certainly attribute the worsening mortgage-related risks to monetary tightening. In Korea, floating-rate loan is the dominant choice for mortgage loans as well as other types of loans, comprising 70% of total outstanding household loans (Exhibit 42).

Exhibit 39: Summary of relevant mortgage and housing indicators
Korea has faced with severe property downturn during the current hiking cycle, however mortgage rates have started to moderate recently

	Interest rate					Housing price		Loan growth	Others	
	Policy rate (%)	Fixed rate on new mortgage loan (%)	Variable rate on new mortgage loan (%)	Jeonse deposit loan (%)	Debt service ratio (%)	Sales price (2019 Dec=100)	Jeonse price (2019 Dec=100)	Mortgage loans from banks (% yoy)	Mortgage delinquency rate (%)	Share of floating rate HH loans (as % of outstanding)
Aug-21 (Start of hiking cycle)	0.75	2.92	2.84	2.72	12.9	112.7	109.4	9.6	0.11	74.4
Jan-23 (End of hiking cycle)	3.5	4.41	5.03	4.96	14.3	108.8	103.0	2.1	0.18	75.8
May-23 (Latest)	3.5	4.16	4.39	4.09	#N/A	105.9	99.3	1.1	0.21	72.0

Source: BoK, Haver, BofA Global Research

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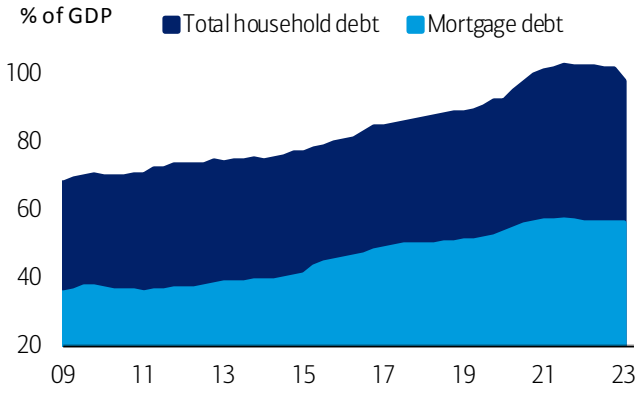
Exhibit 40: Household debt in Korea
Korea is the most household-indebted economies in Asia



Source: Haver, BofA Global Research

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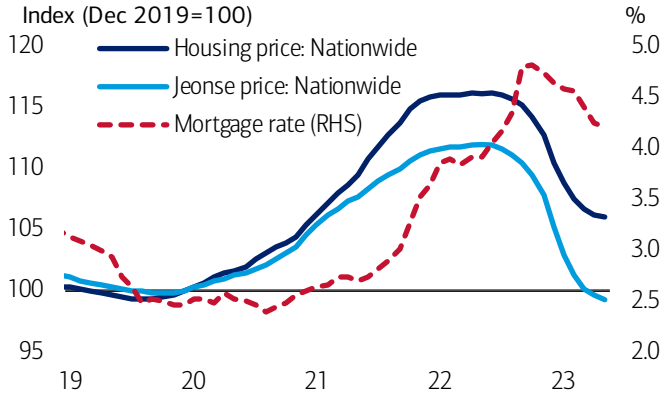
Exhibit 41: Property prices & interest rates
Rise in interest rates triggered property correction in late 2022



Source: Haver, BofA Global Research

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The mortgage interest rate thus tends to track policy rate very closely, with a correlation of about 0.8 for the past 10 years. This implies a strong transmission from monetary policy to debt burden through interest rate channel.

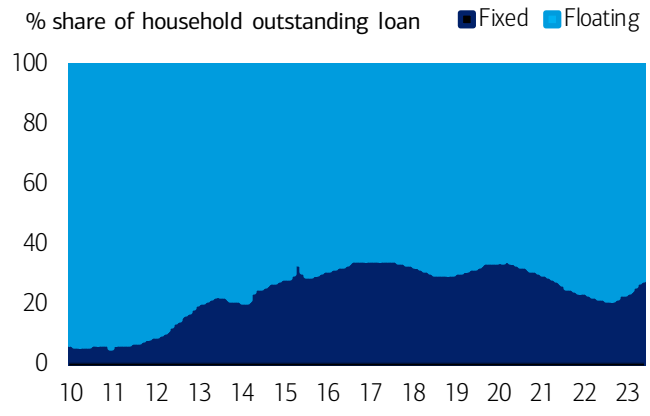
While banks are absorbing the impact of rate hikes

However, we do have noticed that mortgage rate has been fallen already lately despite the still high benchmark rate. The spread between mortgage lending rate and policy rate has narrowed since 2023, from 210bp in the beginning of hiking cycle to about only 70bp as of May (Exhibit 43). Korean banks are absorbing the impact of rate hike in the current cycle, on the back of weak mortgage demand as well as the likely peak of BoK rate cycle.

The current high debt burden is also heterogenous

Although we have experienced increasing debt burden in the past quarters, BoK does not see mortgage-related risk as a major concern, as risks are so far manageable. As mentioned in its 2Q23 financial stability report, the recent increase in delinquent loans for household loans appears to be mainly from vulnerable borrowers, which only accounted for 6.3% and 5.0% of the total number of household loan borrowers and loan balances, respectively. Overall credit quality remains healthy, according to the BoK.

Exhibit 42: Share of household outstanding loans: fixed vs floating
Over 70% of total household loan are floating rate loan



Source: Haver, BofA Global Research

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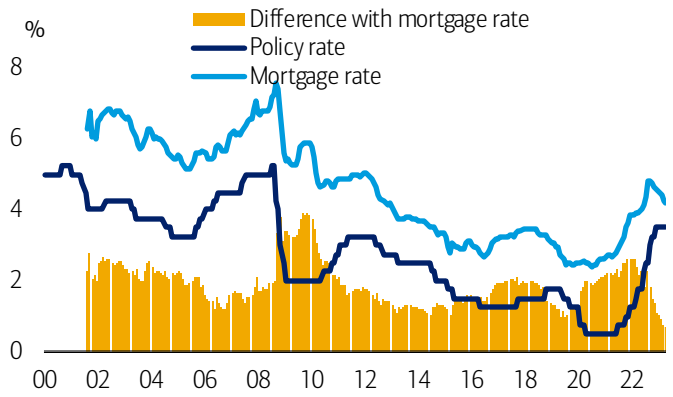
Exhibit 43: Policy rate and mortgage rate (for new loans)
With narrowing gap between mortgage rate and policy rate, banks are absorbing the impact of rate hike in the current cycle



Source: ECOS, BofA Global Research

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A well-equipped macroprudential measures help to alleviate the risk

Financial stability risks surrounding excessive mortgage lending has been on the BoK's radar as early as since 2000s. After two decades of experience, the central bank is well equipped with macroprudential tools to control for such risks, including the surveillance of the quality of mortgage loan and prevent overspeculation in housing market. With various borrower-based mortgage lending restrictions currently imposed, the BoK deems risks in mortgage debt manageable, despite rising monthly interest payment. At the BoK meeting in July, when asked about how to tackle with the resurgence of household leverage up issue, the governor still highlighted they may implement more prudential steps to rein in debt, suggesting a policy complacency in keep restrictive policies.

Taken all into consideration, although Korea has started its fastest rate hiking cycle since Aug 2021, we do not think the central bank has to ease policy anytime soon to alleviate the rising risks in mortgage debt. In fact, the BoK may rather keep the relatively tight monetary policies in preventing risk. We think the BoK is unwilling to see a rebound in housing market and bring leverage issue back to system in case of policy easing.

Australia & New Zealand: Brothers in ARMs

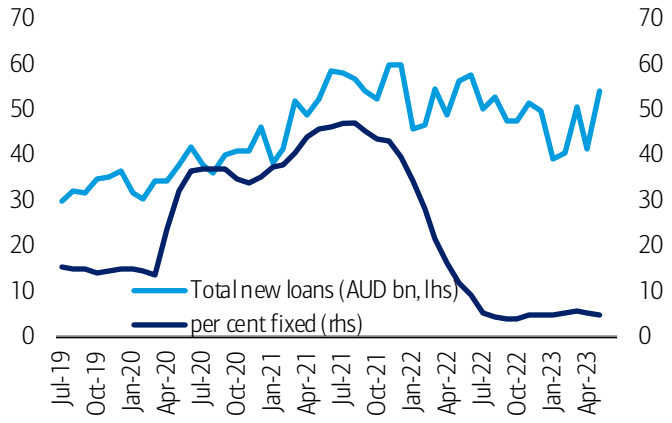
Micaela Fuchila
Merrill Lynch (Australia)

Australian fixed rates roll over is a key risk

With household debt to disposable income at 188% Australian households' leverage sits at one of the highest in the world. Concerns around the outlook for household spending have increased significantly as interest rates continue to rise. While the pass through of higher rates is already being felt by households with spending rising only 0.2% in 1Q GDP, there is uncertainty around the refinance of loans that had been fixed during the pandemic (Exhibit 44). The proportion of fixed loans in new flows has already declined significantly as rates continue to rise though fixed loans' expiry dates and subsequent refinancing are yet to peak (Exhibit 45).

In the RBA's view, fixed rate mortgages have delayed the effect of the higher cash rate on borrowers' cash flows. Indeed, a key issue for the economic outlook and financial stability relates to the ability of borrowers with fixed-rate loans to adjust to substantially higher borrowing costs when their fixed-rate mortgages expire. However, borrowers with fixed-rate loans have had a considerable period to adjust their finances to prepare for

Exhibit 44: Share of fixed mortgages in new flows
Though ultra-low rates saw an increased in fixed loans



Source: ABS

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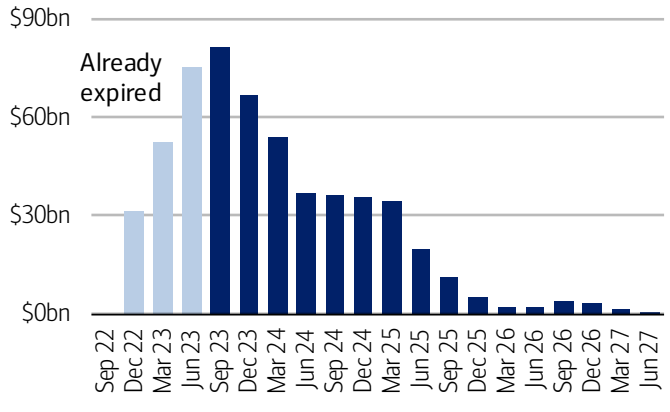
Exhibit 45: Outstanding fixed mortgages rates expiry schedule
As refinancing will be done at a much higher rate



Source: BofA, estimation based on AU major banks aggregate

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the increase in their mortgage payments and many appear to have similar savings to borrowers on variable rates[13].

While a very tight labour market has contributed to higher wages, household savings continue to decline. The savings ratio fell to 3.7% which is the lowest level since June 2008. Savings fell as the rise in household consumption outweighed a softer rise in gross disposable income. This means consumers do not count with much savings to afford extra spending. In our view, this is a key risk to the outlook.

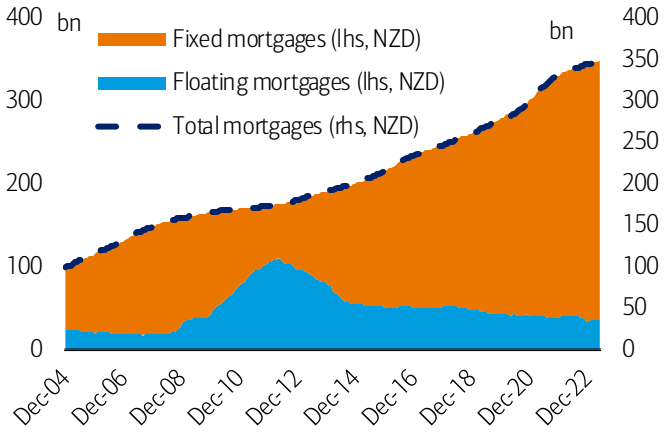
Encouragingly, expectations for a peak in interest rates (we see the cash rate on hold this year) has seen an increase in house prices over the last five consecutive months. Indeed, rent price increases and higher population growth would likely provide support to domestic activity and may improve confidence through the wealth effect channel. Politically, housing affordability remains a key issue particularly for the current labor government though grants for construction of dwellings and tax relief policies were not included in the most recent Budget update.

New Zealand is a fixed rate market

Unlike Australia, currently around 90% of the stock of mortgages are fixed in New Zealand (Exhibit 46). However, the transmission of tighter financial conditions due to higher rates is fast as most mortgages are fixed on a two-year period. Standard mortgage rates are now reflecting the fast increase in the RBNZ's official cash rate to 5.5% from a low of 0.25% in 2020 (Exhibit 47).

Notably, in 2021 the government required RBNZ to consider supporting more sustainable house prices when setting financial stability policy, including bank lending rules. The direction also included how the Bank's actions will dampen investor demand for existing housing stock, which would improve affordability for first-home buyers. The Remit was amended to require the RBNZ to assess the effect of monetary policy on the government's objective to support more sustainable house prices. This means the RBNZ's reaction function was tightly correlated to financial stability and the housing sector during the hiking cycle. While the reference to house price sustainability was removed from the RBNZ Remit in 2023 to promote independence between the government and the Reserve Bank, the Monetary Policy Committee is still required to explain their assessment of the effects of monetary policy in supporting more sustainable house prices.

Exhibit 46: A fixed rate market delays policy transmission
Although consumer spending continues to weaken



Source: RBNZ

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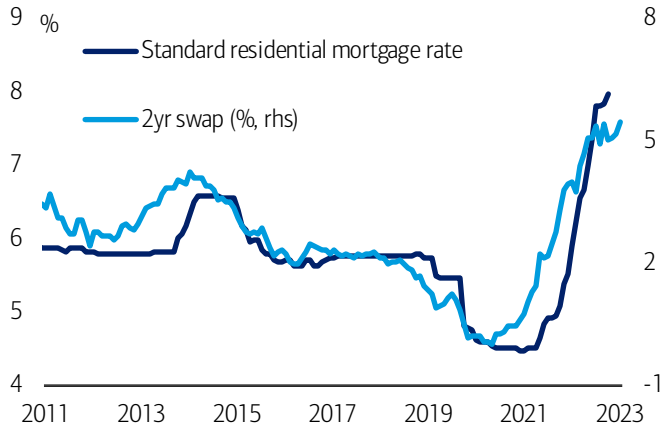
Exhibit 47: Mortgages are fixed for a short period
Two years on average



Source: Bloomberg

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[13] https://www.rba.gov.au/publications/bulletin/2023/mar/fixed-rate-housing-loans-monetary-policy-transmission-and-financial-stability-risks.html

Current conditions and risks in an election year

Focus is now on assessing if monetary conditions are contractionary enough to get inflation back to the 1-3% target in a suitable timeframe. In the RBNZ's view, overall, current mortgage rates and business lending rates are restrictive, supporting a further moderation in inflation.

Household spending will continue to deteriorate as highly leverage households roll onto higher fixed mortgage rates and the full effect of higher rates passes onto mortgages. Risks remain around the pass-through of past OCR increases to activity and inflation.

With the RBNZ's guidance suggesting the hiking cycle is close to an end and the upcoming general election now booked for October 14 political campaigns will remain focused on housing and financial stability. Affordability will remain the key focus for the political campaign as in the year ended in June 2022 one every four households that were renting were spending over 40% of their disposable income on housing costs compared to one in five households that were paying a mortgage[14].

FX: High beta may have to wait

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To the extent that the characteristics of the housing market and housing lending affect the transmission of monetary policy, they could also have FX implications. The longer it takes for monetary policy tightening to affect effective mortgage rates, the higher and for longer policy rates are likely to be, all else being equal. In addition, the sooner monetary policy affects the housing sector, the higher the risk of hard(er) landing in the broader economy. Such cross-country differences could in turn be key FX drivers during a tightening cycle.

We rank ten major economies based on ten indicators that we believe are key for the transmission of monetary policy through the housing sector. They are equally weighted, although one could argue for using different weights in some cases.

The results suggest slower transmission of monetary policy in the major economies in most cases. Indeed, it is slower in Japan, the Eurozone, the US and the UK than in Norway, Australia, Sweden, Canada and New Zealand.

Among the major economies, transmission of monetary policy is the fastest in UK. It seems to be faster in the US than in the Eurozone, although this could be sensitive to using different weights, for example using a higher weight for the share of fixed mortgages, which is higher in the US. Indeed, our discussion below suggests a slower transmission of monetary policy through housing in the US than in the Eurozone. It is the slowest in Japan, but this has primarily to do with the lack of monetary policy tightening to begin with.

All other things being equal, the FX implications are against high beta currencies, because of a relatively faster transmission of monetary policy through housing in these economies. The results point to risks for high(er) interest rates for longer in major economies, and particularly in the US and in the Eurozone. This points to upside USD and EUR risks. Indeed, this is consistent with how FX has performed this year so far, with EUR, USD as well as GBP doing better than NOK, NZD, AUD and SEK, with CAD

[14] StatsNZ household Economic Survey

somewhere in the middle. JPY of course has been weak because of the BoJ avoiding policy tightening and high carry for JPY crosses.

Of course, this analysis does not take starting levels and other FX drivers into account. For example, we are bullish NOK on substantial undervaluation, persistent inflation and higher oil prices. AUD can benefit from China policy stimulus. CAD can also benefit from high oil prices. In Korea, the housing market has already weakened, which together with weak growth in China have contributed to KRW depreciation so far this year. And we are bearish EURSUSD in the short-term, on better US data, sticky inflation and early market pricing for Fed cuts. Still, the results suggest that it may take somewhat longer for high beta currencies to perform and/or can be subject to short-term risks.

US Rates: Struggling to find restrictive level

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The key word from the Fed this year has been "resilience", and we take that to mean resilience of economic activity to their higher rate policy. Financial conditions have also shown resilience. Despite lifting the real policy rate from -5.5% to +3% (using the 1y inflation swap), financial conditions as measured by a variety of indices including the BofA Global Financial Stress Index are at similar levels observed at the start of the tightening cycle. But the components are mixed: high yield and investment grade credit spreads, implied volatility (the MOVE index), funding conditions, equities, and home prices are unchanged or improved, while mortgage spreads are wider, and the bank lending channel measured by the senior loan officer survey has tightened.

We believe that some of this resilience is due to the mixed impact of interest rate changes. Because every rate contract has a payer and receiver, a change in rates leads to income redistribution effects. In the private sector, ever borrower has a lender, and higher rates - which take effect with different lags for different entities - create a shift of income from borrowers to lenders. An important example is within the banking sector, where slowly rising deposit rates on the $17tn in bank deposits create more income for depositors but less income for equity holders. To the extent that the marginal propensity to spend interest income is higher for depositors than equity holders, this redistribution could in some cases have positive effects on spending.

For interest paying government liabilities such as Fed reserves, overnight Fed repo, and Treasury bills and bonds, the impact of higher rates is less ambiguous. With these interest bearing liabilities, unless the government offsets higher interest payments with higher taxes or reductions in discretionary spending, the net impact of higher rates is more income for holders of government liabilities. This includes banks (reserves), money market funds (Fed repo and Tbills), households who have savings in Treasuries, and non-domestic holders. While holders of Treasuries are typically higher income entities, the large amount of government liabilities outstanding (close to 100% of GDP in the US) combined with significantly higher rates could have a small positive impact that runs counter to the Fed's intention, leading to more resilience. As we discuss below, higher mortgage rates in the US have arguably aided shelter inflation due to the supply impact. There are other areas where higher rates may have also supported inflation.

These effects arguably make the Fed's policy tool more blunt, which results in potentially moving rates higher and/or holding for longer than otherwise desired. We expect the Fed to hold longer than markets price. Markets now put a positive probability of the first Fed cut in December and the first full cut by around March 2024. This is counter to our forecast but also to Fed guidance, even from the dovish members. The recent rise in

long-end rates was driven mainly by a rise in the 3y1y rate, which is essentially a proxy for the "long-run dot" in the quarterly Fed staff forecasts. If resilience continues for the rest of the year, which is our US Economics team's expectation, we think 10y rates will be supported in the 3.75%-4.25% range as markets remain skeptical that the Fed can return to low policy levels typical of the post-2008 period, supporting a higher 3y1y rate. 3y1y is the main determinant of long-end rates given the flat term structure of forwards. Lingering fears of repeating the mistakes of their 1970s inflation battle combined with ongoing resilience we think could produce a more hawkish tone from the Fed, which should help deter markets from pricing 3y1y – and hence long end rates – much below our expected range.

US residential mortgage credit – all good

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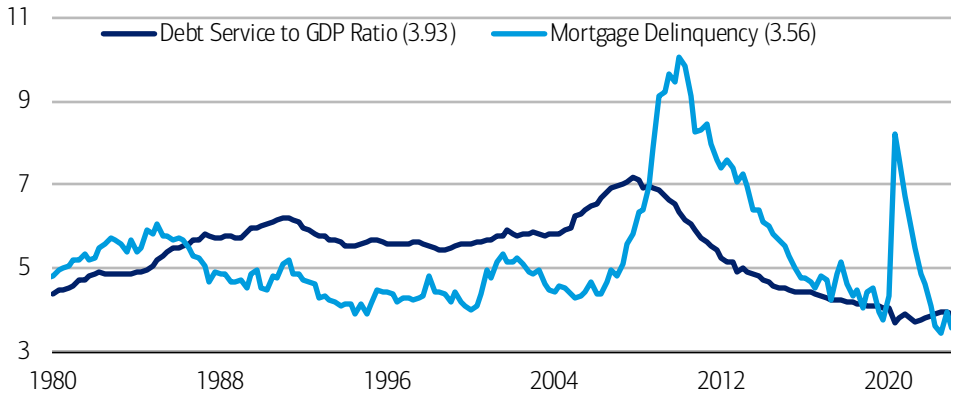
One gauge of the benefits of the near record low effective mortgage rate is the mortgage debt service to GDP ratio (Exhibit 48). This measure aggregates all mortgage payments (principal and interest) and compares to GDP. At 3.93%, this measure is near the all-time low observed in 1Q21. Pre-COVID, it never dropped below 4%. At its peak in 2007, it reached 7.18%. The low debt service stress is evident in near record low aggregate mortgage delinquencies: 3.56% in 1Q23. This stands in stark contrast to the 2010 delinquency high of 10.06%, following the elevated debt service to GDP ratio of 2007. The short-lived COVID delinquency spike had a different driver: the short-lived spike in unemployment. It is not relevant to this discussion.

In addition to the debt service ratio, the other key driver of mortgage credit performance is the equity in the home. Borrowers with more equity are more likely to remain current. Aggregate home equity (Exhibit 49) is reported at $28.7 trillion as of 1Q23, down from the peak of $31.8 trillion in 2Q22, but still up by $9.2 trillion from the pre-COVID peak in 4Q19. Some increase in home equity is anticipated given the recovery in home prices in 2Q23 – we estimate the Case Shiller home price index will be up 3.2% in the quarter, which could add $1-2 trillion to aggregate home equity. As discussed earlier in the context of consumer resilience, the home equity wealth effect is likely a contributor to

Exhibit 48: Mortgage debt service to GDP ratio v Aggregate mortgage delinquency rate
Near record low mortgage debt service to GDP ratio, 3.93%, accompanied by near record low aggregate mortgage delinquencies (3.56%)



Source: Bloomberg

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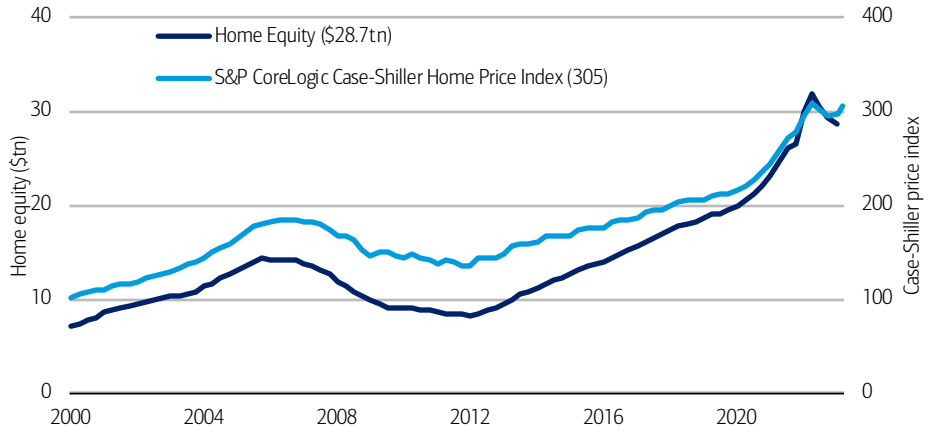
Exhibit 49: Aggregate homeowner equity v Case Shiller home price index
US homeowner equity is up by $9.2 trillion since pre-COVID, on higher US home prices. Higher homeowner equity is typically accompanied by better mortgage credit performance.



Source: BofA Global Research, S&P CoreLogic

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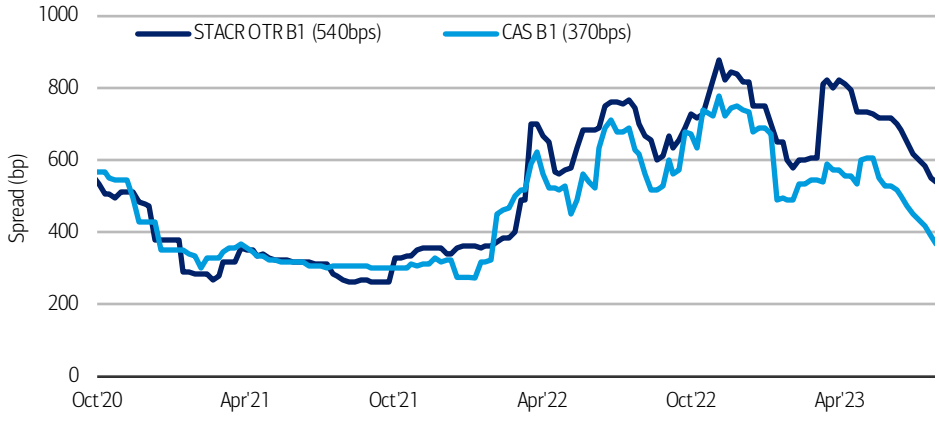
near record low mortgage delinquencies: homeowners are more apt to service their mortgage debt if their equity position is substantial.

In the capital markets, exceptionally strong residential mortgage credit performance has been reflected in mortgage credit spreads. An important sector in the mortgage credit universe is Credit Risk Transfer (CRT) securities issued by Fannie Mae and Freddie Mac. These securities have the acronyms CAS (Connecticut Avenue Securities) and STACR (Structured Agency Credit Risk) and have tranches ranging from M1 (most senior credit priority) to B2 (most junior credit). Exhibit 50 shows the spread history for the CAS and STACR B1s. Note that in addition to credit risk, these securities are highly dependent on prepayment rates. A sharp slowdown in prepayment rates will cause the securities to extend in duration, which typically means that spreads will widen. Nonetheless, the significant spread tightening observed in 2023 reflects the benign underlying mortgage credit metrics discussed above. Given the magnitude of the spread rally this year, there is potential for modest near term spread widening from current levels. Longer term, however, we think spreads have potential to tighten from current levels.

Exhibit 50: Credit risk transfer securities (CRT) spreads: CAS B1 v STACR B1
Good 2023 mortgage credit news - stabilization/recovery of home prices in 2023 and low mortgage delinquencies - has resulted in sharp tightening of CRT spreads. More tightening expected.



Source: BofA Global Research, Bloomberg

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EUR rates: periphery vs core differential

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In Europe, the point of winners/losers in an environment of rising rates also applies but with the added complexity of its financial market fragmentation (i.e. risk/commercial terms for financial transactions are not the same in Germany and Italy).

The relative predominance of floating rate loans in the European periphery relative to core, even if reduced since the financial crisis, remains one of the main risks for a monetary policy hard landing where the "weakest" economies suffer most.

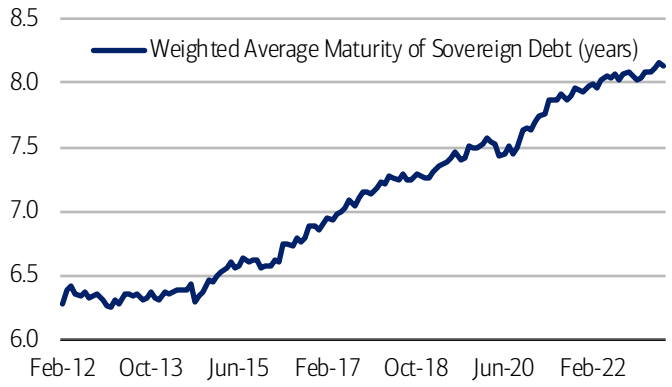
While this differential would be a natural argument in favor for higher sovereign credit risk and wider spreads to Germany, what we note is that the implementation of Next Generation EU (NGEU - an investment programme in the form of grants and loans funded with an element of solidarity and devised during the Covid crisis to sustain growth in the medium term and help "weaker" member states' public finances) is so far proving effective in countering the unbalanced policy transmission inside the Euro Zone.

In fact, countries such as Italy are growing at a much more sustained pace (relative to their own standards and vs core Europe) - this has served to sustain a positive market sentiment towards assets in the periphery, and is likely to continue doing so next year, based on current GDP growth projections.

This is not to underplay the risks intrinsic in the leads/lags of higher rates and how they affect different economic operators. We know from our credit colleagues that big corporates have currently seen relatively little of the higher rates environment on their cost of debt - see The European Credit Strategist: 500 rate hikes later... 21 July 2023 – which helps keep sentiment relatively supported there. For Eurozone sovereigns, the lengthening of the average maturity of debt seen since the sovereign crisis is slowing the effect of higher rates on public finances, meaning that even without further hikes, these actors will have to find additional resources if they want to stick to normalizing Debt/GDP ratios (Exhibit 51 and Exhibit 52).

The possibility of miscalculation for a monetary policy predicated on current data (and its limited extrapolations for the future) remains a major risk for credit spreads in particular. However, but this may be a story for 2024-2025 more so than for this year.

Exhibit 51: Weighted average maturity of Eurozone Government Debt
Years of low yields have pushed demand and supply of bonds towards longer maturities



Source: ECB

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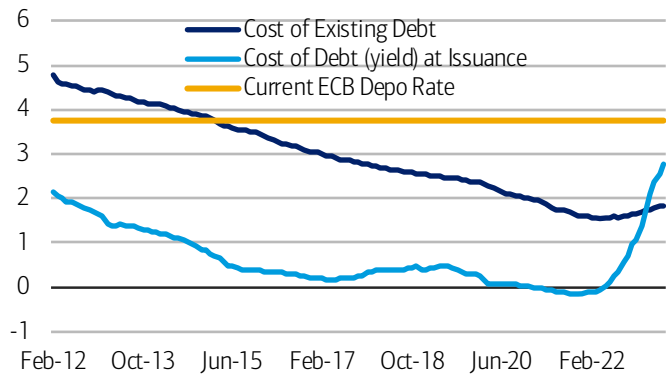
Exhibit 52: Market yields of government bonds vs average cost of legacy debt
Fiscal bills have so far seen little of the recent rise in yields



Source: ECB

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UK rates: mortgage market contribution to 'high-for-long'

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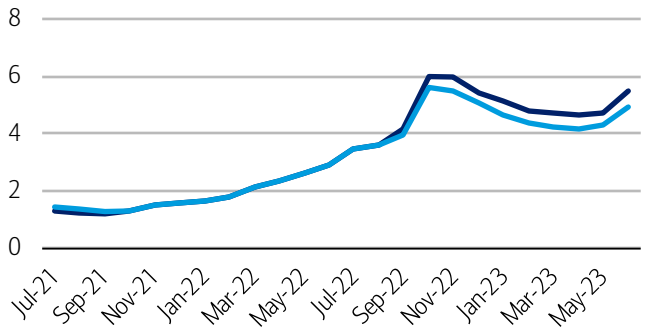
The September 2022 mini-budget turmoil led to a rapid rise in mortgage rates and a sharp drop in mortgage products available on the market. Having eased off the mini-budget peak levels over the first half of 2023, the average two- and five-year fixed mortgage rates have again been on the rise in Q3 (Exhibit 53). According to MoneyFacts, in July the average two-year fixed mortgage rate surpassed its previous peak of October 2022, reaching the highest level since August 2008. But in a marked difference from late last year, there are now more mortgage products on the market.

The mini-budget also resulted in significantly muted mortgage hedging activity in the Sonia space (paying fixed in the 2-5y sector). Anecdotal evidence at the time suggested a sharp slowdown in UK bank mortgage hedging activity in Q1 2023 relative to Q1 2022, possibly with some skew towards 2y as a reflection of the consumer view that a lower rate for longer could be locked in in a few years' time. Judging from occasional anecdotal evidence since, it appears that mortgage hedging activity has remained sluggish in Q2 and into Q3 2023.

Beyond the 2-5y Sonia curve effect from UK bank mortgage hedging flows, perhaps more meaningful is the changing mortgage transmission mechanism impact on optimal Bank of England (BoE) policy. One reason we expected the BoE to prefer a policy of higher for longer – now hinted at by the BoE as well (Bank of England review: high for long, 3 August) – is narrower and slower passthrough of rate hikes. This implies a greater conflict between the optimal interest rate for monetary policy purposes and for financial stability. 1y1y Sonia trading at around 5.27% – some 38bp below spot – is broadly in line with our current Bank rate call. We have recently turned neutral on front-end Sonia curves such as 1y1y/1y3y, thinking that the next steepening would need to come from more Bank rate cuts being priced in by the market, not our base case scenario (UK rates: Closing 1y forward 1s3s Sonia shy of target, 3 August).

The UK mortgage market effect on BoE's 'high-for-long' narrative has important implications for government finances, arguably a much bigger challenge for the UK than consumer resilience. As discussed in UK Macro and Financials: Risk premium re-establishing as carelessness comes home (28 June), the £800bn Quantitative Easing (QE) portfolio at the BoE and the £600bn inflation-linked debt mean that the UK faces the

Exhibit 53: 2y and 5y fixed mortgage rates (75% LTV), %
On the rise again



Source: Bank of England

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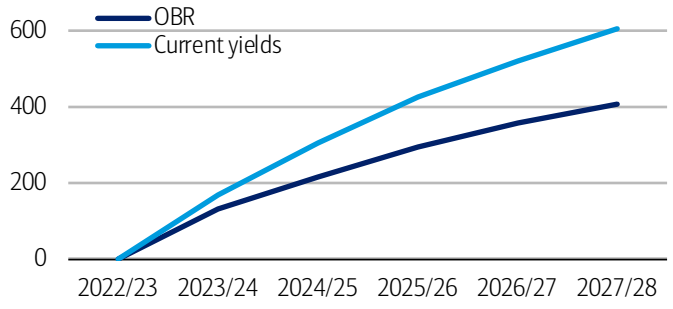
Exhibit 54: An additional £200bn in interest cost
UK government deficit, as expected by Office for Budget Responsibility and given current debt yields (£ bn) 2023-28 (as of 11 July)



Source: OBR, BofA Global Research

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fiscal costs relatively rapidly. Exhibit 54 details the pass-through of £200bn in additional debt costs to the UK budget over five years should yields as of mid-July prevail (yield rally since then should perhaps reduce the gap by about a third). These deficit figures are not impacted by losses the BoE has incurred on its £800bn QE portfolio. However, as the losses are realised, they will also add to the government debt.

EMEA & APAC RMBS: attractive IG mezz

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RMBS vary by country and fund small share of outstanding mortgage loans

In the UK, we estimate the outstanding amount of prime, buy-to-let (BTL) and non-conforming (NC) RMBS at £47bn, £30bn and £32bn, respectively, for a total of £109bn, as at end-2022. The outstanding amount of UK residential mortgages at end-2022 was c.£1.7trn according to the BoE data. UK RMBS account for c.6% of UK mortgage market.

In the Euro area, AFME estimates the outstanding amount of RMBS (prime and non-prime, including retained deals) at €396bn as at end-2022. As a percentage of residential loans outstanding, it was c.7% at end-2021 (€450bn RMBS and €6.5trn residential loans in the EU-27 area). Large share of EUR RMBS is still used in ECB financing operations.

In Australia, we estimate outstanding prime and NC RMBS at A$77bn and A$28bn, respectively, for a total of A$105bn. This is c.5% of the total ADI residential term-loan exposure.

In Japan, the outstanding amount of Japanese RMBS at Mar-2023 was c.Y22.1trn according to JSDA, of which JHF MBS was c.Y15.0trn and private RMBS was c.Y7.1trn. This represents about 10% of c. Y214.0trn Japanese residential mortgages at end-2022 as per BoJ and JHF data.

Post-GFC regulatory regime enforced more conservative loan underwriting

This has helped make post-GFC loans more resilient to stresses.

In the UK, the FPC (Financial Policy Committee) introduced in 2014 the limit on the number of mortgages that can be extended at loan to income (LTI) ratios at or greater than 4.5x (LTI flow limit) and the affordability test which specifies a stress interest rate for lenders to assess borrowers' ability to pay. The FCA Mortgage Conduct of Business requirements ensured that mortgages that had rates fixed for less than five years were stressed at 3% above the contractual reversion rate. All post-2014 loans originated prior to August 2022 were compliant with the affordability test.

In Australia the serviceability buffer has been set at 3% since November 2021 by regulator (APRA). Between July 2019 and Nov 2021, the buffer was 2.5%, and prior to that the min. interest rate of 7% was in place.

In Japan, the underwriting criteria got stricter after the GFC at the initiative of the lenders, we understand.

Credit performance deterioration is inevitable, but manageable

Mortgage rates have risen the most in RMBS sectors that are the most exposed to floating-rate mortgages, such as Spanish RMBS, UK BTL/NC RMBS and Irish re-

performing loan RMBS, as well as Australian RMBS and Japanese private RMBS. In contrast, Japanese JHF MBS, Dutch and French RMBS have mostly fixed-rate mortgages and so do recent vintages of UK prime and Irish prime RMBS.

Total delinquencies in prime RMBS rose by 0.3-0.6ppt in 1Q22-1Q23, with cross sector differences in line with underlying increase in mortgage rates. In non-prime sectors, mortgage rates have risen more, and arrears have picked up more noticeably: by 1-1.5ppt in UK BTL/NC RMBS and by 4.7ppt in Irish reperforming loan RMBS. Although arrears started to rise, it is still too early to see impact on repossessions. Estimated default/repossession rates changed little during 1Q22-1Q23.

We expect further deterioration in arrears and default performance in 2023 and 2024, as borrowers' finances continue to be under pressure from higher mortgage burden coupled with higher inflation/cost of living for longer than previously expected. Mitigating factors include excess savings accumulated during Covid pandemic, conservative underwriting, low unemployment rates, government and lender support, and in case of Australian prime RMBS buffers from prior prepayments and offset accounts.

Sectors with high exposure to fixed-rate mortgages, such as Dutch and French RMBS and recent vintages of UK/Irish RMBS, are the most shielded. The other sectors have high exposure to floating-rate loans but impact of higher defaults on losses should be mitigated by low severities (except in Irish legacy loans), due to low LTVs and high house price growth in recent years and mortgage insurance in case of Australian prime RMBS. Losses on RMBS tranches are further mitigated by excess spread and subordination.

UK BTL RMBS performance relies on rental sector performance as landlords have the option to raise rents, and rents did surge across regions on average 5% YoY (by more than 10% in some areas). Alternatively, landlords may choose to sell the loss-making properties, so there could be a combination of higher defaults and higher prepayments. Owner-occupied RMBS should see a drop in prepayments due to higher barriers to refinance (i.e. harder to pass affordability requirements) and diminished ability to pay.

In Japan, CDR of JHF MBS has been in the range of 0.4-0.5% since 2022, reflecting a slight increase (c.0.1ppt) due to the worsening pool credit quality (due to higher self-employment and DTI loan ratios) and rising inflation after COVID. This trend will continue, but we believe that CDR will remain well below the 1.5% level reached during the GFC thanks to stricter origination criteria by lenders and more benign economic situation overall. Annualized default rate of Japanese private RMBS has remained low since 2022, 0.0-0.1% according to Moody's; we note that Moody's data didn't record a spike even during the GFC (c.0.3%). We expect the default rate to stay at very low levels. Meanwhile, delinquencies will trend higher, more so for JHF RMBS than private RMBS.

We maintain constructive view on credit quality of IG RMBS tranches, but we are cognizant of the higher idiosyncratic risk in below-IG tranches of non-prime RMBS. Extension (in prime RMBS) and contraction (in BTL RMBS) risks are of higher concern than credit risk for the majority of the RMBS markets.

Convincing relative value

European and Australian RMBS spreads price in risk scenarios much more severe than the ones priced on the broader credit markets. The credit curve is particularly steep factoring in a moderate to severe recession in the pricing of junior RMBS tranches. Recent rally of senior tranches and improving macro-economic forecasts make the value of IG RMBS mezzanine more attractive.

With the terminal rate in sight and the expectation for small rate cuts starting from earliest mid-2024 onwards, the carry of RMBS floaters remains attractive, too In Japan, the recent spread compression of JHF MBS has brought them in line with JGBs with similar risk characteristics and reduced their attractiveness. The next steps in the BoJ policy normalization will likely lead to further decline in the attractiveness of JHF MBS.

AU Rates: Riding the wave

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Cautiously higher

Throughout the 2022/23 hiking cycle, markets have assumed the unusual structure of the Australian mortgage market makes the Australian economy uniquely rate sensitive. Given elevated levels of household debt-to-GDP in Australia and the looming maturity of fixed-rate mortgage deals signed at ultra-low interest rates during the pandemic, investors have largely concurred with the RBA's cautious approach to the hiking cycle, pricing in lower policy rates than the Federal Reserve in 2023 but policy convergence around year-end 2024.

Even as futures curves have largely repriced in parallel out to early 2024, the narrative of AU rate-sensitivity has become slightly more exaggerated over the past few month. Front-end swaps now price just 13bps of hikes but the spread between US & AU cash-rate futures starting in January 2025 has widened to 17bps (vs around -1bp three months ago).

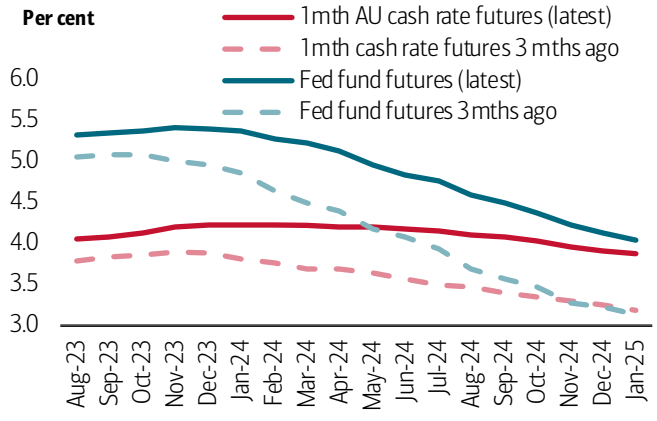
This level of divergence is extreme and the unusually steep AU cash rate futures curve will likely be tested in the coming months as mortgage resets and Term Funding Facility repayments tighten financial conditions. We like 2024 bill flatteners, paired with a Sep23/Dec 23 steepeners to manage the risk of an additional RBA hike in November (i.e., our economists' upside risk scenario).

Funding to tighten

The next few months will also be crucial as AU banks return $188bn in ultra-cheap Term Funding Facility (TFF) loans. Bills have begun cheapening to OIS as the regulatory treatment of TFF loans changes. Banks can no longer treat TFF funds as high-quality liquid assets (HQLA) for the purposes of calculating the Liquidity Coverage Ratio (LCR) once a maturity falls within 30 days.

As the LCR benefit of TFF funding has receded, 3-month bills-OIS basis (BOB) has widened. More recently, 6-month bank bills have also cheapened rapidly vs 3-month bank bills, signaling further tightening in funding markets. We expect this trend to continue

Exhibit 55: AU cash rate futures curve steep vs US Fed funds futures
Yet spreads between year-end 2024 futures have widened



Source: BofA Global Research, Bloomberg

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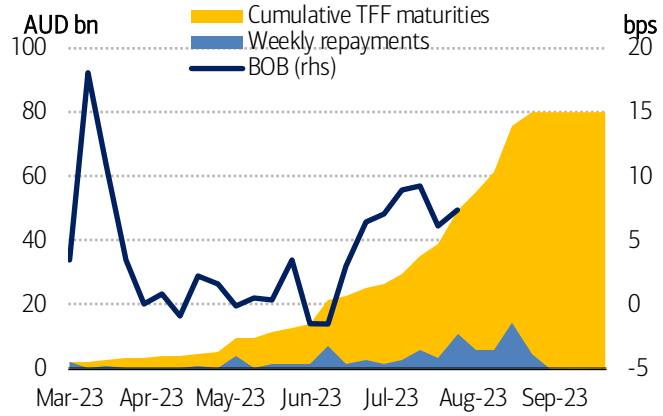
Exhibit 56: TFF maturities adjusted for 30-day LCR window
Bills-OIS basis has begun to widen as maturities step up



Source: BofA Global Research, Bloomberg, RBA

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into late August as TFF maturities step up and demand for HQLA intensifies. We like to pay Sep-2023 BOB with a target of 18bps, stop of 2bps (current level 9bps).

Japan Rates: Bear steepening pressure

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For market implications, the increased usage of variable rate mortgages by Japanese home buyers could generally be negative for JPY and add (1) bear-steepening pressure on the JGB curve, and (2) widening pressure on BEI given a higher hurdle for the BoJ to hike rates.

We have argued that the yen weakening pressure could enter the third phase in 2024 if the Fed's rate cuts are limited in 2024 (see: Liquid Insight: Phase 3 of JPY's structural decline in 2024? 28 June 2023).

The question then is if Japanese policymakers are willing to impose any form of capital control, or compromise on interest rate stability in such a scenario. We think it is unlikely.

- Capital control goes against the government's push for a shift from saving to investment. The Kishida administration says 2023 is the first year of Japan's path for "doubling investment income" and promotes a shift from saving to investment. The expansion of NISA is a key policy to achieve this objective. Any explicit or implicit capital control measures would go against the government's key policy and hence, would be politically less feasible.

- Interest rate stability is also hard to compromise on. Japan's internal imbalance remains highest among major economies with public debt to GDP ratio above 250%. A rapid increase in interest rates could destabilize the government's financing and could even lead to a JGB downgrade (see: Japan Rates and FX Viewpoint: JGB downgrade risks 22 February 2023). Rapid rate hikes on the front-end could also meet strong public opposition given the increased usage of variable home mortgages in recent years.

As a result, we think FX stability would continue to be the one compromised on first. This can be inflationary for Japan and adds bear-steepening pressure on the JGB curve and widening pressure on BEI.

We discussed this issue in the following report as well: Liquid Insight: Yen's 2024 problem 17 July 2023.

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