



CATELLA

# The Epsilon – Great Transformation of Real Estate Markets

European Residential  
Vision 2023

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*Cover image: innovative energy efficient Elithis Tower in Le Havre. The building has a bioclimatic design with on-site renewable energy production through photovoltaic panels on the roof and façade.*

# Preface

## By Xavier Jongen, Managing Director, Catella Residential Investment Management

The catalysts of the energy crisis, surging inflation and geopolitical turmoil ignited by the Covid pandemic and war in Ukraine are forcing an acceleration in the pace of economic transformation needed to confront two of the greatest challenges of our age: climate change and the poor-rich divide. While the former needs global solutions around the political centre, the latter feeds into populism, which produces precisely the opposite effect: domestic and international polarisation. This is feeding through into mounting pressure for a more rapid evolution in housing markets, the largest single source of global capital formation.

In the European residential investment sector, investors and managers are struggling to reconcile their previous business models with the new reality. Firstly, these were formed in the era of cheap money and cheap energy, whereas they are now confronted with a poly crisis of a financing market radically transformed by soaring interest rates, climate change, the tightening of environmental regulation and partial de-globalisation.

Secondly, the emergence of radical new 'impact' business models where 'dual materiality,' or the equal weighing of financial and climate/societal returns in investment decisions, is increasingly taking centre stage in business strategies. For a real estate industry that has grown to institutional scale under Nobel prize-winning economist Milton Friedman's doctrine that "the only social responsibility of a company is to create shareholder value," this is a profound challenge to existing strategies, cultures and benchmark performance metrics. The property sector is driving into this new world when the market's generally accepted ESG valuation and benchmark performance structures are yet to be framed, and where financial returns for a great swathe of assets held in portfolios that do not pass these opaque investment tests look set to fall off a cliff.

### The Great Transformation

Perhaps we are witnessing the prolongation of the outcomes of Hungarian economist and Columbia University professor Karl Polanyi's predictions in his Great Transformation (1944) historical and anthropological treatise. Polanyi's studies of the market economy's development in the 19th century led him to conclude that it was so socially divisive it had no long-term future as then configured. The Industrial Revolution produced the unbedding of the market from society and wide divisions between rich and poor, with the impact on the external environment undiscounted. This produced strong opposing social counter currents in the 20th century with the rise of the totalitarian regimes and, subsequently, the gradual gravitation of the political centre around the concept of the social welfare state.

In the 21<sup>st</sup> century, we are witnessing the biophysical limits of the market economy model with the collapse in biodiversity and onset of climate change. We now need to do what it takes to embed the market back into its biophysical context, into ecology. That is both an inflationary (energy transition) and deflationary (limits to growth) long-term secular process, until a new equilibrium is reached in the new 'great green growth world'. The main goal of the EU's decarbonisation transition 'Green Deal' is to achieve a carbon neutral Europe by 2050, but that is only an intermediate step towards the Great Transformation.

## The Energy Transition and Waiting for the Return of the Residential Cycle

The transition of economies away from fossil fuels towards green renewables has been accelerated by the war in Ukraine, as governments and consumers have rushed to diversify their energy supply in the face of soaring prices and a surge in inflation to the highest levels in decades. European residential markets have also come under pressure with the ramping up of interest rates by central banks driving up financing costs, alongside higher material prices and labour costs, as well as tighter environmental regulations adding to the potent headwinds facing the sector. Investors and managers have responded by moving to the sidelines, if they can afford to 'wait it out,' until they have clearer visibility on valuation levels and the position of European residential markets in the cycle.

So far, so cyclical. But what if this is not cyclical at all? The energy transition seems to be leading us into a real estate 'Reformation,' or the realignment of market cycles on the journey to the biophysical Great Transformation, where the world in which we end up will be fundamentally different to the one we are departing. Projecting forward on how that world might look, rather than extrapolating from the past, will make more sense than plugging in the parameters of mean reversion that were valid for the 1945-2022 period.

Positioning oneself on time for the realisation of the Paris climate accord targets within the real estate industry – the largest single collective source of greenhouse gas emissions and capital formation on the planet – will be the key to creating stakeholder value.

Our economic growth for the past 200 years has been closely correlated with access to low-priced and efficient fossil fuels. We are now reaching the

hard biophysical limits of that 19th century 'Industrial Revolution' model.

If our economic productivity is based on cheap coal, oil and gas as inputs, when those props are removed and aren't replaced fast enough because we are not making the necessary investments in renewables, then GDP, one of the main drivers of property markets, will contract correspondingly.

The price paid for fossil fuels only included the work put in for excavating, refining and transporting them – not for the millions of years they took to be formed, nor the consequential costs generated by the high CO<sub>2</sub> emissions produced by burning them. The Great

Transformation rectifies that 'free lunch' humankind has enjoyed for centuries, as the true costs for the planet

start to be felt, and the market price for decarbonisation becomes established. We will be forced to move from a high Energy Return on Investment (EROI) environment, by excavating cheap fossil fuels, to a low EROI.

The intense political debate in the densely-populated Netherlands on the sustainable limits of growth compatible with the country's greenhouse gas emissions commitments in sectors from construction to transport and agriculture is likely to roll out across other European states, and have a profound impact on the EU's direction of travel on climate change. It is becoming clear that the old models of economic growth cannot continue for very long into the future.

When we start to understand the non-cyclical situation we are in, then we can see that climate change and real estate market mispricing are actually connected in many ways, including through physical climate risk, transition risk and adaptation risk. Once we connect those dots, our analyses take us to climate gentrification and the potential mass migration of people seeking to escape the effects of global warming, which will set into motion another series of societal events which also have a pricing and investment impact.

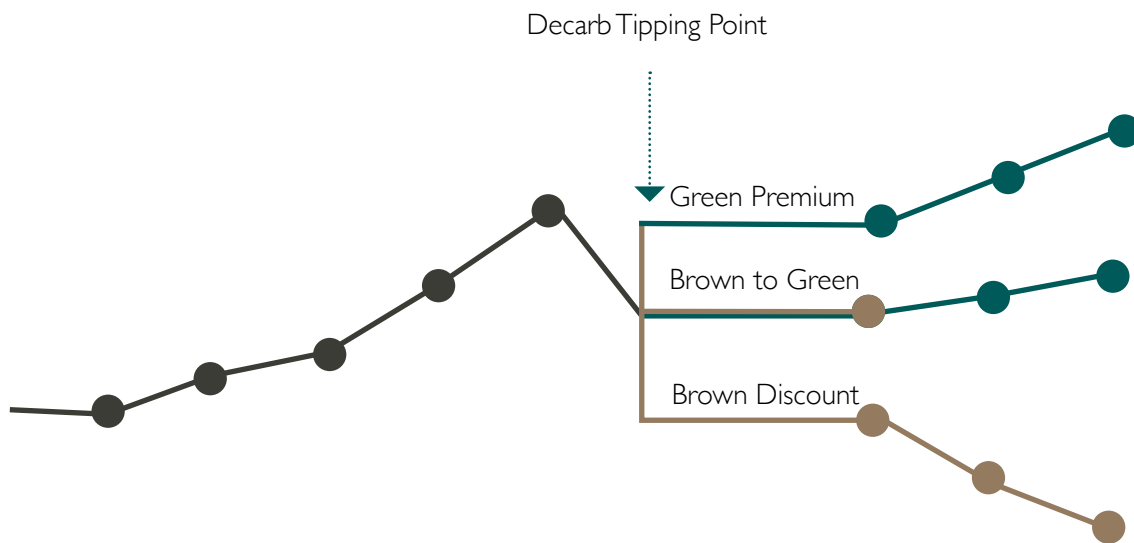
In the coming new world, we are not necessarily damned like the biblical '10 plagues of Egypt' imposed on the Pharaoh for thwarting God's will in enslaving the Israelites. We need, however, to accept hard limits to growth as this is based on hard science crossing over into economics, finance and politics, and can't be changed in the boardroom. The 'tipping point' in Catella's view is well within the next years, which is the industry standard investment horizon for the European residential market, and is why the Great Transformation lies first and foremost in our strategic planning for the future.

## The Epsilon Investment Market

The extraordinary low interest rates of the last decade will not return in the long term, while global climate targets will remain and significantly influence investment behaviour in real estate investment markets.

We believe the real estate realignment is underway as markets start to understand that the era of low-cost financing is fading, and that the valuation gap will continue to widen between assets with a 'brown discount,' which are not sustainable in their current composition, and those with a 'green premium,' or the highest decarbonisation and increasingly societal well-being credentials. In this new paradigm, the European residential transaction market will not revert to a cyclical form, but become more a transformational 'curve,' dividing into a Greek letter Epsilon shape: E/ε.

### Catella decarbonisation market development



Source: Catella Residential Investment Management

The valuations of non ESG-compliant properties will take an 'L-Shape' path, going into a brown discount, and will be repriced or not acquired at all. Unless fundamental action is taken by the investor there will be no bouncing back from a brown discount position.

Some assets will undergo a 'brown-to-green' refurbishment or retrofit within the portfolio, or after being sold, and form the middle track in the Epsilon Market. The top valuation line will be occupied by buildings that achieve a green premium because they have low energy consumption and/or CO<sub>2</sub> emissions in their construction and operational phases.

## The Short-Term Outlook for European Residential Markets, Tactical Investment Strategies

Residential investment markets across Europe have been frozen to a large extent for the best part of a year, after the energy crisis sparked by the war in Ukraine and ongoing global supply disruptions from the Covid pandemic triggered surging inflation and an aggressive ramping up of interest rates by central banks. The dramatic rise in the price of money has disrupted valuation models and reduced the risk/ return attractiveness of real estate relative to investment grade fixed income assets for investors, as well as seriously challenging those who need to refinance deals in a radically changed rate environment.

Holders of housing assets in the private markets have shown a great reluctance to accept valuation markdowns against this volatile and opaque macroeconomic and geopolitical background. Many have the financial reserves to hold out, following a strong decade of investment performance and generally less leverage than in the period before the 2007-2008 Global Financial Crisis. Those with less financial reserves have commenced cost-cutting and cash hoarding to buy time as they wait for markets to 'normalise'.

Today, the private residential markets are mostly in a state of suspended animation because of the wide divergence in price expectations between buyers and sellers. Off-market sales are still being discussed, but are sparsely transacted and with large discounts when assets do change hands, or occur through some form of subsidy, like a cheaper construction loan.

Even though the consensus view on European interest rates is 'higher for longer,' they are likely to stabilise at around a 3%-4% range for the ECB reference rate, below the threshold where they would endanger the Eurozone's competitiveness and challenge the political fabric of the European Union. The long end of the rate curve is flattening due to recessionary fears, indicating that, from both ends of duration, the limits of the current rate rising cycle are coming into view. If interest rates peak in the expected range around the end of 2023, there will be more visibility on the plateau where the residential investment market will land and liquidity should return. We expect the next equilibrium to be consistent with a respectable 150 bps yield spread for the sector over 10-year bonds and in line with the long-term trend.

The timing of the market 'tipping point' is of course guesswork, but some causalities can be observed. The speed of interest rate rises and subsequent value loss in capital-intensive businesses and assets, notably the stock prices of liquid listed residential real estate companies that lead by many months the valuation adjustments in the underlying physical portfolios and usually overshoot, have occurred so swiftly that the bear-to-bull market transition is likely to be shorter than the usual average of 3½ years from peak to trough. In a best-case scenario, it could be that residential yields may rise in the short-term, but fall in the near- to mid-term as the rate cycle peaks, while investments continue to be supported from the ongoing rental growth that is occurring due to strong demand fundamentals. Past the tipping point, those investors who are not in the market would have missed out.

The Paris agreement is not a challenge but an opportunity. Decarbonising existing European housing assets represents a huge new market opportunity for energy consultants and construction companies, estimated at between €25,000-€40,000 per dwelling. Decarbonising from an investment management perspective, when coupled to value creation, means taking development, redevelopment, repurposing, densification risks. This presents great opportunities, since the downside risk is limited due to strong European housing market fundamentals.

Tactical investment combinations on the ground will make a lot of sense. For example, simultaneously decarbonising and repurposing repriced shopping centres as broader 'experience destinations,' including residential alongside the retail offering, or developing

food courts with residential apartments on top. But only a part of the housing stock lends itself to profitable decarbonisation and consequent value creation. For most of the stock it will be a zero-sum game at best.

Innovation in real estate is slow, with incumbents still not really challenged on their business models, even if some disruptors have emerged at scale in recent years, such as the AirBnB sharing app. Cost control and customer service will ultimately gain the upper hand, and the digitalisation of value chains will be the only way out for market innovation laggards.

In geographical terms, our research points towards preparing now to allocate capital to the most cyclical markets first, albeit only around the tipping point. This includes the UK and a few more volatile markets in capital cities like Amsterdam, Copenhagen and Dublin, as well as those where the corporate finance structure of some REITs is fragile, such as Sweden. Off-market repricing has been substantial already in these cities, but capital has not yet returned at scale. At the same time, this strategy would avoid those countries where regulation is strongest and where residential markets are generally less cyclical, like Germany and France.

We need to wave goodbye though to a long cycle of perceived 'bond-like' core residential investment strategies. This is a structural shift away from when residential was a convincing 'new and safe' capital markets product in a zero-bound interest rate world. All bets are off, the pendulum has swung towards hands-on, feet-in-the-mud, value-add and opportunistic value creation. Not only because of the capital markets repricing that we are entering into, but also how that combines with the obsolescence of important parts of the office and retail markets from both a demand and sustainability perspective, which require fundamental repurposing. At the top of everything is, of course, the decarbonising of the housing stock – the largest asset class of all, bigger by value than total equities, fixed income and other financial markets combined.

The trap in the above is that we do not see this Great Transformation as we analyse the piling up of crises through the lens of the known cyclical nature of the previous world order and wait for mean reversion to circle back in. For example, once we got our heads around energy labels, we understood that it is actually all about decarbonisation. Once that was clear, we began to realise that decarbonisation has a non-discounted cost component. Because that brown discount has not

been priced in, particularly in residential markets, we are in essence sitting on an enormous price bubble. The long-term winners in this Epsilon forking of the brown and green climate, and ultimately societal, pathways will be those investors and companies able to capture the emerging green premium, even if it doesn't have a generally accepted valuation tag – at least not yet.

## European Housing Markets in The Great Transformation

For European residential markets, the journey to the Great Transformation starts at, or close to, the peak of the pricing mountain. ECB monetary policy has pushed both square metre prices and, as a knock-on effect, free market rents to record highs. Housing affordability and the rise in the number of households struggling to get by on their monthly incomes is at the top of the agenda for politicians and the residential industry itself across Europe. The sharp increase in energy costs is magnifying the pain for household budgets, and higher bills are likely to extend across the remainder of 2023 and through next year. Policy makers have not been able to find scalable solutions for decades to the huge challenges besetting the sector and now we have a mosaic of broken housing markets.

The political policy response to the housing crisis can be categorised in two ways, either accommodative or restrictive, with the market approach focused on spatial solutions:

### Government Policy Responses

#### I | Rent caps and taxes

Political pressure for caps on residential rents is increasing across the EU, with some markets like Berlin ahead of the curve. More countries will follow in upcoming general and municipal elections. In many states, property taxes are on the rise as well. In the Netherlands, the impact of a combined raft of new regulations is expected to reduce the average internal rate of return (IRR) for investments in the affordable housing segment by around 20%.

## 2 | The housing pendulum may swing back to the public sector

Since the 1980s, the housing market investment pendulum has swung heavily towards private and institutional investors, and away from the social and municipal housing sector. With the current high levels of public dissatisfaction on housing affordability, policy making could swing back towards the type of massive state intervention in housing markets experienced in the 1920s to 1950s, where public entities developed millions of dwellings over the decades in countries such as France and the Netherlands. Populist-style governments in particular may intervene more radically in housing markets. These policies have, however, proved inflationary historically and the European Union, with its budgetary and fiscal supra-national rules, still acts as a hurdle. Some more liberal governments will subsidise green investments and others will leave a greater part of the decarbonisation transition to the private sector.

### Private Market Investment

## 3 | 'Shrinkflation'

Co-living and sharing concepts where tenants have to accept less space due to constraints on their available accommodation budgets are part of the market response. It is mostly the younger generations that are suffering from Europe's broken housing markets, as they do not have the financial reserves of their seniors and are competing for the same inner-city space.

## 4 | Trade-out

Covid brought households the new technology opportunity of remote working. Working from home makes it possible for households to vote with their feet and trade-out to smaller, well-connected thriving communities away from the main and most expensive urban centres.

**“There is much less profit to be made in the market, but much more purpose.”**

Spatially, this creates new strategies where households get the best of both worlds, keeping their higher metropolitan incomes and connections to the job market, while increasing their living space in so-called '18-hour' cities away from the largest centres. This trend is occurring in Paris and London, as well as other cities across Europe.

We are thus embarking on the second leg of the Great Transformation – the 'biophysical,' where our starting position is framed by the elevated cost of living and very steep asset prices, with the prospect of substantial decarbonisation costs lying ahead. In parallel, regulation will put limits on future investment income against a background of structurally higher interest rates. After the last 20 glorious investment years, there is much less profit to be made in the market, but more purpose. It is never too late to do good, but some investment managers will struggle to trade down their financial profitability levels in exchange for higher climate and societal returns, due to a lack of internal motivation and appropriate embedded culture.

How does one navigate this Great Transformation? By being part of it – not as a reporting metric, but as a business strategy. That means focusing on investing in assets that have a 'dual materiality,' where the financial return sits equally alongside societal and environmental returns on the investment balance sheet. Achieving this dual materiality requires a lot of 'value-add' repurposing. A new type of core investment rationale will dominate, producing lower financial returns, but with investments that are far more embedded in the communities and ecosystems where they are located.

Catella's world-leading partnership with French sustainable engineering group Elithis has created 'energy positive' residential towers that produce more green energy than the buildings and tenants consume overall in brown energy, and this at standard construction costs. The Elithis towers also link sustainability to affordability by boosting household income through the sharp reduction or elimination of energy bills. They are still currently the only solution that has been delivered at scale to meet the multiple challenges Europe is facing in its housing crisis, with affordability and climate change at its centre.



# Residential Investment Strategies

We are moving into a much more difficult investment environment, with cyclical adjustment and secular change occurring at the same time. How does one deploy capital in such market conditions, where we also have simultaneous pressure from market rental increases and rental caps, decarbonisation cost repricing and market repricing? Let us first discard a few strategies as being temporarily dead.

The most common investment strategy of the past decade, namely core buy-hold and flip at exit strategy, is the first casualty. Stranded asset risk is a slow train heading towards you. It does not allow passive asset management anymore. In addition, rising interest rates have ended the beneficial yield compression this strategy enjoyed.

The second investment strategy to be overtaken by events is buy wholesale – ‘lipstick makeover’ and sell retail into the owner-occupier market. With the rise in interest rates, liquidity has run out of the market and owner-occupier pricing is already dropping. Moreover, cosmetic makeovers are increasingly discarded by consumers as their financial understanding of decarbonisation costs has risen considerably during the European energy crisis.

The third investment strategy that can no longer be executed is ‘worst first.’ This strategy consists of selling those assets with the highest decarbonisation costs into the institutional capital market, because that market does not yet transact at price levels that properly reflect the costs. That window has closed both due to falling liquidity in the investment markets and partial pricing of decarbonisation costs by institutional investors (so-called brown discounts).

The fourth strategy is the benchmark strategy. In times of high uncertainty, there is a prevailing rationale to follow the wisdom of the markets, which in the longer run tend to be pretty much on target. The difficulty lies in defining a benchmark and limiting the tracking error. Moreover, due to higher volatility in the short term and transformational change in the longer term, this strategy faces extra liquidity challenges and is difficult to execute.

For the other viable strategies, we have plotted them in a matrix on page 11 (Exhibit 1), where the x axis represents the tactical/transformation timeline and the y axis the defensive and offensive risk appetite (core, value add, opportunistic). Of course, combinations of the strategies below can make sense as well:

## 1 | Hold your gunpowder:

Do not bet against the central bank. Wait until interest rate rises have stabilised and more certainty prevails on a new floor of multiples.

## 2 | Deep dive slow decarbonisation:

Do not bet against the state. Follow the Carbon Risk Real Estate Monitor (CRREM) pathway conservatively and maximise subsidy flows into the ‘greening’ of assets. This strategy is asset management medium heavy and may suffer less from prolonged periods of execution problems due to a lack of skilled labour and, as yet, convincing pricing evidence. It therefore assumes a long timeline of not too ambitious decarbonisation targets with hurdles in 2030 to 2040 to 2050. A limited amount of capital is deployed from prime assets into the affordable housing stock range.

## 3 | Minimum Sharpe strategy:

This is the first strategy that actively deploys capital in additional stock. It aims to avoid volatile markets like Ireland, the UK, Denmark and the Netherlands where regulatory pressures are likely to be strongest in their capital cities. Investments should be weighted towards more stable provincial cities. On the product side, strong corporate covenants in social and senior care are prioritised if they provide a full inflation hedge. And sometimes developments are possible if supported by a state subsidy.

## 4 | Cyclical brown to green conversion:

Capital is deployed to actively acquire discounted assets with the purpose of investing in their decarbonisation,

then exiting within say a 10-year time horizon. This is an active acquisition, asset management and green refurbishment strategy of medium intensity, as it focuses on modernisations across all the price-points from prime to affordable.

This strategy is what most investors would qualify as an impact strategy, where the pain point is that the regulator does not apply the same definition.

## 5 | Optionality strategy:

Real assets have options that are not considered in valuations. Valuations' premise is the highest and best operational use of an asset, but in times of volatility it is the alternative usage which may well increase in value. This strategy focuses on mispriced assets from a real options perspective and lowers the downside risk. Valuing real options asks for more analysis than regular due diligence, and only a limited amount of assets have option pricing levels beyond the strike cost. In periods of less liquidity, however, there is also more time to execute a real option strategy.

## 6 | Optimal Sharpe strategy:

This strategy aims to maximise the return for a given amount of risk. In terms of geographical spread, it would be executed around the transformational 'tipping point,' to those markets which are most volatile and reprice first, probably the UK, Ireland and Denmark.

## 7 | Impact strategy:

Buy your way out with assets that are near energy neutral and show a low operational decarbonisation level, and bet on a green premium to occur over the mid- to long-term. For social impact, eradicate or minimise the average energy bill for tenants. This is Catella's Elithis Fund strategy. Over time, enhance life-cycle embodied carbon improvements, including during construction.

## 8 | Go long on affordable housing:

In the short- to mid-term this has become a less obvious investment strategy due precisely to the fact it is this intermediary price point that is the potentially most risky segment from a regulation and political risk point of view. As more mid-income families struggle to make ends meet, governments are likely to impose stricter

regulation. To a large extent, student housing also falls in this category. In the long run, though, the mismatch in supply and demand will not be overcome without new supply, so the affordable rental housing segment provides stable long-term returns.

## 9 | Space – distance arbitrage:

Working from home is here to stay and provides an opportunity for white collar workers to trade out of the most expensive cities to locations where they can find more space for the same amount of money while keeping their jobs. This strategy is a variation on being short on governments' abilities to solve the housing affordability crisis. It is a 'hinterland strategy,' where the bet is on the growing attractiveness of 'next best' cities, such as '18-hour cities', Spa-like cities or university cities close to Europe's highest GVA (gross value added) urban conurbations.

## 10 | Climate gentrification arbitrage:

This is a geographical strategy where we follow the tenant to regions less vulnerable to the effects of climate change. Much like gentrification had a value-enhancing effect on city centres, so the new migrant flows will positively impact those cities that are better positioned against climate change. This is a long-term investment strategy, but 'in-scope' as investors implicitly assume a 20-year investment horizon on a 10-year IRR.

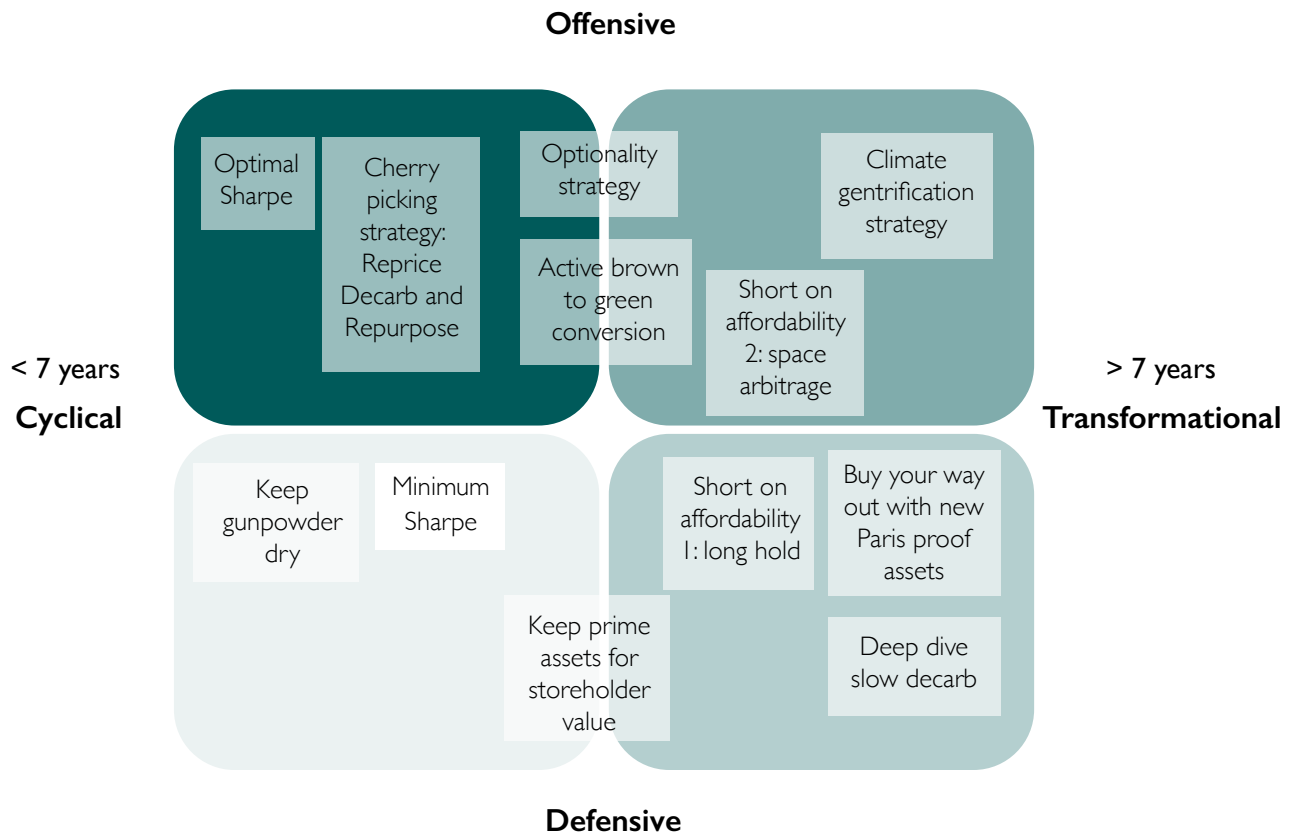
## 11 | Reprice, Repurpose, Decarbonise:

This is the most active acquisition, asset and (re) development strategy. It consists of cherry picking those assets that are fit for purpose and then actively transforming them to new purposes. It includes high levels of densification and is best executed in prime volatile markets after the tipping point and for prime assets. The investment time horizon is short and foresees an exit within, say, seven years.

## 12 | Sell to store value seekers:

The storeholder value strategy is one of capital preservation. In times of extreme geopolitical uncertainty and/or very high levels of inflation there is a flight to real assets as a store of value. If you are short on Europe, then buying centrally-located residential assets will provide shielding.

**Exhibit I: The Investment Strategy Universe**



Source: Catella Residential Investment Management.

In conclusion, there is a central dilemma to consider from an investment strategy perspective: capital deployment versus timeline arbitrage. Indeed, those strategies that are more (Great) transformational will have less capital deployment volume capacity in the near- to mid-term than more cyclical strategies. However, the cyclical strategies are at risk of getting caught out by the Great Transformation-induced repricing.

The emerging generation of dual materiality 'transformational funds' will be judged by investors not only on their financial performance, but equally on their climate and societal impact. That combination is intrinsically a multi- decade challenge. The main risk posed to Great Transformation-inspired strategies is they need more time to deliver projected returns than the average of 10 to 12 years of today's core investment style funds. In addition, it does not fit a spot price go/no-go investment decision.

# Executive Summary

By Benjamin Rüther, CRIM Head of Fund Management

Despite rising interest rates and inflation, European housing markets are expected to remain strong due to limited supply, competition for labour and housing being a basic need. However, the private market is effectively frozen due to the wide spread in price expectations between buyers and sellers.

The Paris Agreement climate accords represent a huge new market opportunity for decarbonising existing housing assets. Instead of being somewhere in a continuum of previous residential cycles, we may be at the start of a Great Transformation, as outlined in the preface to this report, with markets slowly becoming embedded back into ecology. The Great Transformation is a secular trend, and within that the intermediate goal will be the decarbonisation of the real estate industry out to the EU's Green Deal target of 2050. Those who position themselves on time for this intermediate phase will be the winners in creating new value.

This structural transformation is being accompanied by higher construction costs, interest rates and rental levels, against a backdrop of continuing urbanisation, a rising number of households and increasing house prices, which make home ownership less attainable.

The growing number of European households is primarily driven by more people living alone. This trend is outpacing underlying population growth in urban areas, at the same time as the pandemic accelerated people's preference for living in suburban areas and cities with a multitude of lifestyle options, services and cultural offerings. Europe has negative natural population growth, but positive net migration, which is being added to by refugees from the war in Ukraine. Niche asset classes such as student housing, serviced apartments, co-living and senior living could be the winners in these times of tight housing markets.

The traditional economic metrics of success, such as GDP growth, are not always correlated with well-being, and they are negatively correlated with natural health and wealth. This also applies to the real estate sector, where Catella believes internal rates of return and

valuations mostly do not reflect a building's sustainability characteristics, or its potential long-term value in the Great Transformation.

Catella has partnered with other real estate players in an initiative led by the Urban Land Institute to develop a valuation tool called 'Preserve' for decarbonisation-compliant discounted cash flows. This integrates a broader definition of value and risk by reflecting the impact of real estate portfolios on the environment and society, as well as risks to portfolio values. The valuation tool aims to mobilise the real estate industry to decarbonise by sharing data as a prerequisite for capturing the true price of green premiums for assets calculated by analysing decarbonisation costs.

Residential real estate is lagging in pricing the sustainability of assets, particularly because ESG regulations and metrics differ widely at EU, national and local levels, making it difficult to calculate green premiums.

The revision of the EPBD (Energy Performance of Buildings Directive) offers an opportunity to set the whole building stock in the EU on a planned trajectory towards deep refurbishment to boost the rate and depth of energy efficiency across Europe.

Climate change and geology are two elements that have been less in focus when it comes to investment and real estate decisions. Climate catastrophes like floods, heat waves, droughts and forest fires are becoming more frequent and intense. Munich RE and TCC have conducted research on the European real estate value loss due to physical risks from climate hazards, and estimated an annual loss of an average of 0.7 bps p.a. of capital value due to river flood risk, and nearly double that due to sea level rise. According to the Intergovernmental Panel on Climate Change's (IPCC) recent report, between 3.3 billion and 3.6 billion people live in locations highly vulnerable to climate change. The adaptation costs for climate change can be very high, but some cities and national governments are nevertheless taking appropriate measures. For example, Copenhagen

is building an artificial island to hold back rising sea levels, while the Netherlands is boosting its Delta Programme to protect Dutch cities from flooding. Global bond markets are generally the bellwether in sensitivity to the impact of major economic, financial market, geopolitical and increasingly climate risks, and where the 'bond vigilantes' go the world follows. Sharply rising interest rates are increasingly spilling over into the real economy, with corporate insolvencies expected to climb as a result. But fixed income investments are also becoming relatively more attractive, particularly if they have strong sustainability characteristics. Debt issuance without solid ESG overlays is expected to become pricier and harder to raise for non-sustainable projects or companies, as will bank lending.

In 2022, global stocks and bonds lost over \$30 trillion as Covid-related global supply chain shocks and the energy crisis stemming from the war in Ukraine sparked spiralling inflation and the ratcheting up of interest rates by central banks.

Monetary tightening by the Federal Reserve led to the biggest annual increase in the US 10-year government bond yield in Bloomberg records stretching back to the 1960s. Income-producing low-risk fixed income assets are back as an investment alternative for institutional investors, and credit can make more sense to own than equities. For pension funds and insurance companies, falls in the value of their equity and bond portfolios can hinder the amount they invest in private real estate due to the denominator effect, where the lagging relative value of property holdings means they exceed portfolio asset allocation limits. As a result of the denominator effect and a reduced risk appetite, European investors are expected to cut allocations to real estate and return to core as the preferred investment style within the asset class through 2023 – although the high volume of dry powder sitting on the sidelines awaiting deployment in real estate could to some extent mitigate this.

# European Markets

## This Time is Different

After a more than decade-long bull run in European real estate investment, we are now witnessing a possibly dramatic denouement as markets realign for the Great Transformation. Yet cyclical elements remain in certain geographical pockets and sectors acting as a countervailing force to restructuring.

We have passed the peak in energy price hikes as new supply chains have been developed. However, as fossil fuels are gradually replaced by renewable energy sources, we are likely to see price increases in the future. Together with structurally higher interest rates, construction costs and overall housing costs, European housing markets face persistent challenges and will have to adapt accordingly.

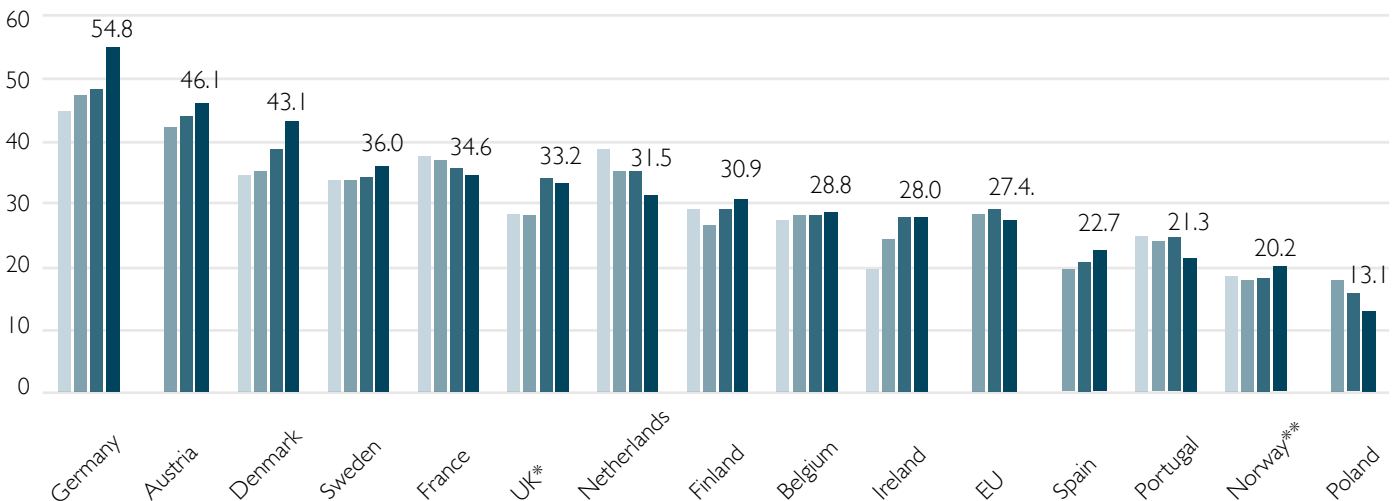
## Rental Markets on the Rise

One of the biggest European market trends lies in the continuous expansion in residential rental markets (see Exhibit 2). In many countries, there is a political preference towards home ownership. However, there have been opposing factors at play that affect the viability of home ownership versus that of the rental market.

Now, with a sudden spike in financing costs, which has pushed the monthly costs of home ownership to more than double, home ownership has become less attainable. Therefore, the share of renters in the population and thus the size of rental markets will inevitably grow in the future.

In recent years, low interest rates enabled many people to purchase homes instead of renting. Despite this, concurrent urbanisation has led to an increase in households opting for rental properties in larger cities.

**Exhibit 2: Share of Tenants in Population in %**



Source: Eurostat

\*estimation for 2021 based on Eurostat and English Housing Survey

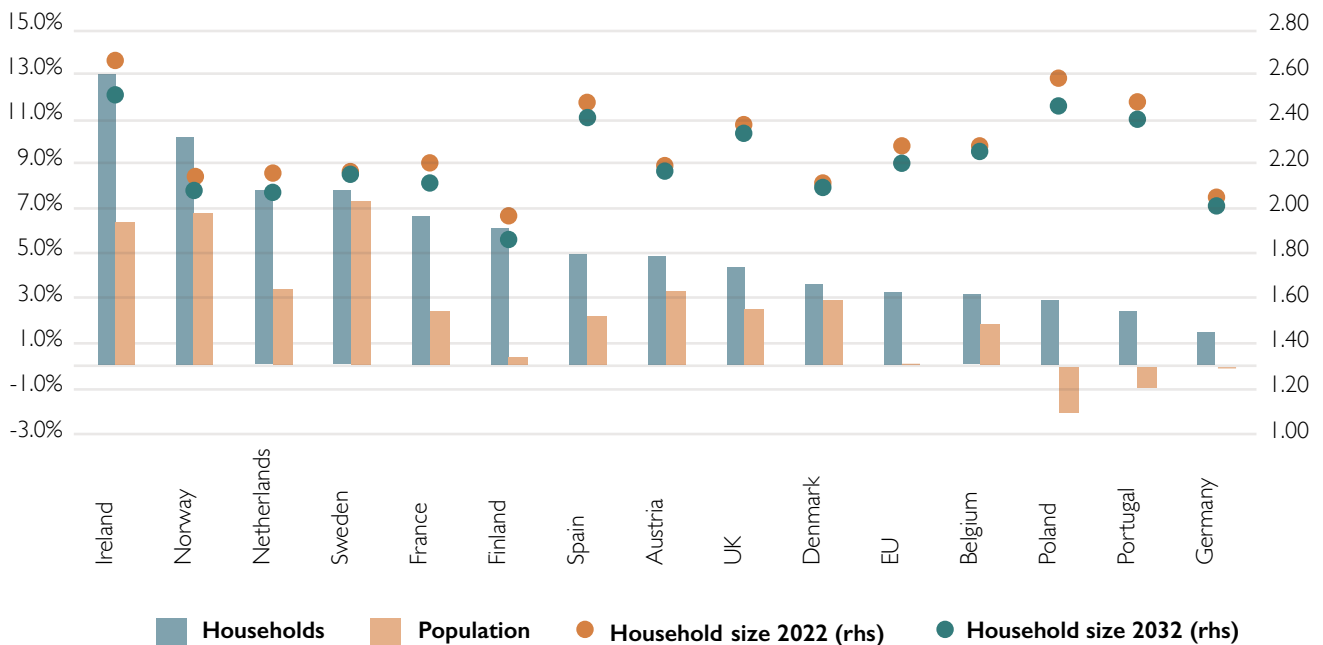
\*\*value for 2020 instead of 2021

### Urbanisation: Smaller Households but More

The growth of households is outpacing population growth in all countries, due mainly to the trend towards more people living alone, particularly in cities (see Exhibit 3). The growth in ‘singularisation’ is particularly pronounced in countries previously characterised by larger households, such as Ireland, Poland and Portugal. In countries with smaller households, less contraction is expected. However, Finland is an exception, with its average household size of less than two projected to drop to only 1.86 people. Norway, Sweden and Denmark are expected to show more moderate, but similar household demographic trends.

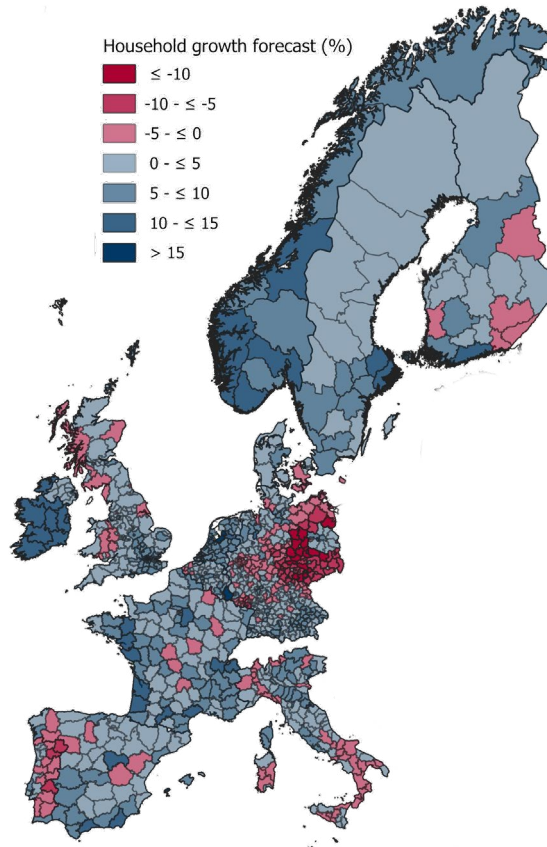
Germany, on the other hand, does not expect population growth, but is projected to see a slight increase in number of households over the next decade. Despite declining populations, Poland and Portugal are both projecting growth in household numbers due to singularisation.

**Exhibit 3: Household Growth, Population Growth and Household Size Forecast 2022-2032**



Source: Oxford Economics

**Exhibit 4: Household Growth Forecast 2022-2032**



Source: Eurostat, Oxford Economics, National Statistical Offices

The map above (Exhibit 4) shows forecast household growth is expected to be concentrated in the large leading metropolises such as Berlin, Munich, Paris and London. In contrast, rural regions in eastern Germany are projected to experience a significant decline in the number of households, as are many southern regions of Italy and areas of eastern Portugal.

Urbanisation is most likely a long-term trend in Europe, even if the accelerated 'digitalisation' of job processes during the pandemic made working from home and shopping via e-commerce a more attractive proposition for many. At the same time, higher travel costs have led people to wanting to keep daily trips short. As a result, some of the largest city centres have lost attractiveness relative to suburban areas. Some citizens moved further out, such as to Spa cities, or 18-hour cities that offer a high quality of life in terms of amenities and affordability.

It has been shown time and again that the heterogeneity of the age cohorts causes different migration movements. For example:

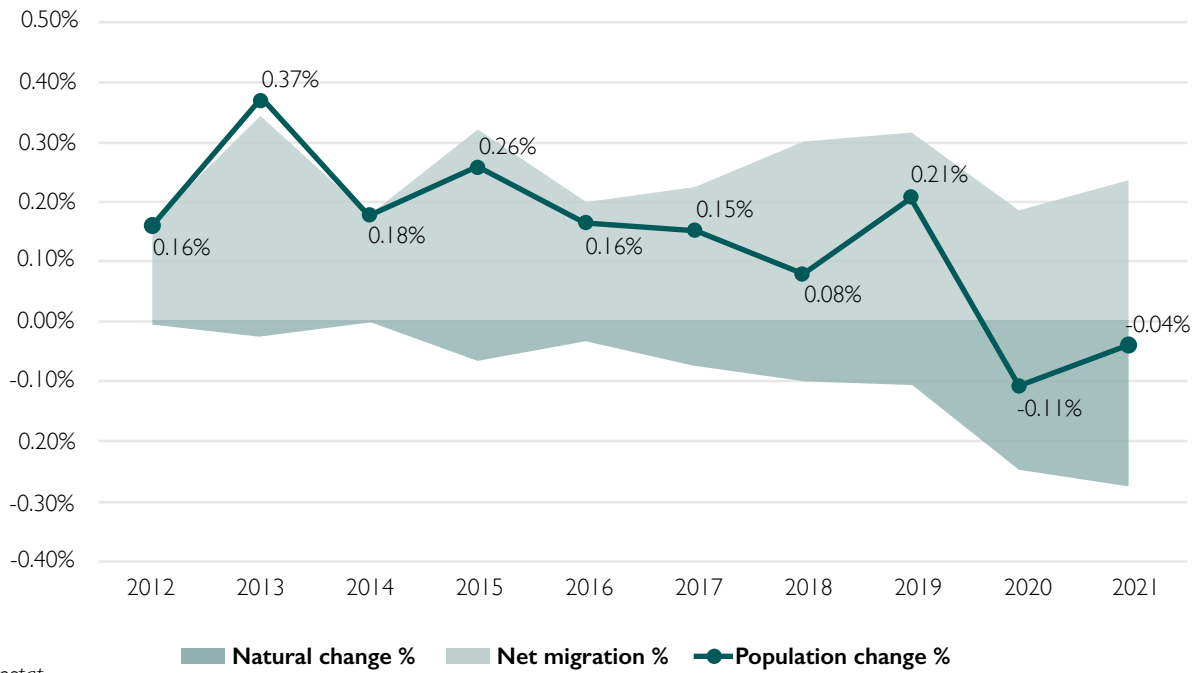
- 'Best agers,' or people in the prime of their lives above 50, whose kids have left the family nest and can afford to move to the great metropolises or 'swarm cities' to enjoy the urban amenities on offer.
- Young families who want to buy their own home in the immediate vicinity to the metropolis to combine still affordable prices with affordable commuting costs.
- The urban bohemians who accept small living spaces for an affordable total rent in order to live centrally.



## The European Melting Pot

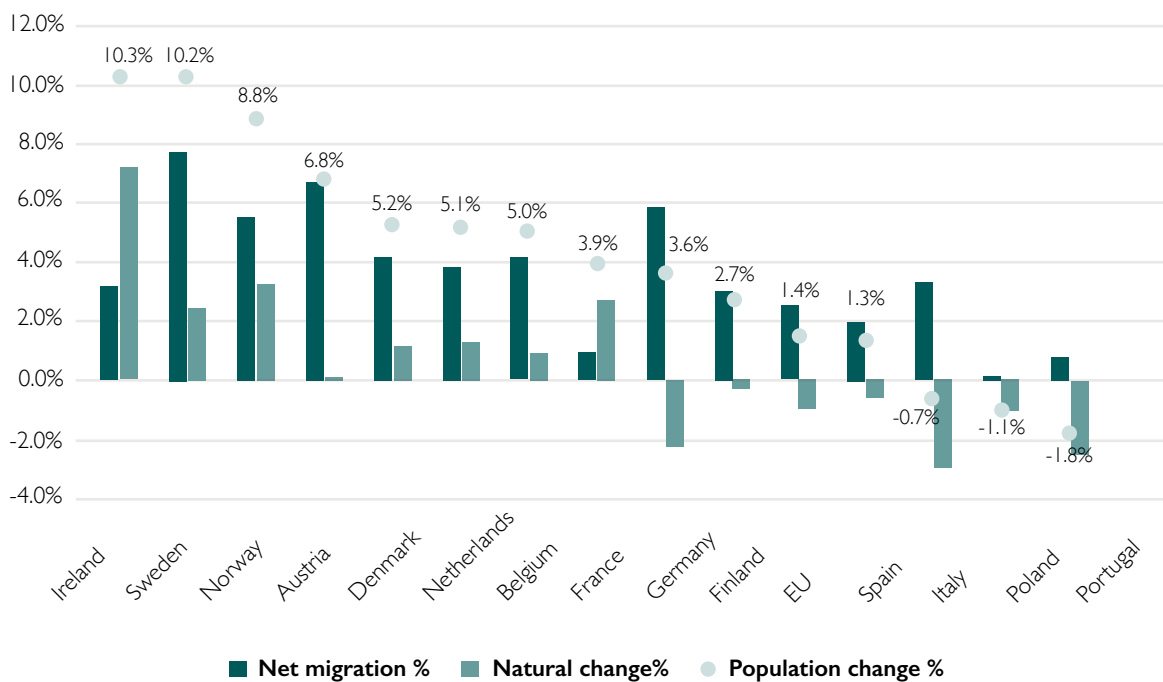
Population growth in Europe has slowed over time. This is due to negative natural growth, which has fallen even further in recent years. On the other hand, there is a positive and steady net migration to the EU. Especially in 2022, but also through 2023, a sharp increase in net migration is occurring, with large migration flows from Ukraine, mainly to Poland and Germany, but also from Russia.

**Exhibit 5: Population Change by Migration and Natural Change in the EU**



Source: Eurostat

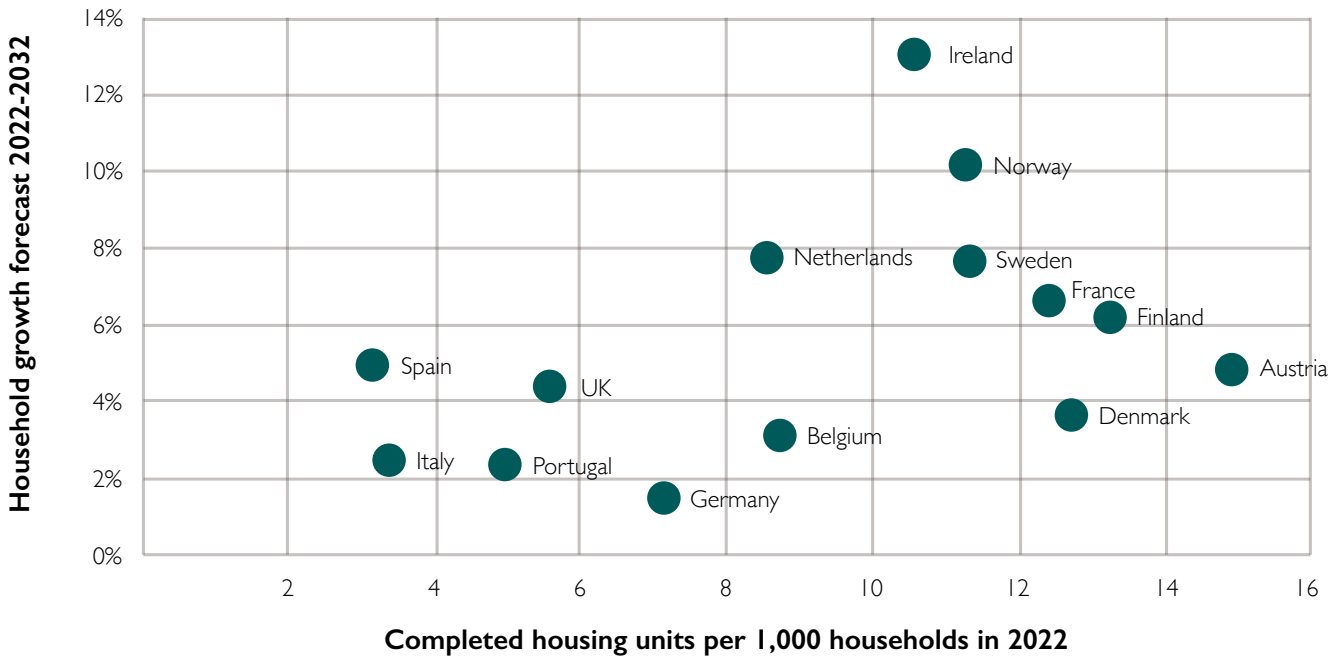
**Exhibit 6: Population Change by Migration and Natural Change from Jan '12-'22**



Source: Eurostat

Generally, countries with higher growth also show higher construction activity (see Exhibit 7). Ireland and Spain in particular though experienced relatively low housing completions in 2022 compared to the past and expected household growth. On the other hand, Austria, Denmark and Germany had relatively high construction numbers.<sup>1</sup>

**Exhibit 7: Household Growth Forecast and Construction Activity**



Source: EUROCONSTRUCT, ifo Institute, Oxford Economics

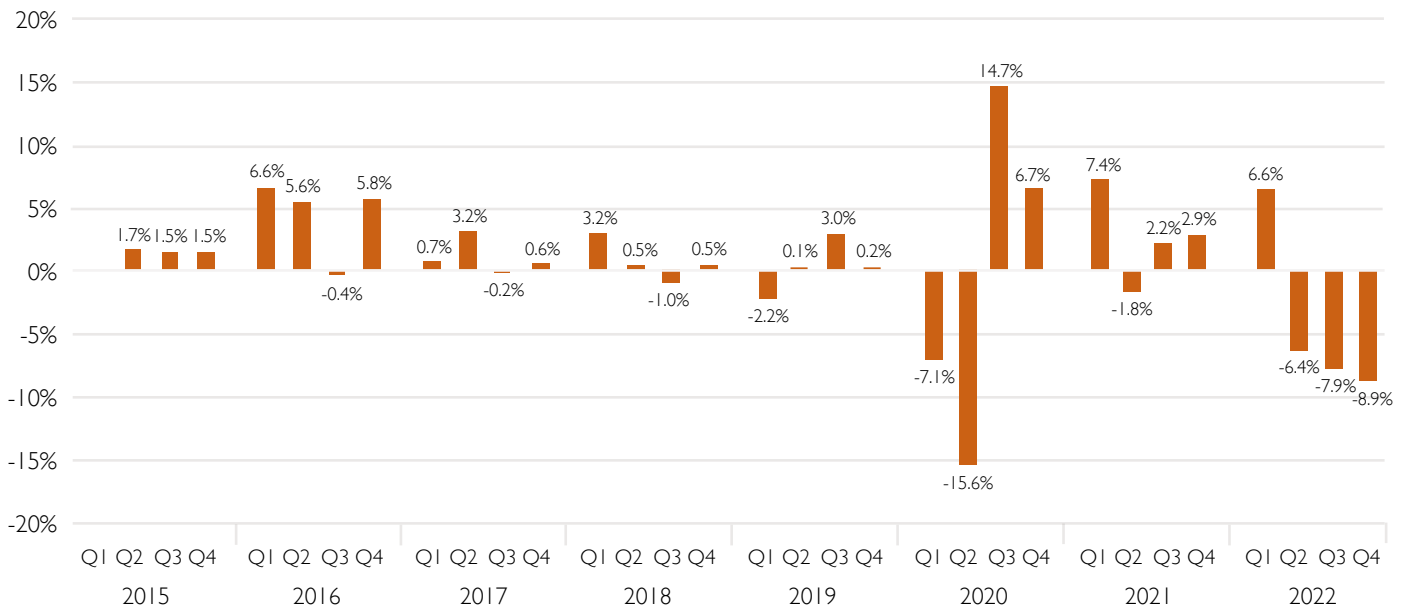
### Construction Activity was Postponed During the Pandemic: Now the Dip is Real.

The European real estate market has seen a significant decline in the supply of new properties due primarily to an increase in construction costs. This trend is reflected in the number of building permits issued, which fell sharply during the Covid pandemic. A second reason was capacity constraints within public administration. The issuance of building permits rebounded in the third

and fourth quarters of 2020, before the outbreak of the Russian-Ukrainian war triggered another slide across almost all countries, with the notable exception of Spain, where a record number of building permits were issued in the third quarter of 2022.

<sup>1</sup> The latest household numbers, especially for Germany, are likely to be much higher due to migration flows caused by the war in Ukraine. This immigration has not been considered in the forecasts.

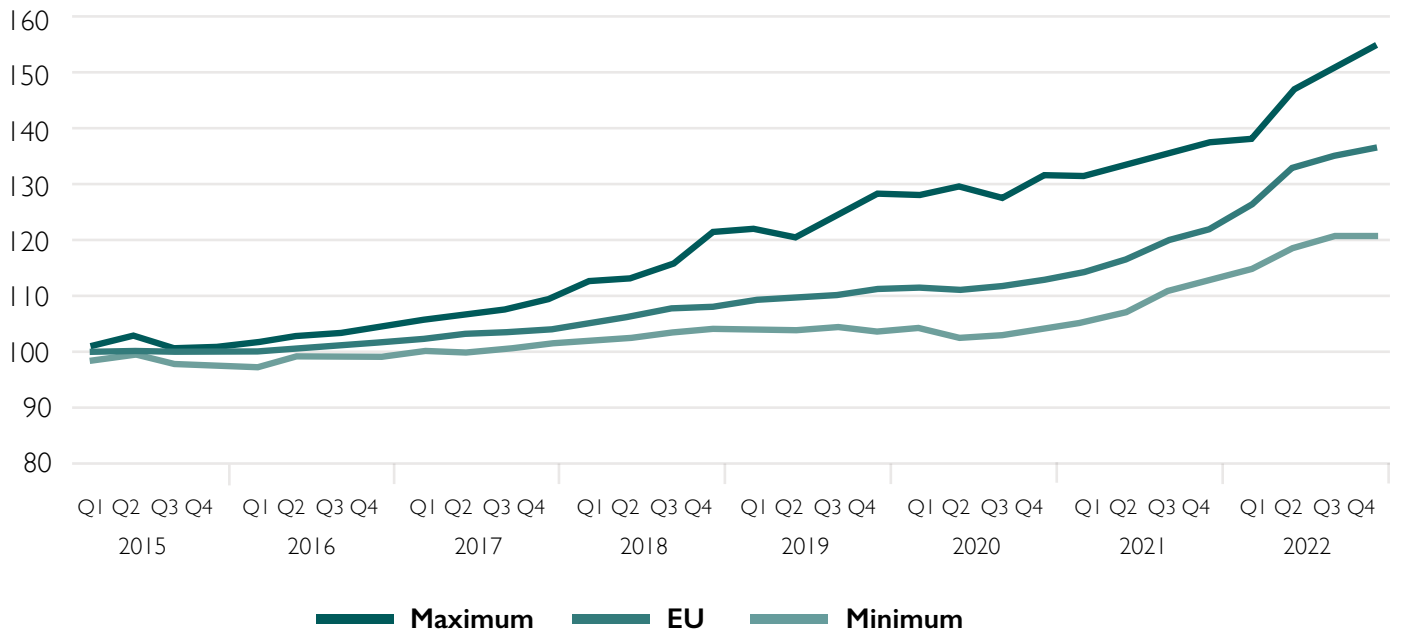
**Exhibit 8: Square Metre Residential Space Permitted for Construction – Change of Previous Quarter**



Source: Eurostat, Department for Communities and Local Government (UK)

**Exhibit 9: Construction Costs for New Residential Buildings**

Index 2015=100



Source: Eurostat

## Niche Asset Classes Could be the Winners

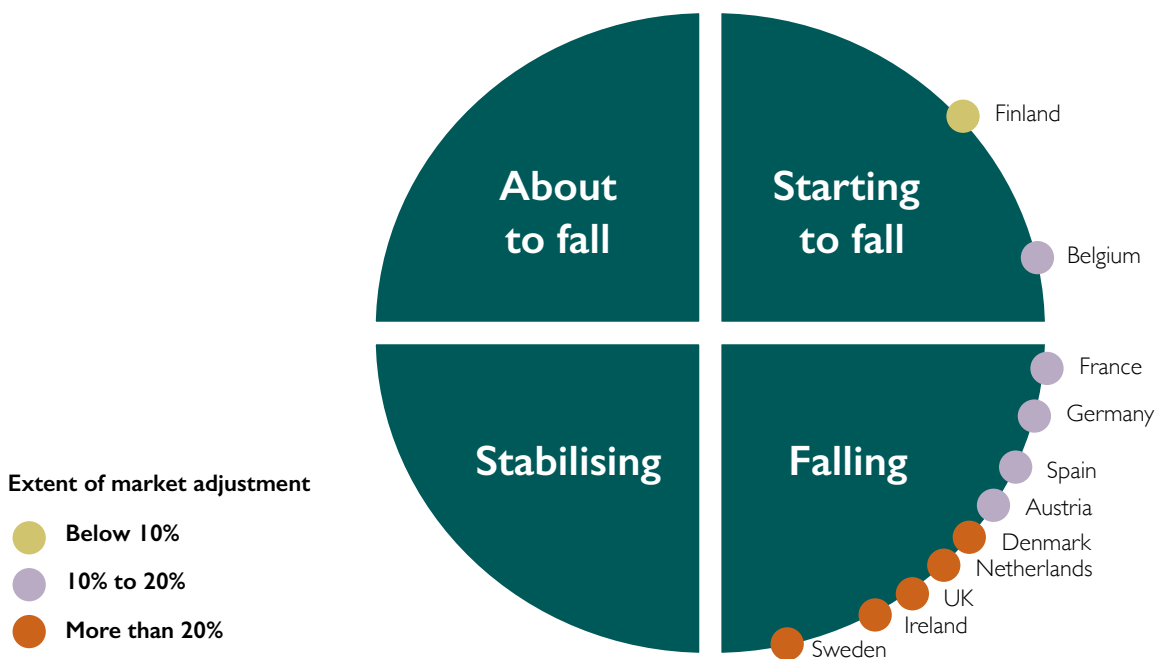
The specialist student housing, co-living and senior living niche accommodation sectors are expected to gain relatively more importance in times of tighter housing markets, the growing internationalisation of residential investments and expansion in single households across Europe. Tenants in these property asset classes benefit from less complicated contracts and more accessible apartments compared with the classic residential segment. Investors can benefit from strong long-term growth in these sectors, but also need to be aware of the potential risks posed by tighter regulation in the future.

With the rising number of students and expanding international cohort studying abroad, demand for private student accommodation continues to increase in Europe. Despite the slump in international student numbers due to the Covid lockdowns, the market for purpose-built accommodation has bounced back and is showing strong signs of recovery. MSCI data suggests student housing transaction volumes peaked in Europe in 2022, with €5 billion in the fourth quarter of 2022 alone. A JLL leasing study shows winter term occupancy rates in the UK fell from 97% in 2019 to around 80% in 2020, but then recovered to about 90% in 2021 and 97.5% in 2022. Poland, the Netherlands, Germany and France have similarly high occupancy rates.

Exhibit 10 displays the property clock for the European owner-occupier market, as well as our expected drop in price.

**Exhibit 10: Real Estate Market Clock**

Assessment of national real estate markets in terms of position and extent of market downturns



Source: Catella Residential Investment Management

# A Reflection of Sustainability in Real Estate Valuations

Real estate prices do not reflect their sustainable characteristics and thus the long-term value of a building in the Great Transformation. We need a broader valuation definition that more accurately reflects the potential risks and returns. To get there it's necessary to understand that the real estate industry can have a profoundly damaging impact on the environment. Conversely, the changing natural environment has a direct impact on real estate valuations.

The market will urgently need to price-in climate mitigation measures that halt and ultimately reverse the harm we are inflicting on the planet, and these have a cost that is becoming increasingly visible in the short term. But the investment returns from climate mitigation may be realised over a longer time period, resulting in a mismatch that challenges most current business models and market assumptions.

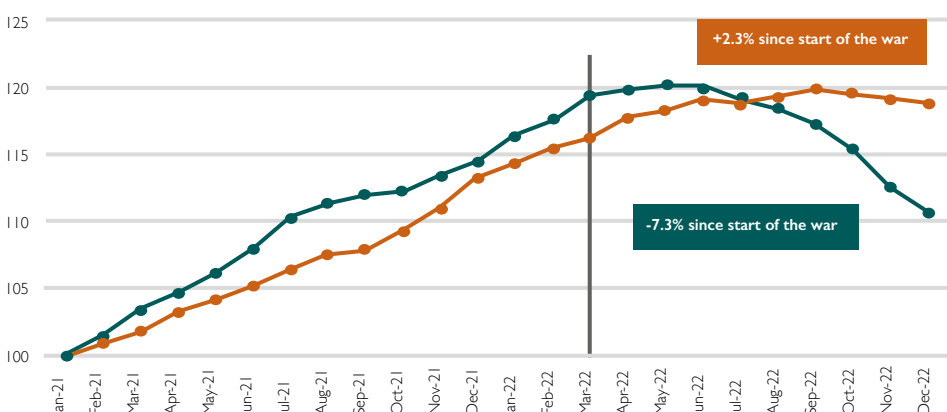
Simultaneously, real estate needs to adapt to the changing environment and implement defensive measures to counter physical climate risk. Adaptation measures can be executed directly at the asset level and through building environmental resilience into infrastructure. As with transition measures, they will not result in a short-term increase in valuations, but can contribute to averting losses.

## Transition Risk and Costs

In European prime office real estate, an approximately 15% higher rent for green buildings and up to a 25-35% green premium are being achieved relative to 'brown assets,' a rather precise capitalisation of sustainability in the market now. Residential real estate is lagging behind on pricing sustainability into assets, and decarbonisation measures have a lower return on investment in the short term. This variance between the office and residential sectors is probably due to the difference between their corporate and private individual tenants in terms of energy management, price sensitivity and corporate reputation.

Sharply higher inflation, in energy prices in particular, is, however, having a profound influence on household spending power. As a result, residential tenants are paying

more attention to lowering their utility costs and making their homes more energy efficient, which in turn is reflected in the liquidity, funding and capitalisation of housing assets for investors. Furthermore, 'brown assets' require more capital expenditures to extend their investment lifespan and bring them in line with domestic and international environmental regulations. As a result, residential sales prices are developing in different directions depending on the energy efficiency of the assets. In Germany, there was a positive 'cross-over' in the pricing development of more energy efficient new-build single-family homes, relative to an average price decline for older and less-efficient standing housing stock, after the Russian invasion of Ukraine in February 2022 sent gas prices soaring.



### Exhibit 11: EPX – Europe Hedonic House Price Index for Germany

(Index 01/2021=100)

Source: Europace, <https://report.europace.de/epx-hedonic/>

- New-builds
- Stock

According to the International Energy Agency (IEA), to achieve a net-zero building stock by 2050, all new buildings after 2030 must be built as net zero, and 2.5% a year of old stock needs to be retrofitted to produce zero net emissions. This shows the urgency for a rapid acceleration of the industry's decarbonisation pathway compared to 2020's result of less than 1% of existing stock being retrofitted p.a. and only 5% of new stock built achieving NZEB (Nearly Zero Emission Building) status.

### Exhibit 12: Key Milestones in Transforming Global Buildings Sector

Category		2020	2030	2050
<b>New buildings</b>	From 2030: all new buildings are zero-carbon-ready.			
<b>Existing buildings</b>	From 2030: 2.5% new buildings are retrofitted to be zero-carbon-ready each year.			
Category		2020	2030	2050
<b>Buildings</b>				
Share of existing buildings retrofitted to the zero-carbon-ready level		<1%	20%	>85%
Share of zero-carbon-ready new buildings construction		5%	100%	100%
<b>Heating and cooling</b>				
Stock of heat pumps (million units)		180	600	1800
Million dwellings using solar thermal		250	400	1200
Avoided residential energy demand from behaviour		n.a.	12%	14%
<b>Appliances and lighting</b>				
Appliances: unit energy consumption (index 2020=100)		100	75	60
Lighting: share of LED in sales		50%	100%	100%
<b>Energy access</b>				
Population with access to electricity (billion people)		7.0	8.5	9.7
Population with access to clean cooking (billion people)		5.1	8.5	9.7
<b>Energy infrastructure in building</b>				
Distribute solar PV generation (TWh)		320	2200	7500
EV private chargers (million units)		270	1400	3500

The European Commission estimates the EU needs to invest between €85 billion to €90 billion in the energy efficiency of buildings each year, while refurbishment requires a projected €275 billion annually until 2030, which means the real estate industry has the largest climate investment gap of any economic sector in Europe. That presents an enormous investment opportunity for investors able to mobilise the capital, estimated at €3.5 trillion out to 2030 (2021 est.), to address the climate gap.

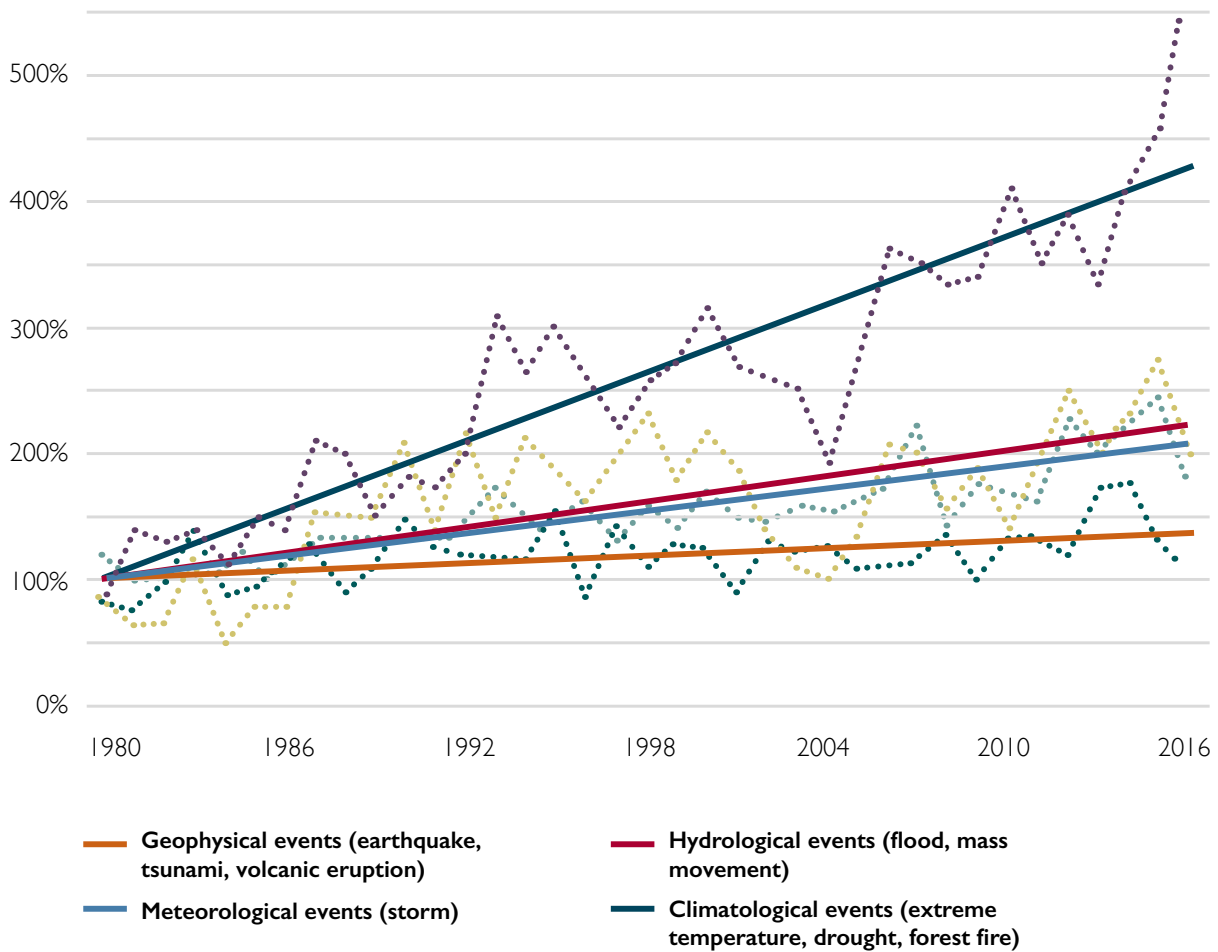
The goal is to at least double investment in the energy efficiency of residential and commercial property buildings by 2030 (the Buildings Performance Institute Europe (BPIE) suggests it needs to be tripled), and establish a standard of at least a minimum of 30% in energy savings.

In March this year, the European Parliament accordingly adopted its EPBD proposal, whereby all new builds should be zero emission and incorporate solar panels by 2028, with a minimum residential energy efficiency label of E until 2030 and D by 2033. Commercial property and public buildings should have the same ratings by 2027 and 2030.

## Physical Climate risk and Adaptation Cost

Climate catastrophes are accelerating around us. We tend to first think of the long-term developments, like melting of the ice caps and consequent sea level rise and coastal erosion, but there are acute hazards like floods, heat waves, drought and forest fires that are part of our life already and are intensifying.

**Exhibit 13: Trends in Different Types of Natural Catastrophe Worldwide (1980-2016)**



Source: MunichRE NatCatSERVICE

The number of floods occurring globally has quadrupled since 1980 and doubled since 2004. An analysis of 37 published works worldwide indicated that the direct impact of flooding on residential real estate values suggests a price discount of 4.6% on average associated with locations in a 100-year floodplain, which is a precise capitalisation of flood risks into property values. For example, in the city of Reading, located in the Thames Valley in southern England, around 54% of real estate (all asset classes) is deemed to be at risk of flooding, representing US\$900 million in 'Value at Risk.'

Reinsurer Munich RE and German insurance group ERGO's TCC (Tackling Climate Change Together) research report on European real estate value loss due to physical risks from climate change, particularly flooding, covered 146 markets. The report estimated that losses from river flooding would be an average of 0.7 bps p.a. of capital value and nearly double that (1.3 bps p.a. across 47 real estate markets) from rising sea levels. The relatively low level of average risk reflects the fact only 76% of the sample markets are exposed to river floods and 24% to rising sea levels.

Affluent cities more adept at finding political consensus and implementing measures to protect against future climate risks are also likely to have more resilience in preserving real estate values than some of their peers. For example, Copenhagen is a locationally fragile city for climate change, but an increasingly resilient one. The Danish capital is building an artificial island to act as a barrier to rising sea levels, while creating space for new housing at the same time. In the Netherlands, where a third of the country lies below sea level, the vast Delta programme has been established to protect its cities from flooding. In the UK, a Thames Estuary 2100 plan has been put in place to protect 1.32 million people and £321 billion in property from tidal flood risk. The TE2100 project is designed to counter the higher risks stemming from climate change and to supplement the original Thames Barrier, which was set-up to defend London from a large flood (1:100 years) up to 2030.

At a global level, the UN body for climate change estimated that worldwide adaptation costs for developing countries only are likely to range from US\$160 billion to US\$340 billion a year by 2030, and could rise to US\$315 billion to US\$565 billion p.a. by 2050.

At a national level in Europe, Norway estimates its adaptation costs at €725 million a year (excluding government costs) for construction measures for buildings to address sea level rises, excluding coastal defences and 'resilience infrastructure.' In Germany, climate change costs of up to €900 billion until mid-century, stemming from extreme heat, drought and floods, could be reduced by 60% to 80% through climate adaptation measures.

Research from the Global Alliance for Buildings and Construction & OI in 2021 indicated that including climate resilience in infrastructure adds approximately 3% to CAPEX, but that for every dollar invested US\$4 of economic value is generated. The cost-benefit ratio in coastal cities is even more significant, at 1:10. Climate adaptation measures, similar to transition measures, have an influence on the cash flow, risk premium and liquidity of the asset and the cost, plus availability of funds.

## Balancing Risk/Return and Preserving Value

Locations blessed with renewable energy resources and that are less prone to climate hazards due to geography and geology will have less transition and adaptation risks and associated costs than those facing the greatest risks, and their real estate values will be naturally preserved or even heightened. These are ultimately the regions that balance financial wealth with ecological wealth, and that have the economic capacity to invest in climate resilience.

Copenhagen is arguably a great example of how to deliver climate change adaptation. The city has low dependence on external sources of energy, a very reliable power grid and clear roadmap for the decarbonisation of its energy grid and built environment. Its northern island location means Copenhagen is naturally protected from extreme heat, water stress and consequently wildfire risk.

A rising sea level is the highest physical climate risk, and the government has acted accordingly by heavily investing in coastal defences.

In conclusion, investment in climate change mitigation is of existential importance. Energy transition measures not only preserve real estate values but are fundamental to the transformation that is urgently needed. In other words, if there is no transition, there will only be value loss, and not exclusively in real estate. The sooner and more in-depth transition takes place, the less the climate-related loss and need for investment in adaptation measures. For example, if we were to accelerate and intensify transition and therefore achieve the 2 degree Celsius target of the Paris agreement, the losses in global annual growth would be 1.6%, compared to a loss of 2.2% for the equivalent of a 3 degree Celsius global warming trajectory. But with the transition happening at a stubbornly slow pace, the onus is on governments and the real estate industry to create healthy and safe environments in locations that are protected as much as possible from the threat of climate change, and where economic priorities and ecology are brought back into balance.



# BOX AI & Green Premium

Catella has utilised advanced AI techniques to explore the relationship between property energy efficiency and market valuations, commonly referred to as the 'green premium.' The two automatic valuation models, developed using gradient boosting machine learning algorithms, accurately predicted the purchase price and rent per square metre for properties in the Netherlands with R2 scores of 0.89 and 0.64 respectively.

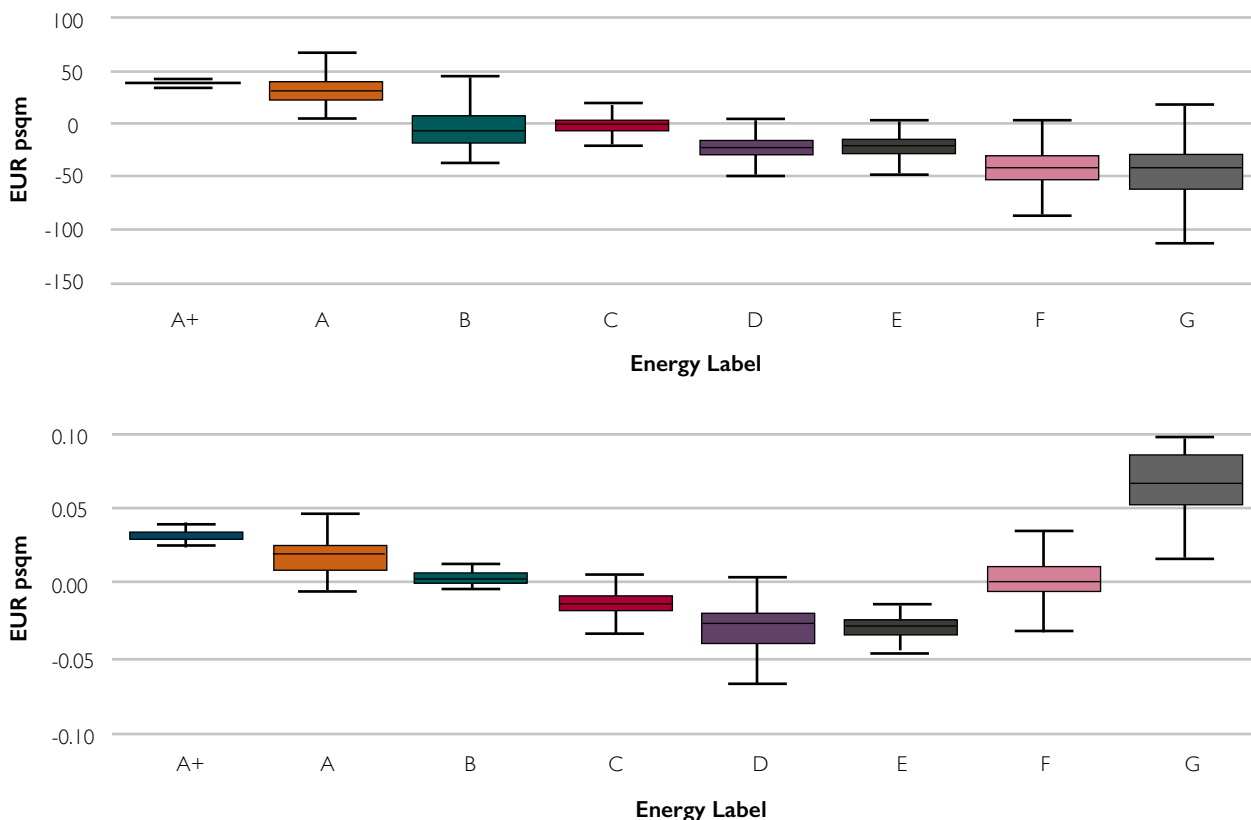
To quantify the impact of various factors on predicted prices, we employed the SHAP algorithm, a powerful machine learning technique that allowed us to analyse the relative importance of different attributes. One of the most significant factors investigated was the energy label of a property, a measure of its energy efficiency ranging from A+ (most efficient) to G (least efficient).

The analysis revealed that, on average, properties with better energy labels tend to command higher purchase prices and rents per square metre. This finding supports

the existence of a green premium in the real estate market, whereby energy-efficient properties are valued more highly due to their lower environmental impact and reduced energy costs. However, the analysis also uncovered some exceptions, particularly for energy labels F and G in rental properties. These exceptions were attributed to the tendency for older properties located in city centres to command higher rental prices despite their lower energy efficiency.

The results suggest that investors and property owners can benefit from leveraging AI and machine learning to assess the green premium of properties, providing them with a competitive edge in the market. By understanding the relative importance of different factors affecting property valuations, such as energy efficiency, they can make more informed decisions about which properties to invest in, ultimately driving the transition towards a more sustainable built environment.

**Exhibit 14: AI model on energy and pricing Netherlands**



Source: Catella Residential Investment Management

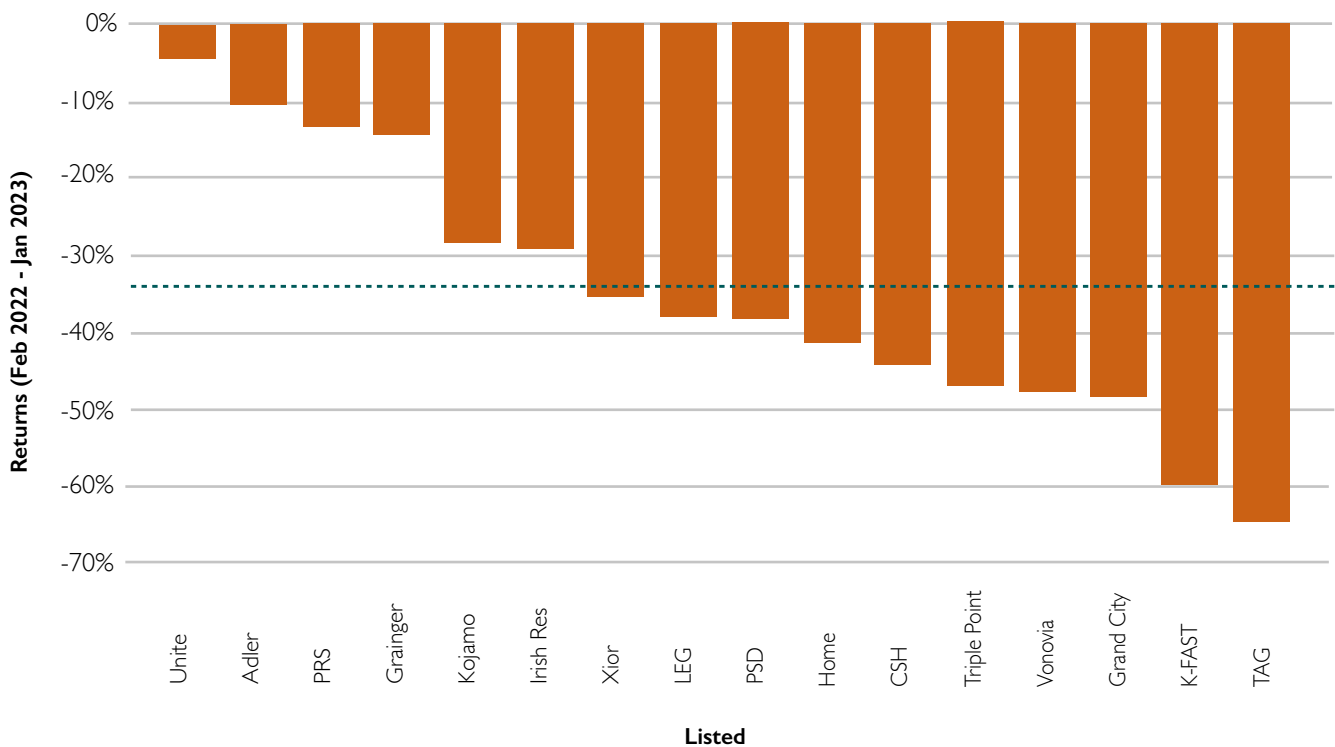
# Listed Market

A year after the Ukraine war started, residential listed market valuations have dropped over 30% on average. While listed markets can overshoot, they give an indication of where, after a time-lag, the non-listed market can land. Long-run time series and analysis in the owner-occupier market also reflect a similar order of magnitude of over 30%<sup>2</sup>.

Most residential crises historically have been debt crises in essence. That is not the case today, with much lower LTV values and less bank risk exposure in relation to borrower exposure compared to the Global Financial Crisis (GFC). This points to a possibly faster cleansing of the market towards new pricing levels than in previous cycles.

Still, some markets, and particularly the Swedish listed sector, are very vulnerable to the negative spread differential between net yield level and cost of finance. The Swedish housing market has a history of *trompe-l'œil*, where protracted periods of stable price increases are followed by abrupt price adjustments.

**Exhibit 15: Listed Market Downturn Since the War in Ukraine**



Source: Catella Residential Investment Management, Investing.com

<sup>2</sup> *This Time is Different*, Rogoff and Reinhart (Princeton University Press, 2011)

# Finance Market

## Rising Interest Rates

According to a recent survey by Oxford Economics, most businesses see the major central banks' policy rates peaking "reasonably soon" – although the ECB and Bank of England are expected to peak later than the Federal Reserve. There's a wide range of views over when central banks will start cutting rates, with the latest economic data in several countries suggesting further hikes may be on the agenda. The recent rate increases, and possibility they will remain at high levels for several quarters, could push a number of companies into trouble, especially those that barely survived the last three years.

**Exhibit 16: Central Bank Prime Rates**



Looking back at the GFC, there is a risk markets could end up in a negative feedback loop, where declining housing prices impact the banking and credit system. Should house price devaluations prompt a spiral in credit delinquencies and defaults it would weigh on bank balance sheets. Banks would have to increase provisions for expected losses and cut back on credit supply in response to shore up their balance sheets, amplifying a potential housing market crisis.

Rising policy rates have also driven mortgage interest rates up. Borrowers in countries with a large incidence of short-term fixed loan rates, such as Spain or the UK, face higher financial burdens. Market participants expect housing prices to drop sharply as a result.

Source: Oxford Economics as of 05.03.2023

**Exhibit 17: Household Floating Mortgage Rates with IRF of One Year by Region / Countries**



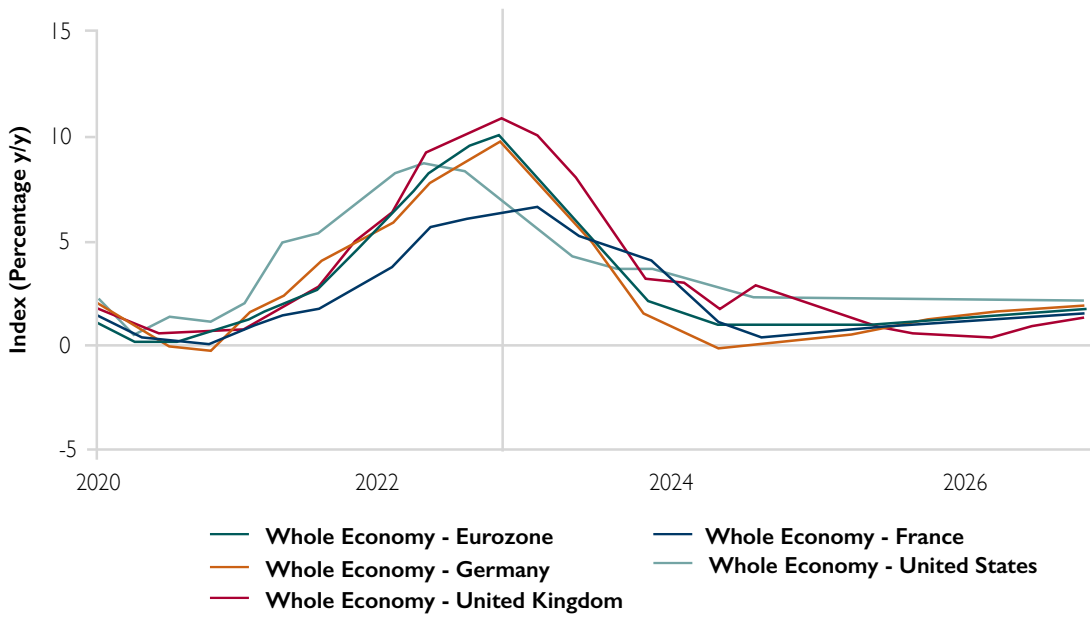
Source: ECB

With indicators and forecasting models often overtaken by events, taking a mid- to long-term view is challenging at present. However, in light of the current information flow, one could argue that the high(er) interest rate level is here to stay, with the long period of low and negative interest rates unlikely to return. Given the generally lower LTVs compared to pre-GFC, the market doesn't expect the same default rates as 2008 to 2010.

## Inflation

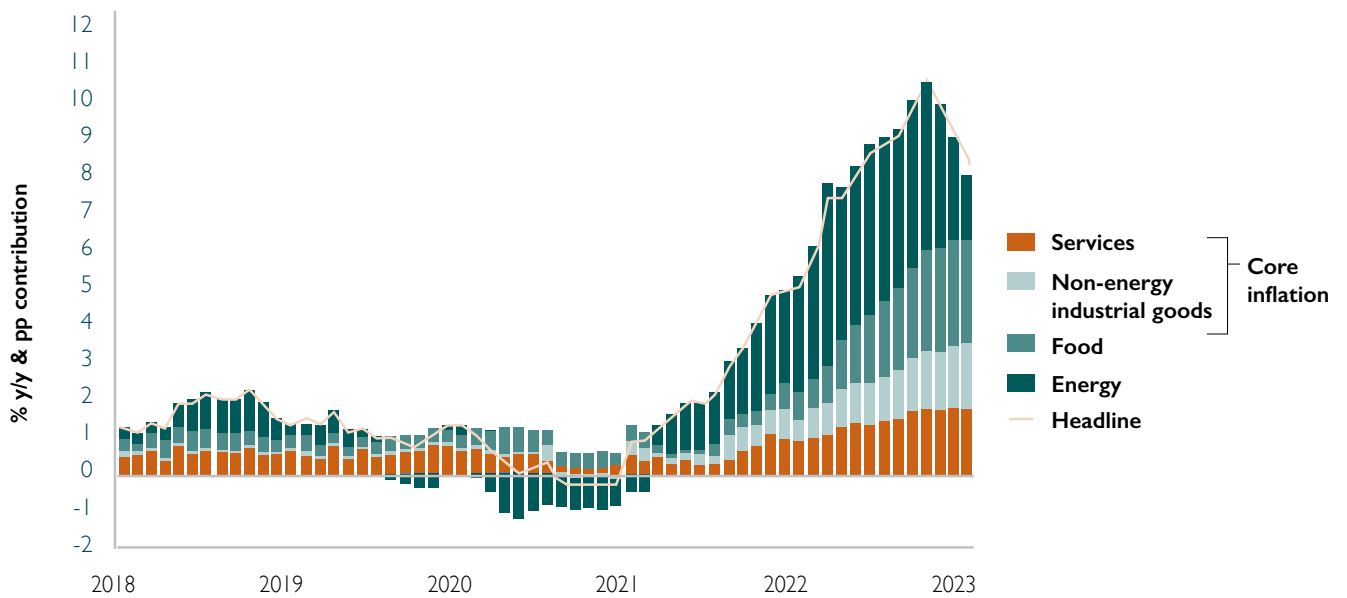
Slowing inflation in both the US and Germany may indicate that the price increase peak is behind us. Yet despite a decrease on the back of lower energy prices (see Exhibit 18), inflation at the time of writing (March 2023) remains higher than anticipated. With households and businesses preparing for a longer period of high inflation, central banks are now focusing on wage increases as a potential inflationary driver.

**Exhibit 18: Year CPI Index (Historical and Forecasted)**



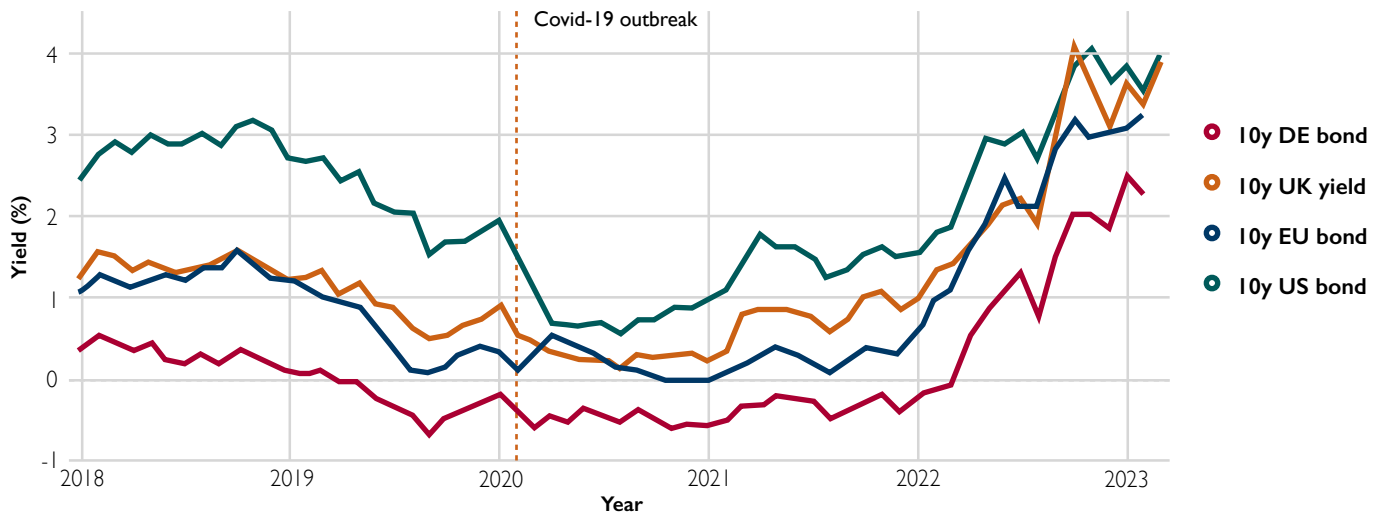
Source: Oxford Economics, Halver Analytics

**Exhibit 19: CPI Index Decomposition (Drivers)**



Source: Oxford Economics

Exhibit 20: 10-Year Government Bond Yields



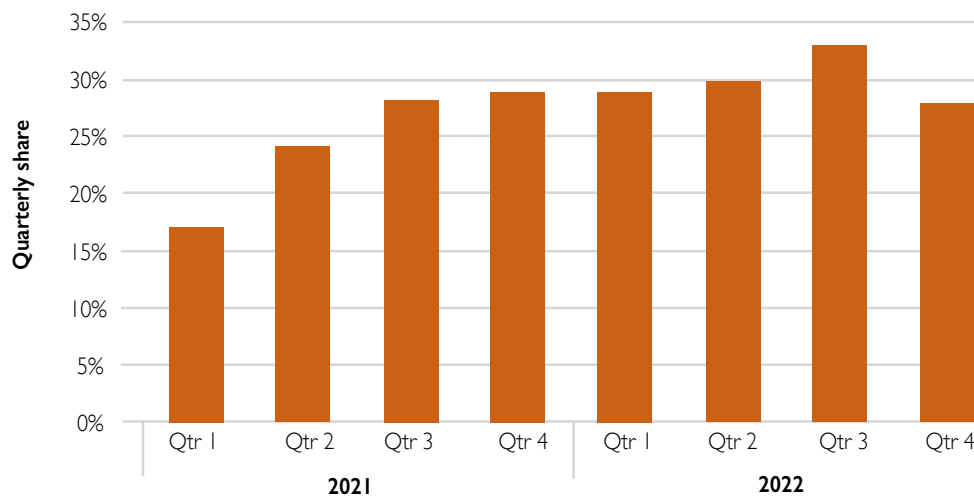
Source: ECB, Investing.com

Whether policy rate hikes will push economies into recession is a matter of debate. According to the IMF, one-third of the world economy will fall into recession in 2023, while the US may avoid one. However, low unemployment rates in Europe and increasing production in German factories are boosting hopes a recession will be milder than feared.

### Sustainable Finance

While corporate bond issuance fell sharply in 2022 amid inflation, rising interest rates, and growing market and macroeconomic uncertainty, issuers were relatively comfortable issuing ESG-linked debt. ESG-linked bonds now account for approximately 30% of total quarterly bond issuance, and it is on an upward trend.

Exhibit 21: Quarterly Share of ESG Corporate Bonds Issued in Europe During 2021/22

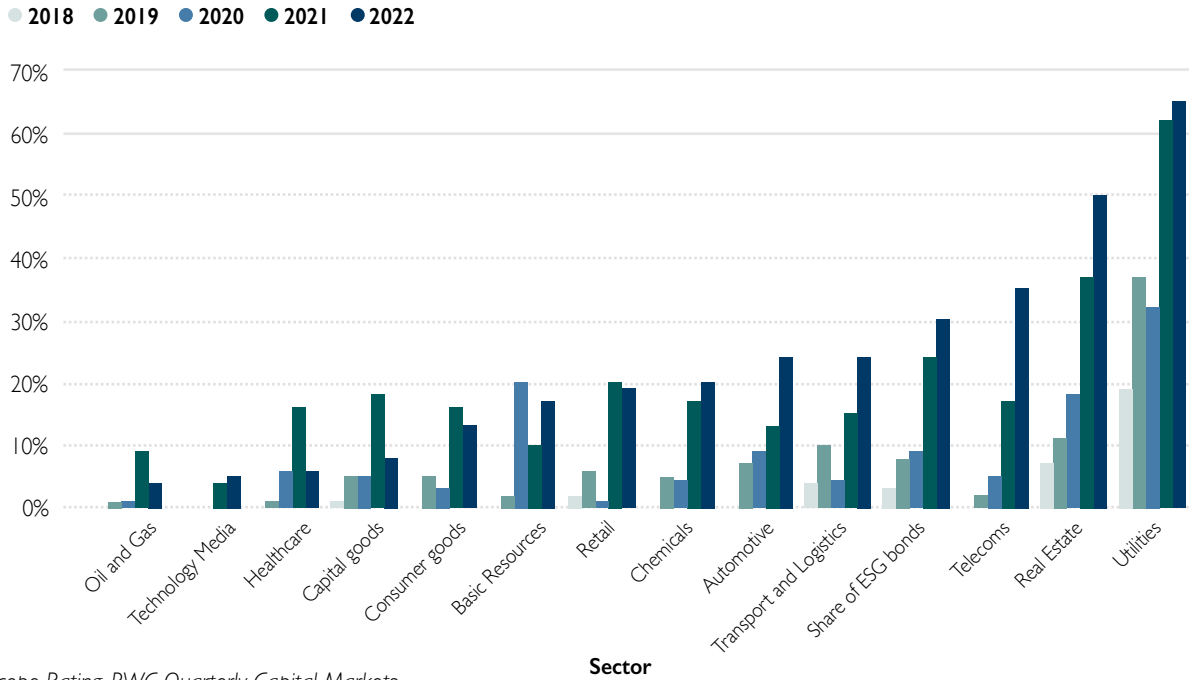


Source: Bloomberg, Scope Rating

Sustainable aspects have become a decisive feature in debt market issuance and are quickly turning into the minimum standard for any type of financing or debt issue. The still low pricing differential (-3bps to -10bps) between ESG and "standard" financing suggests non-ESG compliant financing will become pricier and harder to obtain in future.

Historically, capitalism has been a catalyst for climate change. The Industrial Revolution was built on the overexploitation of nature. Today, sectors such as transport, livestock, manufacturing and construction – which are responsible for a significant share of greenhouse gas emissions – have the highest proportion of ESG bond issuance.

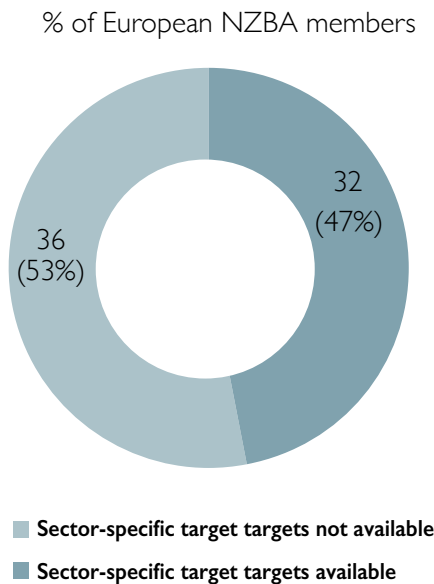
Exhibit 22: Share of ESG Bond Issuance by Industries



Source: Scope Rating, PWC Quarterly Capital Markets

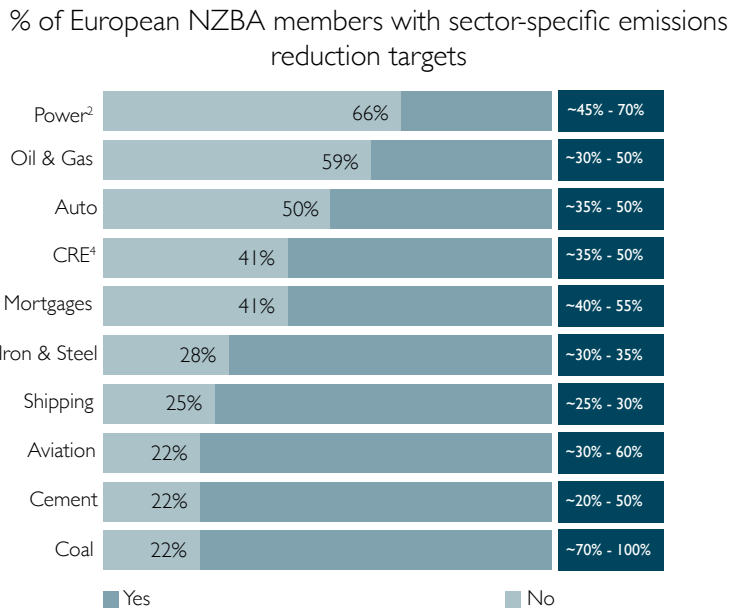
A growing sustainable finance sector is exploring how innovative capital markets can promote, rather than prevent, positive impacts. As climate risks progressively influence the performance of investment portfolios, ESG strategies are coming to the fore. Accordingly, net-zero committed banks – many of which are in the process of adopting sector-specific targets – are pushing clients to significantly reduce emissions.

Exhibit 23: Adoption of Sector-Specific Targets



Source: Oliver Wyman analysis

Exhibit 23b: By Portfolio Category



Source: Oliver Wyman analysis

Businesses that cannot demonstrate their willingness to make the transition to net-zero will find it harder to obtain funding, as banks stop lending to companies without credible transition plans in key sectors.

The same applies for real estate investments – ESG rules will affect lending as much as LTV. While a higher LTV results in risk-adjusted higher interest rates, the lack of decarbonisation for certain assets or even portfolios will curtail the availability of financing. Being planless means being debtless – in a negative way.

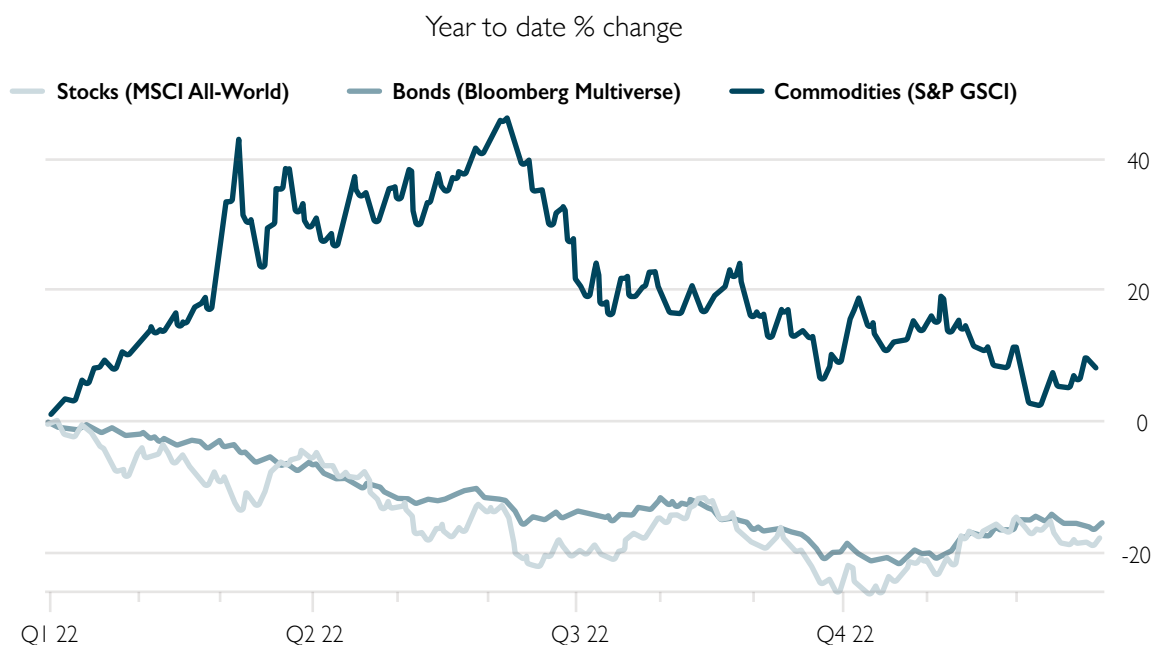
# Capital Markets

## Central Banks' Inflation Battle and War in Ukraine Trigger Big Swings

The central themes of 2022 were high inflation, potential economic recession and dislocated asset prices.

The tightening of monetary conditions by the Federal Reserve in 2022 has affected the capital markets to a historic degree. For both equity and debt investors, 2022 was the worst year on record (see Exhibit 24). Any diversification strategy (especially equity vs. bonds) has failed investors with a lack of non-correlated returns.

**Exhibit 24: A Turbulent Year for Stocks and Bonds**



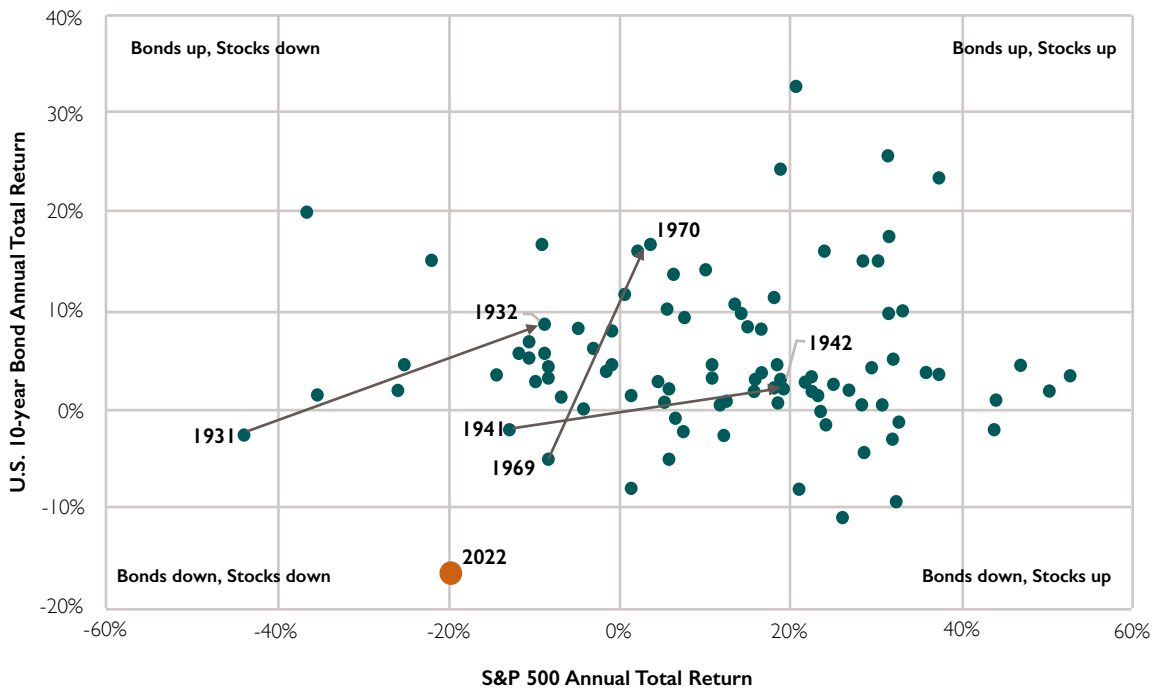
Source: Bloomberg

Global stocks and bonds lost more than \$30 trillion after inflation during 2022<sup>3</sup>, with interest rate rises and the war in Ukraine triggering the heaviest losses in asset markets since the Global Financial Crisis. The broad MSCI All-World index of developed and emerging market equities shed a fifth of its value during the year, the biggest decline since 2008. Shares from Wall Street to Shanghai and Frankfurt all notched up significant falls. Bond markets also endured heavy selling: the US 10-year government bond yield, a global benchmark for long-term borrowing costs, has shot up to close to 4% from about 1.5% at the end of 2021 – the biggest annual increase in Bloomberg records stretching back to the 1960s.

This contrasts with 2008, when the slump was concentrated on equities while bond prices rose. The joint decline has dealt a painful blow to many investors who built portfolios in the hope that fixed-income holdings would act as a ballast when equities markets tumble.

<sup>3</sup> [https://www.ft.com/content/“Stock and bond markets shed more than \\$30tn in ‘brutal’ 2022”](https://www.ft.com/content/“Stock and bond markets shed more than $30tn in ‘brutal’ 2022”)

Exhibit 25: Annual US Stock and Bond Total Returns (1928-2022)

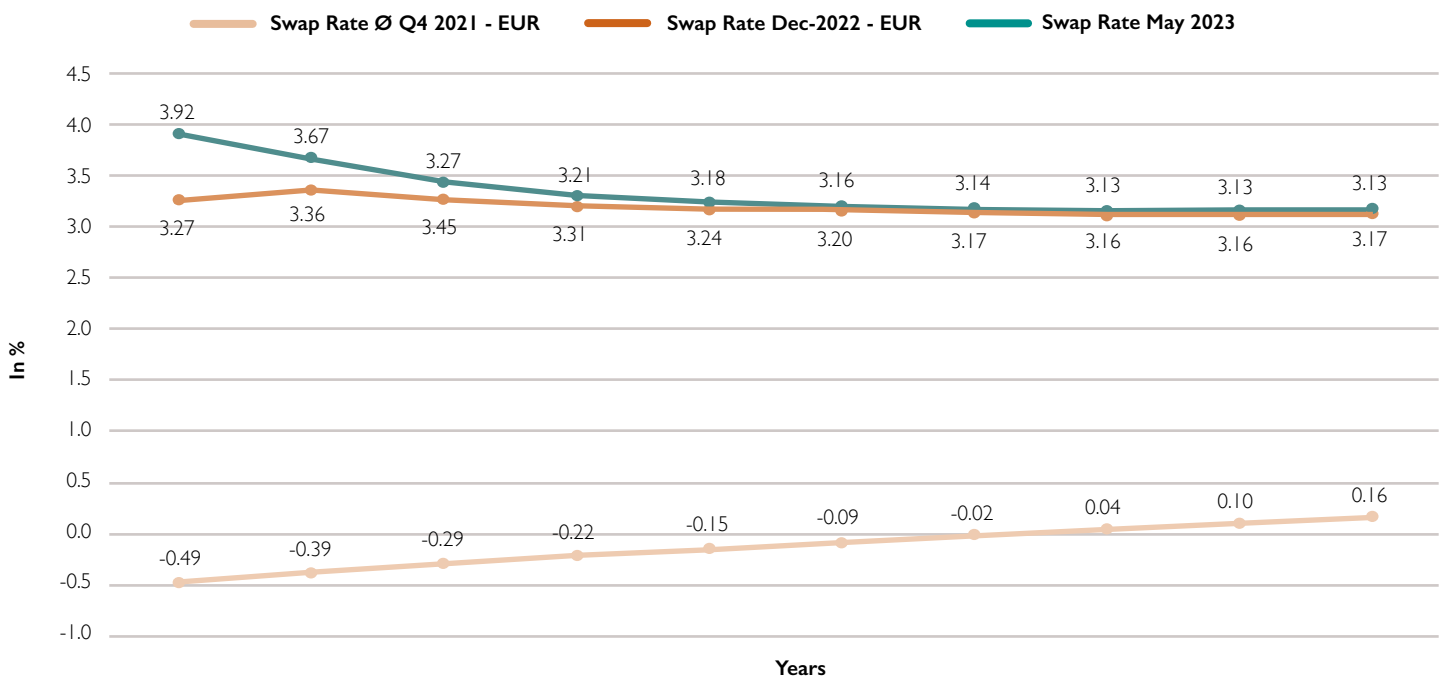


Source: American Realty Advisors based on data from Macrobond, NYU Stern, BlackRock and Slick charts as of January 2023

### Income-Producing Low Risk Fixed Income Assets are Back

The interest rate rises brought to a dramatic close the era of cheap money that followed the financial crisis, which squeezed the yields on safe government debt below zero and pushed up the prices of even the riskiest assets, particularly in the wake of the Covid pandemic. Today, credit can make more sense to own than equities across most asset classes, not least since bonds tend to outperform stocks when unemployment rises. Sharp yield increases have made bonds attractive even for long-term oriented institutional investors.

Exhibit 26: Swap Rates Rise



Source: European Commission: Swap rate proxies; Skandinaviska Enskilda Banken: Swap rates rises



## Risk-off or Risk-on: Redemptions and Dry Powder

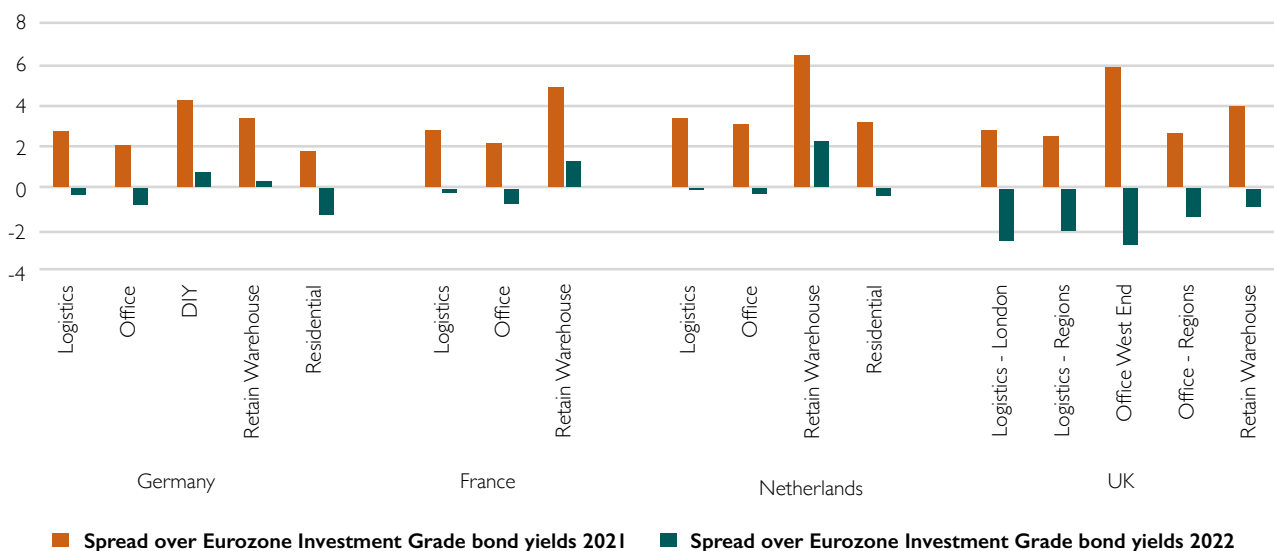
For pension funds and insurance companies, falls in their equity and bond portfolio values can also hinder the amount they invest in private real estate. The “denominator effect” means an allocation to property, slower to be revalued than other asset classes, will increase relative to falling equity and bond valuations, preventing further investment.<sup>4</sup>

Investors that rely on debt must pay a higher price for that debt as interest rates rise too. The price leveraged investors pay for an asset must fall in turn if they are to hit their target returns.

Unleveraged investors are demanding lower prices as well because, for the first time in a decade, they can get equivalent returns from less risky sectors than real estate. Negligible spreads over investment grade bond yields suggest a mispricing of income risk, likely requiring European real estate to be repriced.

### Exhibit 27: Yield Spreads

Negligible spreads over investment grade bond yields suggest mispricing of income risk. Yield spreads have narrowed faster than expected.



Source: Fidelity International, CBRE

The rise in interest rates will undoubtedly create stress, requiring some owners to sell at reduced prices.<sup>5</sup> That Blackstone had to limit withdrawals from its US\$69 billion unlisted real estate investment trust (REIT), the world’s largest real estate investment vehicle, points to the nervousness in the market. The curbs came as redemptions hit the REIT’s pre-set limits of 2% of monthly net asset value and 5% of quarterly NAV.<sup>6</sup>

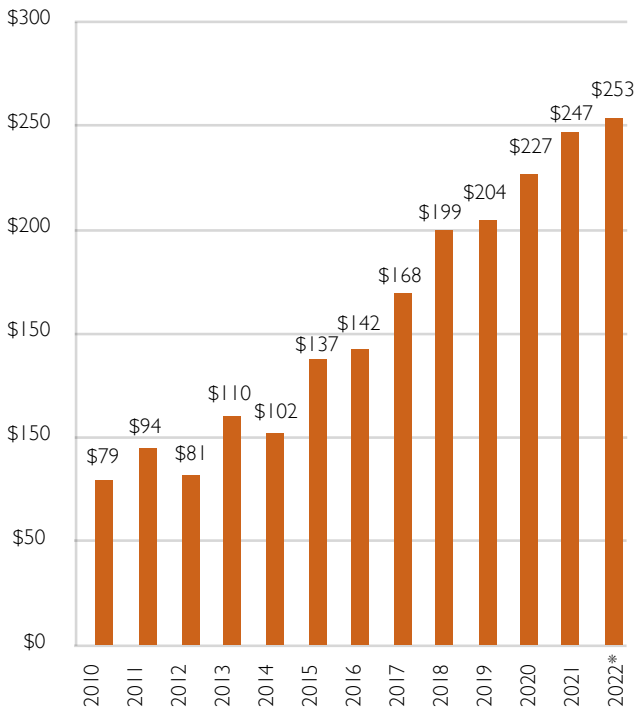
But it is not all gloom. U.S. real estate dry powder totals US\$253 billion, with more than half targeting distressed or opportunistic returns. Putting that dry powder to work could reignite sales activity through competition for deal flow in 2024-25.

4 PWC/ULI – Emerging Trends in Real Estate – In the Eye of the Storm - 2023

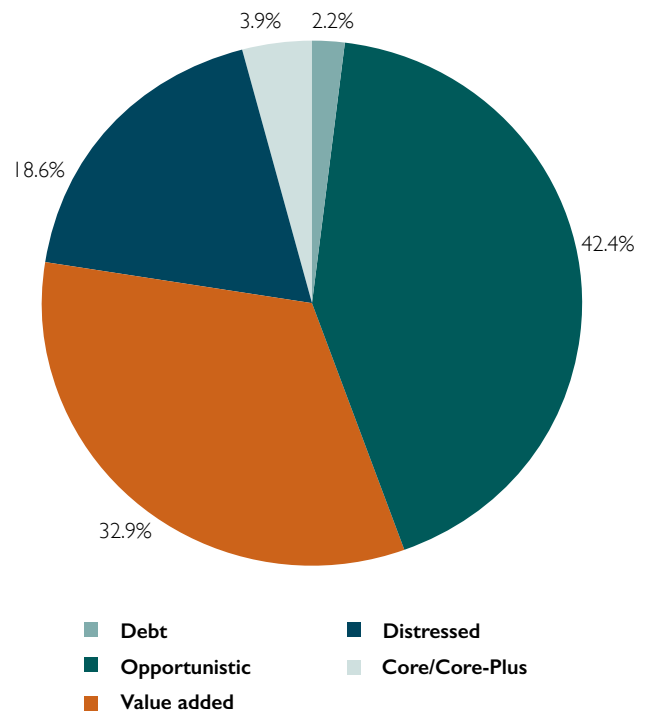
5 PWC/ULI – Emerging Trends in Real Estate – In the Eye of the Storm - 2023

6 <https://www.ft.com/>; “Blackstone limits withdrawals at \$125 billion property fund as investors rush to exit”

**Exhibit 28: Real Estate Dry Powder, 2010-Q3 2022 (billions)**



**Exhibit 28b: Share of Real Estate Dry Powder by Strategy**



Source: American Realty Advisors based on data from Prequin as of November 2022

## European Investors Plan to Decrease Allocations to Real Estate, Return to Core

The current average allocation to real estate globally is 10.2%. But with uncertainty surrounding investment decisions across every asset class, almost a quarter of all investors globally plan to decrease their real estate allocations in 2023/2024. This is barely offset by the 27% of investors planning to increase allocations over the same period, revealing a muted outlook for the industry.

European investors – the only ones above their target allocations – are the most cautious. According to the 2023 Investment Intentions Survey published by ANREV, INREV and PREA, 37% plan to decrease allocations during the period, significantly above the 20% and 5% equivalent for their North American and Asia Pacific peers.

The prevailing mood of caution has prompted a return to core as the preferred investment style for 2023. European investors are again the most risk averse, with 57% opting for core when investing in their region. They also have the lowest preference for opportunistic strategies, at just 8%.<sup>7</sup>

<sup>7</sup> INREV; "European investors plan to decrease allocations to real estate"; 18 Jan 2023

# Acquisition

Transactions in the real estate sector declined dramatically in 2022, with similar projections for 2023.

Many developers are not beginning new projects at present due to the unfavourable conditions, with hopes they will improve in the medium term. There has also been a decrease in condominium sales due to stricter lending conditions and higher interest rates, creating buyer reluctance.

Despite these challenges, as yet there have been no massive residential real estate 'fire sales', just 'transaction restraint'. Project developers' high prime costs leave limited room for price reductions, and generally banks do not push developers into fire sales during crises but wait for better market conditions. This feeds into the market standstill. Furthermore, inflation and resulting rent indexations could help offset some sharp price decreases.

In this environment, land values will need to fall significantly to enable economic project developments. The extent of these reductions will become apparent in the coming months, since many landowners have not yet accepted the new framework conditions and made the necessary price cuts, leading to a decrease in transaction volumes. An eventual drop in land costs will also impact where property prices settle.

Buildings with a lower CO<sub>2</sub> footprint and less energy waste are increasingly setting the standard and are more future proof. What will be seen as a core investment in the future will be those that are significantly better-than-average in their ESG quality. So currently we are stuck between the romantic picture of only building sustainable apartments and the fact that almost no one is starting construction activities, as uncertainty and rising interest rates temporise behaviour.

A new era is often accompanied by a new way of marketing. Older building stock from the 1960s is now presented as "brown to green" opportunities with high potential in ERV. This is an exaggeration, as the possibility of energy renovation already existed. The pressure to renovate is also increasing given the rise in operating costs. At the same time, cost increases, especially in construction, had started well before spring 2022 due to the Covid-related disruption to global supply chains.

Transaction managers in real estate companies will increasingly go from merchants to ESG experts, focusing on issues such as roof pitch and orientation for PV panels, and the subsoil drilling conditions for installing brine heat pumps.

# Regulations

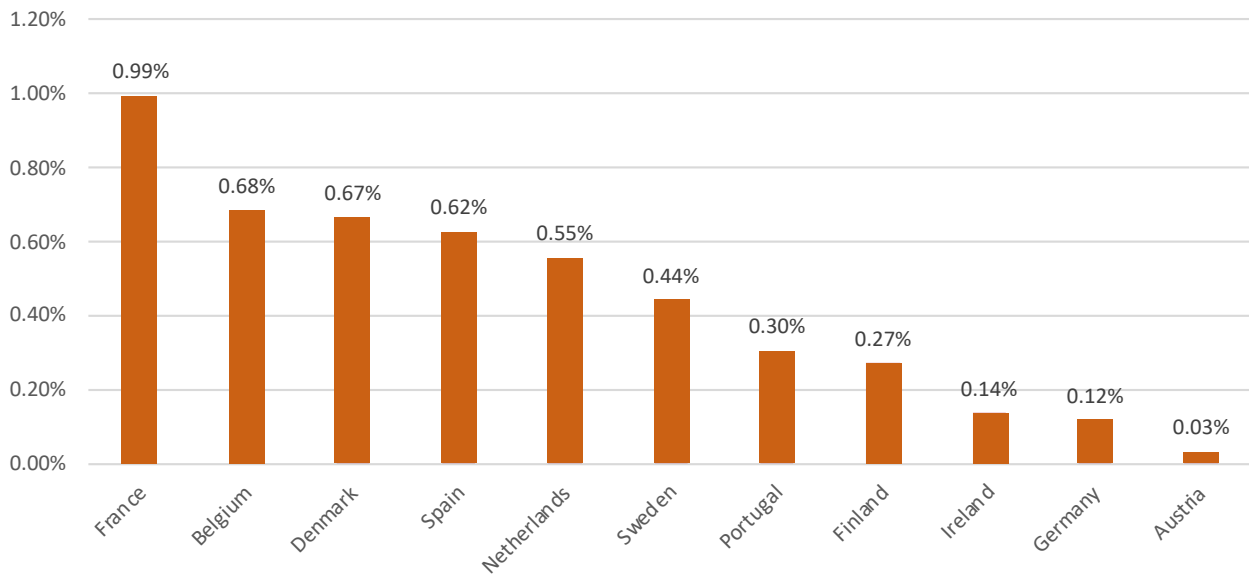
Regulation plays a significant role in shaping housing markets across Europe. In most European countries, rent price regulations are in place to protect tenants from excessive rent increases. These regulations typically include caps on how much rents can increase each year for existing contracts, as well as guidelines for landlords to follow when setting rent levels for new contracts. The aim is to ensure a stable and fair housing market for tenants. The specific regulations and their implementation vary from country to country, with some implementing stricter controls than others, so it's important to be familiar with the local laws and guidelines.

**Exhibit 29: Regulations in the Residential Market**

Country	Degree of tenant protection	Property taxes Low: <0.25% Mid: 0.25%-0.50% High: >0.50%	Transfer taxes / stamp duty Low: <2.5% Mid: 2.5-5.0% High: >5.0%	VAT on leases	Rent price regulation new leases	Rent price regulation existing leases
Austria	High	Low	Mid	High (10%)	Mid	High
Belgium	High	High	High	None	None	High
Denmark	High	High	Low	None	Mid	High
Finland	High	Mid	Mid	None	None	Mid (can be > CPI)
France	High	High	High	None	Mid (rent controls in selected cities)	High
Germany	High	Low	High	None	Mid (high for existing apartments, none for new builds)	High
Ireland	High (change in "security of tenant regulation")	Low	Low (although: 10 % for bulk purchases of 10+ SFH)	None	High	High (tied to CPI and capped at 2% in major cities)
Netherlands	High	High	High	Low (9% for furnished, residential)	Mid (high when regulated segment is extended)	Mid (new regulations due to inflation)
Norway	High	Mid	None	None	High	High
Portugal	High	Mid	Low	None	Mid	High
Spain	High	High	High	None	None	High
Sweden	High	Mid	Low	None	High	High
UK	Low	Mid (council tax)	Mid	None	None	None (some in Scotland)

Sources: CBRE European Residential Regulatory Framework; Barrios S., Denis C., Ivaškaitė-Tamošiūnė V., Reut A. and Vázquez Torres E. (2019), Housing taxation: a new database for Europe, JRC Working Papers on Taxation and Structural Reforms No 08/2019, European Commission, Joint Research Centre, Seville.

### Exhibit 30: Implicit Property Taxes in 2020



Source: Barrios S., Denis C., Ivaškait-Tamošiūnė V., Reut A. and Vázquez Torres E. (2019), *Housing taxation: a new database for Europe*, JRC Working Papers on Taxation and Structural Reforms No 08/2019, European Commission, Joint Research Centre, Seville.

## Inflation Calls for New Rent Regulation

As a rule, real estate investments can provide effective inflation protection for landlords, since rent increases are often linked to a country's consumer price index (CPI). However, recent very high rates of inflation would have allowed for sharp rent rises. Governments – fearing tenants might be overburdened by these increases and the hikes in energy costs – are now implementing regulations in many countries against rent increases based on the CPI.

In **Austria**, there was discussion of capping rent increases linked to the long-term consumer price index at 2% p.a. or at least spreading the price increases over a longer period. However, these plans were discarded.

In **Portugal**, rents for almost all rental contracts can be adjusted in line with the rent update coefficient that is published every year in October, and which is closely linked to the inflation rate. Rents can then be updated from January. In 2022, however, the coefficient was temporarily capped at 2%, allowing only a 2% rent increase from January 2023, although landlords are compensated via tax reliefs.

Rent increases in **France** for existing contracts are based on the rent reference index (IRL), which is temporarily capped at 3.5%.

In **Denmark**, rent increases follow the net price index (NPI). For 2022 and 2023, the increases are capped to a maximum of 4% for both years combined, except for when the landlord has higher operational expenses.

The **German** government is still discussing possible caps for rental contracts with index-based increases. However, recent studies show this only applies to approximately 2.2% of all rental contracts in Germany<sup>8</sup>. An initiative proposing a 3.5% cap failed to gain a political majority in December 2022.

Rent rises in the private sector in the **Netherlands** are regulated from May 2021 to May 2024. Increases are linked to the minimum of inflation and wage development plus one percentage point.

In **Spain**, rent rises are usually linked to the CPI. However, increases have been temporarily capped at 2% until the end of 2023. In 2024, rent increases in areas with greater demand will be capped at 3%, and a new index will be set for 2025.

The **United Kingdom** has no rent increase regulations, except for in parts of Scotland. However, rents for affordable housing can only be increased in line with the inflation rate plus one percentage point. As a temporary measure, this increase is currently capped at 7%.

## Regulated Markets for Core Strategies

While rent caps for both new and existing contracts have created a lot of negative effects for the affected housing markets (misallocation, poorer accessibility, modernisation backlog, creation of a black market), caps do provide some security for investors: as long as the regulated rent is below the market price, occupancy rates are high, turnover rates are low, and even a decline in market rents would be absorbed in the crumple zone.

	Prime yields	Apartment rents	Apartment sales prices
<b>Forecast 2023</b>	↗	↗	↘
<b>Explanation</b>	Yields will increase drastically to be consistent with risk-free investment alternatives.	Rents will increase due to rising demand and falling supply.	On average, sale prices will fall due to higher financing costs and thus lower demand.

	Prime yield Q1 2023	Apartment rent, av EUR/sqm/month Q2 2023	Apartment price, av EUR/sqm Q1 2023
<b>Austria</b>			
Vienna	3.65	13.80	6,650
Graz	4.00	10.25	4,250
Innsbruck	3.50	19.10	7,750
Salzburg	3.50	16.60	7,100
<b>Belgium</b>			
Antwerp	4.10	11.50	3,850
Liege	4.80	9.50	2,300
Brussels	4.00	14.00	4,700
<b>Denmark</b>			
Aarhus	3.50	13.40	3,950
Copenhagen	4.50	10.00	2,900
<b>Finland</b>			
Helsinki (Metropolitan area)	3.80	22.00	5,040
Turku	4.40	15.70	3,510
Tampere	4.30	16.10	3,430
Oulu	4.70	14.00	2,510
Jyväskylä	4.80	15.00	2,160
Lahti	5.10	13.90	1,720
<b>France</b>			
Paris	2.50	28.80	10,100
Nantes	4.00	13.90	3,950
Montpellier	4.00	14.50	3,290
Lyon	3.25	17.10	5,110
Bordeaux	3.75	16.10	4,650
Toulouse	3.90	13.90	3,500
Marseille	3.50	14.70	3,020
Nice	3.50	18.75	4,700
<b>Germany</b>			
Berlin	3.30	16.00	5,800
Cologne	3.90	14.00	5,050
Dusseldorf	3.70	12.60	5,600
Frankfurt	3.60	16.75	6,800
Hamburg	3.50	14.50	6,350
Munich	3.00	21.50	9,600

	Prime yield Q1 2023	Apartment rent, av EUR/sqm/month Q2 2023	Apartment price, av EUR/sqm Q1 2023
<b>Luxembourg</b>			
Luxembourg	3.70	30.00	11,500
<b>Netherlands</b>			
Amsterdam	3.90	26.00	7,900
The Hague	4.50	18.00	5,000
Rotterdam	4.50	16.50	5,200
Eindhoven	4.70	16.50	4,850
Utrecht	4.25	21.50	5,900
<b>Norway</b>			
Oslo	2.80	26.00	7,180
<b>Poland</b>			
Krakow	5.40	11.45	2,750
Wroclaw	5.40	13.50	2,450
Warsaw	5.20	14.20	3,010
<b>Portugal</b>			
Lisbon	4.75	18.10	5,100
Porto	5.00	14.80	3,290
<b>Spain</b>			
Madrid	3.85	16.60	4,330
Sevilla	4.75	10.60	2,180
Malaga	4.75	12.00	2,390
Barcelona	4.10	18.80	4,090
<b>Sweden</b>			
Stockholm*	1.75	13.00	7,850
Malmö	2.50	12.50	3,500
Gothenborg	2.40	13.00	5,450
<b>Switzerland</b>			
Zurich	2.00	27.90	13,450
Bern	2.25	20.50	9,000
Geneva	2.10	31.00	15,250
<b>United Kingdom</b>			
London	3.75	33.10	13,550
Birmingham	4.50	20.70	4,590
Manchester	4.25	23.70	4,800
Leeds	4.50	19.60	4,070

Sources: Catella, APAM Ltd, Real Estate Pilot AG, NOTARY, Thylander, Notaire FR, idealista



## Darwin theory

**“It’s not the strongest that wins, it’s the most adaptive.”**

This year’s European capital of culture titles itself “mysteries of transition”. Eleysina, an industrial city close to Athens that has based its economy on the refining of fossil fuels and cement, has harmed its natural beauty and wealth and finds itself in a fundamental dilemma. What direction will its transition go and how will the city of circularity (reference to the legend of Greek Goddess Demeter) revive its lost glory?

# Methodology:

This document is divided into sections that are most relevant to the current development of the real estate markets in Europe and to investment decisions in these markets. Each section has been prepared by an internal Catella expert in the field and reviewed by a second in-house expert.

The main contributing experts are Xavier Jongen (Managing Director) for the preface, the investment strategies and the listed market section; Dr. Lars Vandrei (Senior Research Manager) for the European market and regulations chapter; Benjamin R  ther (Head of Fund Management) for the Executive summary; Marvie Haas (Fund Manager Happiness Fund) for the reflection of sustainability in real estate value; Dr. Aliaksei Vasilevich (Senior Data Scientist) for the BOX AI and green premium; Didier Beltai-Menth (Head of Debt Finance)

for the finance market; Michael Fink (Managing Director) for the capital markets; and Michael Eirich (Head of Transaction) for the acquisition part.

The experts used demographic, economic and financial data, e.g. from Eurostat and Oxford Economics, which are summarised in the source list. In addition, much in-house expertise was taken into account, using the Delphi method for the real estate clock in the European market section and Catella's proprietary machine learning algorithm to determine the green premium in apartment prices.

The document concludes with a table of current prices, rents and yields in key markets per country, compiled from various sources and validated by Catella's several local alliance partners.

## Source list

Topic	Subject	Source
European Market	Demographics	Eurostat Oxford Economics National statistical offices
	Economical	Oxford Economics
	Construction	EUROCONSTRUCT ifo Institute Eurostat Department for Communities and Local Government (UK)
ESG	Transition costs	London and Paris offices: green premium emerges, MSCI, 2020
	Transition costs	The impact of sustainability on value, JLL, 2020
	Transition costs	The sustainability series, Knight Frank, 2021
	Transition costs	Net zero by 2050: a roadmap for the global energy sector, IEA
	Transition costs / execution	A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives, European Commission, 2020
	Transition costs / execution	Renovate2Recover, E3G, 2021
	Transition costs / execution	Delivering the European Green Deal, European Commission



Topic	Subject	Source
	Physical climate risk	Underwater assets? Real estate exposure to flood risk, MSCI, 2019
	Physical climate risk	Next wave of physical climate risk, AEW research, Europe, 2022
	Physical climate risk	Extreme weather events in Europe: Preparing for climate change adaptation, European Academies' Science Advisory Council (EASAC)
	Physical climate risk	Beltrán, Allan & Maddison, David & Elliott, Robert J R, 2018. "Is Flood Risk Capitalised Into Property Values?" Ecological Economics, Elsevier, vol. 146(C), pages 668-685.)
	Adaptation costs	Adaptation gap report 2020 & 2022, UN environment programme
	Adaptation costs	Climate change to cost Germany up to €900 billion by 2050 – study, Prognos and GWS and Germany's Institute for Ecological Economic Research, 2023
	Adaptation cost in Norway	Almås A.-J. and Hygen, H. O. (2012). Impacts of sea level rise towards 2100 on buildings in Norway. Building Research & Information. 40 (3): 245–259.
	Adaptation measures in infrastructure	Lifelines: The Resilient Infrastructure Opportunity, S Hallegatte, 2019
<b>Listed Market</b>		Investopedia
<b>Finance Marker</b>	Net-zero committed banks are in the process of adopting sector-specific targets	CDP Report February 2023 Oliver Wyman analysis; Net-Zero Banking Alliance (NZBA) Members (status as of 31 December 2022); Oliver Wyman analysis
<b>Capital Market</b>		
<b>Acquisitions</b>	Market data	Sources: RCA, national market reports (like CBRE: Investoren am Wohnimmobilieninvestmentmarkt Deutschland angesichts der höherer Finanzierungskosten und gestiegener Gesamtrisiken zurückhaltender (cbre.de); Information from alliance partners
<b>Regulations</b>	Tenant protection Property taxes Transfer taxes VAT on leases Rent price regulation	CBRE European Residential Regulatory Framework
	Property taxes Transfer taxes	Barrios S., Denis C., Ivaškaitė-Tamošiūnė V., Reut A. and Vázquez Torres E. (2019), Housing taxation: a new database for Europe, JRC Working Papers on Taxation and Structural Reforms No 08/2019, European Commission, Joint Research Centre, Seville.

Topic	Subject	Source
Investment beliefs		Validation document
Investment strategies		
Table summary	Apartment rent Apartment price Prime yield	Catella, APAM Ltd Real Estate Pilot AG NOTARY Thylander Notaire FR, idealista
Tooling		



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