A Framework for European Transformation

December 2022

Investors for a new now

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Research Institute
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December 2022
Thought Leadership

A Framework for European Transformation

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- **If Europe wishes to maintain the same level of prosperity achieved in the last few decades, a deep transformational journey is required.** Geopolitics means that the need for such a transformation is now significantly more urgent. However, macro and micro dynamics also indicate that past growth drivers have run their course, and are now moving in reverse. Still, Europe has a long-established legacy in transforming itself, with capital playing a pivotal role.
- **Europe needs to address its lack of dynamism.** Venture capital across the continent is estimated to be just 0.1% of EU GDP. The absence of large IT-related companies in European equities is a clear indicator that inertia and incrementalism has come at a high cost to investors over the past decade. An added risk relates to a structural difference between demand and supply, leading to suboptimal growth and/or higher inflation.
- **Any transformation is an ambitious project, requiring significant capital deployment.** High debt levels limit what governments can do. The Capital Market Union is an important enabler and, if we wish to avoid future debt-related crises, private capital will need to fill an estimated €250 billion annual shortfalls.
- **Current regulation (SFDR) favours divestments over transition or transformation. This is a problem for a mature economy such as Europe**, as it risks creating economic imbalances and starve healthy companies of economic capital.
- The transformation of Europe requires a framework that puts the sustainable investor on a par to the financial investor. **Current regulation discriminates against sustainability, thus resulting in long-term capital misallocation.**
- **Europe's major companies should consider new types of partnerships with asset managers to decarbonise supply chains and permanent carbon sequestration.** Large transformative investments may require tax efficient financing in Europe such as the flip structures which exist in the United States.
- **The long-term nature of private markets is currently better suited for driving European transformation**
  - **Transforming European commercial real estate.** Aside from transforming the existing stock of buildings to ensure that they are resilient to climate change, real estate will be an important component of supply chains associated with future geopolitical change
  - **Transforming European residential buildings and cities.** Buildings use 40% of Europe's energy and there are 100 million residential buildings in Europe. Most buildings are privately owned, and this is a small, but, fast growing part of European investors' private real estate assets
  - **Transforming European infrastructure.** This asset class presents compelling opportunities, given the vast array of projects associated to creating an economy that is climate resilient. For example, investments in areas such as power plants, power grids, transport, EV charging points, resilient water infrastructure, among others
  - **Transformation projects in emerging markets (EM).** Europe is a large consumer and indirectly generates emissions, primarily in EM. Partnerships aimed at ensuring sustainability throughout the supply chain ought to be the focus of investments

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Foreword

One of the core roles of investment professionals is the analysis of opportunities and risks, which can be divided into the short-, medium- and long-term. Short- and-medium term dynamics often relate to the economy, central banks and market dynamics over the next few years. Generally, the underlying view is one of stable socio-economic systems where cycles tend to fluctuate around central paths and where many measures, such as inflation rates or real economic growth per capita, tend to revert to the averages seen in the past. This type of business cycle analysis is very different from taking a 'long-term' view, where the focus is on how, why and when the structures of complex socio-economic systems change over time.

To observers purely focused on the short-term, such structural changes tend to appear sudden, unexpected and, depending on their economic impact, often destabilizing and even shocking. In reality, they are more often than not the results of complex trends and emerging patterns that have established themselves over a prolonged period of time. With the benefit of hindsight, "Everything is obvious, once you know the answer", as highlighted by the title of an influential book on the frailties of human forecasting.[1]

Examples in global politics and finance abound, from Russia's latest invasion of Ukraine, to Brexit, the Euro crisis and the 2008 Great Financial Crisis. But also the stunning outperformance of the U.S. equity markets post the 2008 Great Financial Crisis, when most were expecting its demise vis-à-vis emerging markets. Each of these events took many market participants by surprise and was deemed un-forecastable.

In each of these cases, however, a more attentive analysis pointed to plenty of warning signs well in advance, easily visible to the attentive eye. To take the example of the U.S. housing bubble that triggered the 2008 crisis, economist Paul Krugman argued as early as August 2005 that the U.S. economy had become dangerously dependent on rising house prices: "Now we're starting to hear a hissing sound, as the air begins to leak out of the bubble. And everyone (...) should be worried."

Our perception of shocks being sudden is possibly intimately related to how and when markets tend to price risk. This is particularly the case for risks that are unfamiliar to most market participants from their own lived experience; it can take quite a long time and a lot of mounting, worrying evidence until markets react. Another difficulty in assessing the potential impact of such "unexpected" events is forecasting policy reaction functions, at least in terms of "common sense" expectations underpinning the "conventional wisdom" at a given moment in time.

The challenge for the investment industry is that it rarely pays to think about the long-term, especially when it comes to warning about risks, which may never materialize. Furthermore, in public markets, incentives tend to be clearly geared towards short-term and familiar dynamics with concepts such as 'tracking error' or 'one-year' and 'three-year' relative performance being of primary importance in measuring the relative success of investment professionals.

Yet, taking a longer-term view and highlighting risks and opportunities which might not yet be obvious, is an essential part of fulfilling our fiduciary duties to our clients[2] and our broader responsibility to society.

Our industry plays a fundamental role in the well-being of society. The financing we provide, the products we develop will serve to channel investments in the real economy for decades to come. Such economic activities should aim to produce a return that will produce wealth for the communities we serve, foster sustainable prosperity and equality, promote innovation and enhance the security of the communities we operate in. Here, preparation is of paramount importance, and this requires a clear-sighted view that looks beyond immediate, business-cycle dynamics.

In this spirit, we share with the readers our in-depth analysis that underpins our view that Europe must transform to protect the high level of living standards for its citizens and lay solid foundations for the continent's future prosperity.

[1] Watts, D. (2011), "Everything Is Obvious: *Once You Know the Answer – How Common Sense Fails Us", Crown Business Press

[2] PRI (2021) A legal framework for impact

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Europe needs transforming, but why now? And why is this time different?

The term (i) *transformation* tops the German league of the most searched Google term in the 2004-2022 period against other popular terms such as (ii) *crisis*, (iii) *inflation*, (iv) *recessions*, (v) *climate change*. It is currently below *inflation* and *recession*, but it is in line with *climate change* and ahead of *crisis*.

Figure 1: League table of most searched Google terms in Germany (2004-present)

Keyword	Monthly hits - average*
Transformation	19.7
Inflation	19.1
Crisis	15.3
Climate	11.8
Recession	8.7

Source: DWS, Google search data; * Average of the monthly readings between January 2004 and October 2022, within Germany

A very European approach to change management

This result may seem surprising. But upon reflection, Europe, in general, and Germany, in particular, has faced a pattern of both stability and change for much of its post World War II history. Transformation occurs as new challenges present themselves. Hence, **at a geopolitical level, one feels tempted to paraphrase Giuseppe Tomasi di Lampedusa's famous line**[3] about 1860 aristocratic life in Sicily against the backdrop of momentous events elsewhere.[4]

Policymakers in Western Europe seem to have told themselves, time and time again, something along the lines of "If we want things to stay as they are in terms keeping our voters safe and prosperous under a U.S. security umbrella, things will have to change in terms of how we organize ourselves within our country and on our continent", without paying too much attention to political and geopolitical dynamics in the rest of the world.

The war in Ukraine is a humanitarian and economic disaster, which will require long overdue changes to how Europeans think about security, the market economy and global trade. Still, **one should remember that little in world events was ever quite as orderly or peaceful as it may have appeared from the comfortable, "post-war" perspective of Berlin (or Bonn), Paris or Brussels.**

Box 1 - Historical narrative is a matter of perspectives

If you were to shift only a little further east from Europe, a very different picture would emerge on the historical evolution of the past forty years, starting with the failed Soviet invasion of Afghanistan in 1979 and the collapse of the Soviet Union in 1991.[5] Nor was the aftermath of what some historians would now call Europe's last Empire as peaceful. or likely to remain peaceful. as the end of communist rule in most Soviet satellite states of central and Eastern Europe seemed to suggest to Berlin policymakers ever since.[6]

Certainly, there was no lack of early warning signs, even in the 1990s, that geopolitics would eventually stage a comeback in Europe's neighbourhood. The violent wars in the former Yugoslavia, the civil war in Tajikistan, the crushing of Chechen independence by the Russian Federation, the conflicts in the Southern Caucasus and Moldova and the Kremlin's use of energy blackmail against the Baltic states all pointed to the potential dangers ahead.

However, policymakers in what was slowly becoming the EU were busy with their own set of important, but far more parochial challenges as the EU grew from its 6 founding members in 1957, through successive waves of expansion, notably in 1973, 1986 and 2004. In the end, history is often a matter of perspectives.

Transformation is a feature of Europe

The reality is that "Europe", and specifically the European Union (EU), has been in a constant state of flux since well before the formal establishment of the EU in 1993 and the subsequent enlargement in central, northern, and eastern Europe. And this has continued with the creation of the European single currency and the Euro-crises.

[3] "If we want things to stay as they are, things will have to change."- Giuseppe Tomasi di Lampedusa, The Leopard
[4] For an appraisal of Giuseppe Tomasi di Lampedusa's masterpiece, its author and its reception, see Economist (Oct 1998)
[5] The latter was not solely due to the brave and laudable efforts of its dissidents. It had as much to do with the corrosive undermining of Soviet legitimacy due to defeat and humiliation on Afghan battlefields and an increasingly chronic inability of its centrally planned economy in matching U.S. military expenditures. See for example: Lieven, D. (2002), Empire: The Russian Empire and Its Rivals, Yale University Press
[6] Plokhy, S. (2015), The Last Empire: The Final Days of the Soviet Union Paperback, Oneworld Publications

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The reason for urgency

The sense of urgency to speed up the transformation of Europe is catalysed by research suggesting that the foundations on which European prosperity and security have been built for the past seventy years are no longer fit for the future. Using terms borrowed from ecological theory, the symbiosis between the European economic and geopolitical system and its environment is structurally changing.

We need to recognise and adapt to these changes or Europe risks a slow and steady decline. For evidence, just look at the economic and social damage created by the Russian invasion of Ukraine. The writing was on the wall for some time, but, still many of us were shocked and unprepared when Russia invaded a sovereign nation.

At an investment level, investors need to interrogate the significant underperformance of European equities versus U.S. equities over the last decade, something we analyse later in this paper. What emerges is a picture of a region that is more keen to defend the status quo than embrace change.

To ensure Europe delivers a high level of sustainable prosperity, it must once again transform itself. It must strengthen its foundations to make it fit for the future. If it fails, it will likely mean allowing pre-crisis dynamics evolving unchecked and, with it, sleepwalking into dangerous terrain.

Moreover, this time is different not so much because the world has suddenly become more dangerous, but because European voters and policymakers are finally waking up to the dangers that have been lurking all along. This is also being recognised by academics, consultants and national intelligence institutions[7].

A plan of action

The transformation of Europe may appear political in nature, but capital still has a decisive role to play. We (i) identify the investment gap required for the transformation of Europe and assess why European finance is struggling to finance transformational projects, (ii) we highlight policymaking changes that are required for such a transformational journey, and (iii) define areas that are already fit for transformation and where capital can already be put to work.

(i) The investment gap

The investment required to transform Europe is worth trillions of euro, and the investment gap is considerable. For example, the EU estimated[8] that in 2019, before the COVID-19 crisis, the level of public investment in the EU27 was insufficient to keep the public capital stock constant as a share of GDP. *Net public investment, that is. gross fixed capital formation less consumption of fixed capital, amounted to just 0.3% in the EU27, a level which would – if maintained – result in a declining public capital stock as a share of GDP.*

The same study estimated that the investment needs for delivering the green transition and the digital transformation was at least €595bn per year. The estimate includes €470bn per year associated to the additional investments needed to reach the EU's current 2030 climate and environmental policy goals, and €125bn related to the EU's needs to pursue digital transformation.

Some of these investments were to be covered through public spending, but the remaining investment and hence financing gap was expected to be around €1.77 trillion for the 2021-2027 period, or €250bn per year[9].

Meanwhile, European financiers are struggling to deploy capital. This is primarily due to the banking sector still playing a primary role in financing economic activities during a time when the banking sector has been dealing with the effects of both the Great Financial Crisis and the euro crisis. Listed equity markets ought to provide financing for long-term activities, but this is not happening.

[7] A recent article published by the McKinsey Quarterly focuses on CEOs and building resilience. 'This is a defining moment for a generation of executives who have never been tested in quite this way …. Today they face a unique confluence of crises that is of another magnitude. The play book of the past will be only moderately helpful.' Nouriel Robini, the economist, also just published its latest book, Megathreats, where he talks about the ten trends that imperil our future, and how to survive them. Roubini, often nicknamed Dr Doom, is not famous for his optimism. But it is not only consultants or economists that are worried about the future. Michael Bess, a historian of science and technology, specialising in 20th- and 21st-century Europe, just published Planet in Peril. In his book he argues that humanity face four mega-dangers – climate change, nuclear weapons, pandemics, and artificial intelligence. His focus is more at systems level; he argues that today's institutions have failed to deliver the planet-level responses required to effectively deal with such challenges and calls for modifying the United Nations so that it can become more effective at coordinating global solutions to humanity problems

[8] European Commission Staff Working Document. SWD (2020) 98 - Identifying Europe's recovery needs

[9] Climate & Company for Agora Energiewende (July 2020)

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(ii) Transformational policymaking

Europe, and specifically the EU, is in the midst of a significant transformation driven by the recognition that capital has, in its current form, a detrimental impact on the environment and society. However, **sustainable investors are discriminated against by regulation, leading to capital mis-allocation, which ought to be a primary source of concern for regulators and policymakers.**

Addressing the following issues would enable capital to be more effectively deployed, enabling a true European transformation:

1. Make a clear distinction between ESG and sustainable investment. Bring ESG back to its origins of single materiality, and simplify ESG by incorporating it into traditional accounting disclosure.
2. Develop a credible standard for sustainability disclosure, based on science and managed by an independent body.
3. Equalise the costs at a consumer level for products that are only focused on financial return and products that are sustainable in nature, to ensure that sustainability is not at a disadvantage in capital allocation decisions.
4. Develop a label and a framework for transitioning issuers whose economic activities are recognised as posing systemic risks to the environment.
5. Ensure that divestments from public market companies are not ending up in private hands, with little scrutiny and disclosure requirements.
6. Transition is a better path than divestment, but the latter currently has the upper hand. Within public equities there is clear scope for funds invested in 'dirty' activities, which are essential to the European economy, to be managed with a view to transitioning them to a more sustainable future.
7. Develop an investment framework for the sourcing of the resources and materials that are of fundamental importance to the climate transition.

(iii) Transformational investment

Introducing and implementing policies take time to develop and implement. In the meantime, it is essential to act now to unlock capital that can have an immediate positive impact on Europe's transformation.

The long-term nature of transformative investments means that some of the most appropriate opportunities are in private markets where investors can take the long-term view. Investors focus therefore ought to be on:

1. **Transforming European commercial real estate.** Aside from transforming the existing stock of buildings to ensure that they are resilient to climate change, real estate will play an important part in supply chains associated with future geopolitical change.
2. **Transforming European residential buildings and cities.** Buildings use 40% of Europe's energy and there are 100 million residential buildings in Europe. While most residential buildings are privately owned, they are also a small, but fast growing, part of European investors' allocation to private real estate investments.
3. **Transforming European infrastructure.** This is the asset class with the largest opportunity set, given the vast array of projects associated with climate transition.
4. **Transforming the approach to nature-based solutions and carbon sequestration.**
5. **Transformation projects in emerging markets.** Europe is a large consumer and as such indirectly generates emissions, primarily in emerging markets. Partnerships aimed at ensuring sustainability throughout the supply chain need also to be the focus of investments.

The structure of this research paper contains six sections covering:

1. Why the comeback of Geopolitics matters?
2. Transformation from a macro perspective
3. Transformation from a micro perspective
4. Why Europe is struggling to finance transformative projects
5. Transformative policymaking
6. Transformative investments

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1 / Why the comeback of Geopolitics matters

Superpowers come and go almost every other decade. At least, that is what you would conclude by simply scanning international bestseller lists containing that term. Lately, India, China and Silicon Valley all appear on the up, as far as book sales are concerned. Forty years ago, it was Japan's turn. In between, post-Soviet Russia, Brazil, Nigeria and South Africa have all made the occasional appearance.

Within this genre, the (EU has had its moments of glory too, especially in the early 2000s, after physical euro notes went into circulation and before the subsequent financial crises.[10] The point of reading such books, especially with the benefit of a few decades' worth of hindsight, is twofold. First, they are a reminder that predictions are hard and that emergent developments are rarely as obvious in real-time as they later appear. Pundits tend to extrapolate from recent years or decades and their forecasts are often rosiest, just before a crisis of some sort strikes. That is the second reason how and why books about ascending superpowers can be valuable.

Still, unlike perceptions of international influence, sources of actual power to sway others tend to be quite sticky. Whether we are talking about military, political, economic, cultural or ideological means of influence, great powers rarely rise or vanish all that suddenly. **If power is steady even during periods of perceived decline, that tells you it is quite likely to be sustained going forward.**

The macro environment is structurally changing, which means that the terrain on which capital is operating is no longer the same as it used to be. For the last seventy years, the economic and political development allowed first Western and then all of Europe and its citizens the luxury of not worrying all that much about geopolitics, at least most of the time. Peace, prosperity and ever closer integration on the "Old Continent" went from policy goals of the 1950s to the lived experience for many in later generations.

Partly due to deliberate U.S. policy decisions based on the lessons learnt following World War One, much of what Western Europe experienced is what Germans, following World War Two, still refer to as their Wirtschaftswunder.[11] Following the collapse of the Soviet Union, the transition of many states towards democratic systems and the enlargement of the EU, the temptation to take the U.S. security umbrella for granted became even stronger.

The increasingly pan-European industrial system that emerged was a primary beneficiary of increasing globalisation, first among the world's industrialized democracies (we will – for want of a better term – refer to as the Global West) and later through the economic developments in emerging markets. Working on agreeing terms of trade, bringing best practices led to growing prosperity.

An increasingly integrated and globalised economy emerged, based on specialisation and under the governance of well-established and trusted institutions including the United Nations, the World Bank, the International Monetary Fund and the World Health Organization. The overarching assumption was that the various democratic systems of much of Europe and North America would work as a template for the rest of the world.

With the benefit of hindsight, the real puzzle is why it took until February 24, 2022, for European policymakers and investors to realise the world was changing. It seems oddly reminiscent to market complacency before other crises, such as the 2008 financial crisis, except that has taken even longer for those "new" realities to sink in.

For the first few years after the collapse of the Soviet Union in 1991, observers might have been forgiven for thinking that the world was inexorably moving towards a mono-polar order of benign U.S. hegemony underpinned by global rules, institutions and, perhaps most importantly, a shared understanding this new order could and would last. Iraq's invasion of its neighbour Kuwait was defeated by 35-country military coalition, spearheaded by the United States. Within a single human lifespan of the imperial wars of aggression by the likes of Hitler's Germany, Mussolini's Italy and Tōjō's Japan, the very idea of warfare to annex territory was becoming not just intolerable but increasingly unthinkable.

[10] Arguably the most read-worthy version of the arguments made on behalf of Europe's rise as a superpower around that time is probably Reid, T. (2005) The United States of Europe: The New Superpower and the End of American Supremacy Paperback, Penguin Books

[11] Rockoff, H. (2012) America's Economic Way of War: War and the US Economy from the Spanish-American War to the Persian Gulf War (New Approaches to Economic and Social History), Cambridge University Press

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In a seemingly benign geopolitical backdrop, trade and specialisation were seen as key for economic prosperity. If everyone can trust everyone else to follow the same rules, it makes sense to produce goods and services wherever resources are used most efficiently. For several decades, this proved a great way to control inflation, as states and companies could always find a different partner to do business with.

Still, poke a little at any of these shared assumptions, and it is hard to see exactly how and why they came to be so widely shared. By breeding complacency, this “fabled mono-polar world” was great in fostering a low inflation environment and high returns on risky assets and the same way – and for similar reasons – why, in 2005, market commentators might have seen rising U.S. house prices and low household savings rates as signs of economic strength. Nor was it ever a particularly accurate description of geopolitical realities, rather than hopes.

From 2003 onwards, the second Iraq war had shattered in historical terms the brief moment of “Western” unity. Indeed, it arguably took the events of 2022 to restore a common sense of purpose in defence of our way of life among the world’s industrialized democracies in the Global West.

Though the U.S. remained powerful in military, political, economic, cultural and ideological terms, its ability and willingness to provide effective leadership was called into question long before the Trump presidency. The Brexit referendum created further friction. Indeed, talk of a multi-polar world first took shape amid hopes in Moscow and Beijing that economic self-interest might prompt Europe to weaken its transatlantic ties. Meanwhile, one of the more lasting effects of the 2008 financial crisis has been that Western-style institutions no longer appeared quite so desirable or credible as guarantors of economic stability and prosperity.

At a geopolitical level, we are now fast moving towards a much less orderly multi-lateral system, though it would be equally premature to declare the new era a multi-polar system in the sense the decision-makers in Moscow and Beijing had been hoping. While practically all of the Global West, including even countries such as Switzerland, Austria Finland and Sweden with a long tradition of military neutrality were quick to put up sanctions against Russia, the same could not be said of the rest of the world. In much of the Global South, the conflict is seen as a purely “European” problem. Meanwhile, India and China, alone representing more than a third of the global population, publicly embarked on equidistant approach, while simultaneously expanding trade links, as did Turkey.

Further strains to the global order already loom

At the recent held Chinese Communist Party's 20th party congress in Beijing, President Xi was keen to reiterate that "Resolving the Taiwan issue is the Chinese people's own business, and it up to the Chinese people to decide. We insist on striving for the prospect of peaceful reunification with the greatest sincerity and best efforts, but we will never promise to give up the use of force and reserve the option to take all necessary measures." Speaking hypothetically, what might be the political reaction to a China invading Taiwan?

The answer, it increasingly seems, at least as far as Europe is concerned, is far more resolute than would have seemed plausible even ten months ago. Ironically, **geopolitics has staged a return as a key focal point for financial markets,** precisely as policymakers are starting to address some of the weaknesses that continuing “business as usual” for even longer would have entailed. Europeans now accept that China’s stance on Taiwan is a long-term risk to their own prosperity and security, not just a problem for others to take care of.

This has implications at both the micro and macro level, and potentially more benign ones than common sense tends to suggest amid the shocking scenes we all see on our TV screens every day. Vladimir Putin’s latest campaign against a weaker neighbour has served as a wake-up call.

In the light of the new risk assessments in Western Europe, it seems less likely that we will see full-scale deglobalisation, protectionism and inward-looking policies of the sort that appeared increasingly plausible during Donald Trump’s presidency. Instead of reshoring of manufacturing, we might see nearshoring and even “friend-shoring”, to an ever-wider circle of friends.

If the unity of the “Global West” can, at least, be maintained, it could pave the way towards a renaissance of democracies. The EU’s single market has already endowed it with a longstanding leadership role in setting international norms on economic and regulatory issues, potentially giving it geopolitical clout on trade, sanctions, technology regulations, and environmental and investment policies.

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Such unilateral power to regulate global markets is arguably unprecedented in global economic history. Known as the Brussels Effect, it frequently turns the EU into the world's most influential regulator.[12] Even more interesting is how this effect works.

Europe's underrated power

The EU has no way to directly enforce compliance outside its borders, and, with a few exceptions such as trade law, nor do any of the world's multilateral bodies. Instead, EU rules are, time and again, transformed into global standards through market mechanisms. Most obviously, companies may voluntarily abide by them worldwide for commercial reasons, given the size of the EU's single market. More subtly, EU laws often become templates for other countries. Having been refined through the cumbersome process of EU rulemaking and compromise, typically involving all its 27 diverse member states, they tend to strike a good balance between competing policy goals, especially where purely technical questions are concerned. In countries facing similar regulatory challenges, often with more limited administrative capacities, it is tempting to copy the readily available Brussels playbook.

The problem, up until now, has been the inability, if not downright refusal of the EU as a whole to see itself as a geopolitical actor. That has been even more true of Germany, its most influential member state. This has made it difficult to a develop a common strategy for dealing with common, transnational challenges. The contrast with small Baltic states, such as Estonia, is instructive, as highlighted in Box 2.

This points to a second, powerful and effective source of the EU's geopolitical influence, at least for countries within its neighbourhood. In the past 30 years, economists have increasingly come to appreciate how crucial the rule of law, private property rights and legitimate, accountable state institutions are in enabling economic growth.[13] The problem is that the desire for such institutions is much easier than actually building them, even if significant resources are devoted to the task.

The importance of institutions

As the United States found in Afghanistan and Iraq, being a military superpower able to succeed on the battlefield is one thing, getting democratic institutions to work and deliver the promised prosperity quite another.[14] Nor is it enough for most voters to agree on the importance to fight corruption and elect candidates to do so if the modern experience of Latin America is anything to go by.[15]

Box 2 **The EU- Russia experience from an alternative (Baltic) viewpoint**

Ever since regaining independence and embarking on a modernization strategy around digitalisation, Estonia has been subject to regular waves of Russian aggression.[16]

The combined result of all this has been the development of a more prosperous economy and resilient society than ever seemed possible 30 years ago. In recent months, it has been striking to obverse how the geopolitical perspectives of events in Ukraine have begun to converge in Paris, Berlin or Rome with those in Riga, Vilnius or Tallinn. To take the most prominent example, the Nordstream underwater gas pipelines directly connecting Germany to the Russian Federation, despite the considerable costs and technological challenges, were self-evidently geopolitical projects.

Seen from the Baltics, Western Europe had plenty of other options to either diversify European gas supplies, or at least, choose less costly land routes via the Baltic states and Poland or even just have the maintenance of pipelines via Ukraine as a precondition for continuing to rely on Russian gas supplies. To Baltic eyes, German policies have appeared naively irrational and short-sighted at best, and at worst a constant reminder of how the Molotov-Ribbentrop pact had cost them their independence of the interwar years. Yet in the short-term context of German electoral politics, all these seemed like remote concerns in Berlin, even as little as a year ago during last year's general elections to the Bundestag. It also shows how swiftly democratic and open societies can learn from previous errors. More subtly, it also highlights how much Western Europe still has to learn from some of the newer EU members, whose warnings of the Russian threat have proven so prescient.

[12] Bradford, A. (2020), "The Brussels Effect: How the European Union Rules the World", Oxford University Press
[13] See, for example, Robinson, J. and Acemoglu, D. (2013), "Why Nations Fail: The Origins of Power, Prosperity and Poverty", Profile Books
[14] Stewart, R. and Knaus, G. (2011), "Can Intervention Work?", Norton & Company
[15] Edwards, S. (2012), "Left Behind: Latin America and the False Promise of Populism", University of Chicago Press
[16] Like its Baltic neighbours, Estonia has seen off repeated attempts at energy blackmail, strategic corruption, cyberattacks, disinformation campaigns and other forms of hybrid warfare. See, for example, The Evolution of Russian Hybrid Warfare: Estonia - CEPA and for further background, Lieven, A. (1994, 2nd ed.): The Baltic Revolution - Estonia, Latvia, Lithuania and the Path to Independence, Yale University Press

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Policymakers may say one thing, but in deeply patronalistic societies, quite tempted not to follow through once elected. In any case, building a functioning judiciary, an ethos of independent civil servants and various independent watchdogs are long-term tasks, which are likely to take generations without outside assistance. In Eastern Europe at least, and almost uniquely in today's world, the chance of EU membership has proved a credible and attractive option to voters and elites alike to speedily bring about such societal changes.[17]

More by accident than by design, EU enlargement has proven an extremely powerful foreign policy tool to support democracy, ethnic tolerance and various necessary reforms. Of course, progress has been uneven in some of the newer member states, which have seen backsliding after joining. Moreover, the need to imitate or implement rules largely made elsewhere can cause resentment.

Though understandable in terms of electoral politics of individual member states, arguably the biggest blunder of EU history in geopolitical terms has been the treatment of Turkey's membership application. Holding out accession hopes which never materialize is a sure-fire way to generate backlash in the EU's neighbourhood. Vladmir Putin's latest war on Ukraine has made it a lot less likely that this mistake will be repeated, not just as far as Ukraine itself is concerned, but also the West Balkan, Moldova and, potentially one day, countries such as Georgia.

Such further enlargement will, no doubt, require institutional changes. We will steer clear of such debates other than stating that further tinkering is likely, perhaps allowing members, would-be members or looser partners to choose varying degrees of cooperation. Known in EU jargon as "variable geometry", such changes may also make future events similar to Brexit more manageable and less distractingly painful for all parties involved.

Still, both the EU and global governance bodies such as the UN have come under significant criticism over recent years, with long-running arguments from both the left and the right.[18] The European Union has spent the bulk of the past 15 years dealing with the aftermath of several financial crises. Both Brexit and the Russian invasion caught it unprepared politically and economically, which served to highlight the challenges of an imperfect union.

The challenges ahead

As we come to the end of this section, our conclusion is that **the reason the EU needs to accelerate its transformation is not some vague wish to stay relevant in a multi-polar world. It is, rather, the old logic that "If we want things to stay as they are in terms keeping our voters safe and prosperous under a U.S. security umbrella, things will have to change** in terms of how we organize ourselves within Europe", but this time taking into account the geopolitical implications.

Above all, that means serving as a template for others in tackling such challenges as climate change, and promoting the nuts and bolts underpinning democratic institutions could be key to the success of the Global West in coming decades.
Already in 2021, the U.S. National Intelligence Council[19] presented five different scenarios on what the global political economy could look like in 2040. Four of the five are gloomy in nature and consistent with a "business-as-usual" approach in terms of policy patterns and are a result of Western societies not recognizing the structural changes they face following the tumultuous events of 2022. Our strong belief is that the fifth option, *Renaissaince of Democracies* is possible, albeit challenging. The authors describe it in this manner, and which is worth quoting at length:

"In 2040, the world is in the midst of a resurgence of open democracies led by the United States and its allies. Rapid technological advancements fostered by public-private partnerships in the United States and other democratic societies are transforming the global economy, raising incomes, and improving the quality of life for millions around the globe. The rising tide of economic growth and technological achievement enables responses to global challenges, eases societal divisions, and renews public trust in democratic institutions. In contrast, years of increasing societal controls and monitoring in China and Russia have stifled innovation as leading scientists and entrepreneurs have sought asylum in the United States and Europe."

[17] Vachudova, M. (2005) Europe Undivided: Democracy, Leverage, and Integration After Communism, Oxford University Press

[18] For an example of the later, see, for example, Lal, D. (2004) "In Praise of Empires: Globalization and Order", Palgrave Macmillan
[19] Global Trends 2040: A More Contested World

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The document does not provide a description of how exactly any such resurgence of open societies and functioning democracies could be made to work better or how backsliding could be prevented. But, with its waves of enlargement, the EU already has decades of experience on the former and it looks set to gain plenty on the latter in coming decades. A functional equivalent of enlargement would be a gamechanger within the global context.

This highlights that, in and of themselves, geopolitical labels such as superpower status are of limited analytical value. The EU, arguably, already has superpower status when it comes to regulating USB chargers, though it would probably struggle if it had to organize its own military defence without U.S. assistance any time soon.

It is against this backdrop that the reader ought to analyse the following two sections, since Geopolitics is also a function of intrinsic economic strength, which is itself a function of the strength of its businesses (the micro) as well as the ability of the macro context to enable it.

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2 / Transformation from a macro perspective

In this section we shy away from talking about items such as inflation expectations and wars, to focus on a few issues that represent the most significant structural challenges that Europe, and specifically the EU, will face in the coming decade:

- **European demographics.** How can Europe play a role as its population and economic weight is likely to become a smaller share of the world economy?
- **High debt levels in some European jurisdictions and whether this becomes a significant challenge to Europe's transformation.**
- **Strategic dependencies and supply chains.** Europe faces high dependency on non-European suppliers for key raw materials and intermediate goods.
- **Climate risk** Climate change as well as the preservation of the environment pose a significant challenge, especially for a densely populated continent like Europe.
- **Beyond climate.** The transformation of Europe towards a more sustainable future also needs to address the food-land link, recognise the importance of biodiversity and move towards a circular economic system.

The European demographic time bomb

The European Union has some challenging demographics. The total population is stagnating and, given current anti-immigration dynamics in many European countries, is likely to shrink in the coming years.

Life expectancy is projected to rise from 83.7/78.2 (w/m) in 2018 to 90.3/86.1 in 2070, while fertility rates will probably stay low, roughly 1.5 babies per woman.

The combination of such trends has numerous effects on how the EU will look in the future:

- The population aged 65+ will increase from 20% to 30%.
- The share of seniors (80+) will increase from 6% to 13%.
- The median age will increase from 41 to 47 by 2040.
- The working age population (15-64) is expected to shrink by roughly 0.5% per year, starting now.
- The dependency ratio will increase from the current level of 55% to 75% in 2050.

As a result, one ought to expect lower productivity, higher health care expenses and challenges for pension systems[20]. This in turn has implications for many parts of the economy:

- A shrinking working age population requires investments to make production less labor intensive.
- Slowing productivity growth requires more investments into productivity enhancing technologies.
- Smaller household sizes translate into more demand for housing, hence additional construction.
- An older population means more spending on health care.
- A higher share of the very old population requires more expenses for long term care.
- Fast-aging societies might want to take profit from more benign demographics elsewhere, requiring pay-as-you-go pension systems to be complemented by funded pension systems.

Such structural changes require long term policies to ensure the transition is properly managed.

From a strategic perspective, the obvious question is how can Europe maintain a role vis-à-vis the growth of countries such as India and China and other emerging economies. It is a fair question, but we note that the example of Singapore, Switzerland, New Zealand, and some of the Baltic countries do suggest that economic and social success can be achieved through appropriate frameworks.

At the same time, the emerging "silver-economy" is an opportunity for the health and long-term care sectors. Digitalization is a clear opportunity in the health care sector as it can speed up efficiency gains by providing people with the option to independently monitor their health. The impact can be wide-ranging in nature (i) better quality of life, (ii) increased efficiency of health and long-term care, (iii) market growth and industry development[21].

High levels of debt are an issue, but less of a problem given large net savings

High debt is often seen as a major economic challenge. Typically, debt is measured relative to economic output,

[20] European Commission (2021) Pension adequacy European Commission (2021) Pension adequacy

[21] European Commission (2020) The impact of demographic change

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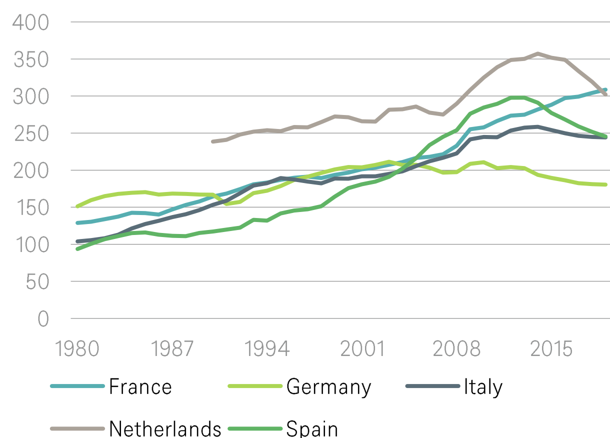
such as gross domestic product. As of 2019[22], the International Monetary Fund's global debt database reveals some interesting findings for the EU's five largest countries:

In the eurozone an aggregate debt ratio of households-, non-financial corporations- as well as government-debt ranging from 180% of GDP in the case of Germany to 309% in France.

Italy and Spain are roughly in the middle of these extremes, while the Netherlands is relatively close to the French figure.

In terms of pathways, the debt-to-GDP ratio has declined over the past decade in Germany, Spain and the Netherlands, while it has remained stable in Italy. These trends reflect austerity efforts to overcome the euro crisis, sometimes also referred to as the sovereign debt crisis.

Figure 2: Debt / GDP levels (private household plus non-financial corporates plus governments



Source: IMF Global Debt Database (GDD)

However, the eurozone as a whole has exported savings on a large scale over the past decade, instead of using them for investment at home.

One of the most basic relationships in macroeconomics is the identity $S - I = X - M$, i.e., that the savings balance (savings - investment) must equal the external balance (exports - imports).

The Eurozone has run substantial external surpluses over the past decade, but rather than investing at home, investments took place abroad. A look at the investment ratios of individual countries seems to confirm this trend[23]: while investments in Italy averaged 21.2% of GDP between 2000 and 2009, this ratio fell to 18.2% in the last decade. Among the five major eurozone countries, Spain (19.5%), the Netherlands (20.2%) and Germany (20.7%), their investment ratios were also below the G7 average (21%).

In this respect, **it is reasonable to suspect that there may be some catch-up potential in terms of investments after a decade of austerity.**

Figure 3: Eurozone current account balance (12m rolling total, in €bn)

Source: ECB

Europe's strategic dependencies

As we write, Europe is in the midst of an energy crisis. The continent's vulnerability was also exposed in the early days of the COVID-19 pandemic, when it was almost impossible to source medical equipment to ensure that the pandemic was properly dealt with.

In a globalised economy based on specialisation, moving some production elsewhere made sense. However, economic models did not assume that political or national interests would prevail over financial interests. But, already in 2018, the U.S. recognised that **"economic security is national security."** (the U.S. Dep. of Commerce's strategic plan for 2018-22).

Europe, and specifically the EU, has several strategic dependencies that must be effectively dealt with. This will require investments and agreements with friendly

[22] 2020 data subjected to one-off pandemic effects and hence used 2019

[23] IMF (2022) World Economic Outlook

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parties to ensure a more resilient economic path going forward. They include:

- Raw materials: The European Commission has identified 30 critical raw materials[24] including rare earth metals, gallium and indium, silicon metal and Platinum Group Metals. Country dependencies range from China (rare earth metals) to Turkey (borate) and South Africa (platinum)
- Medical products: the EU is dependent on foreign supply chains for a number of inputs and products in the health ecosystem which are critical for society. Disruptions can vary from trade disputes, cyberattacks, to uncoordinated stockpiling, export restrictions, disruptions in logistics, closing of sites or on-site accidents as well as non-compliance with Good Manufacturing Practices. There is also a large regional concentration in the production of generic active pharmaceutical ingredients (APIs).
- Lithium batteries: Batteries are key to enabling the EU's green and digital transformation. They are essential to achieving the European Green Deal ambition for the EU to become climate neutral by 2050. Batteries are particularly important for the production of electric vehicles. They are increasingly used for energy storage and in other industrial applications, such as machinery, power tools, or forklifts. But global production is highly concentrated in China (66%), South Korea, Japan and rest of Asia (20%) with the EU's share of global capacity just 3%.
- Hydrogen: Renewable or low-carbon hydrogen will be essential for the decarbonisation and competitiveness of Europe's industrial sector. To decarbonise major sectors (e.g., steel, chemicals or heavy transport), a large and reliable supply of clean hydrogen is required. Europe is a technology leader in several clean hydrogen technologies with half of electrolyser manufacturers being European. However, Europe is dependent on imports of raw materials for key components as well as the supply of renewable energy.
- Semiconductors: Europe is heavily dependent on the U.S. for general design tools and on Asia for advanced chip fabrication. However, limited production capacity, high entry costs and lack of a level playing field are threatening Europe's capacity to fully seize the opportunities of the digital transformation.
- Cloud and edge computing: Cloud computing technologies enable the functioning of technologies such as AI, Internet of Things and 5G/6G. They are a strategic and key enabling technology for a green and digital future for European industries and the public sector. Europe has a unique market opportunity in the next decade to strengthen its data processing technologies by capitalising on the changes to come, in particular in relation to edge computing[25].

Climate change risks

The effects of climate change are already being felt across Europe. Examples of climate impacts include:

- Floods: A year ago, extreme floods across Europe caused an estimated US$12 billion in total insurance losses. It is projected that annual flood losses will increase fivefold, between now and 2050, to an estimated €23.5 billion of losses every year.
- Droughts: Conditions across Europe this year were reported to be the worst for at least 500 years with impacts on the continent's hydro and nuclear production.
- Wildfires: Since the beginning of 2022, wildfires have affected 60,000 hectares across the European continent, or 4.6 times the average of the last ten years.
- Sea temperatures: Between 1982 and 2018, sea surface temperature rise in the Mediterranean has been more than double the world average leading to marine heatwaves and amplifying precipitation events on land.
- Sea level rise: Rising tides, waves and storm surges means that extreme sea level events that would have occurred once every 100 years are expected to occur every year in the Mediterranean by the end of this century.
- Climate migration and immigration integration: The World Bank[26] estimates that in the absence of adaptation and development action, 216 million people in developing countries could be compelled to migrate within their countries by 2050. Climate migration's potential to trigger disputes and national security tensions has been flagged by the US National Intelligence Council[27].

[24] European Commission (2020) Critical raw materials
[25] European Commission (2022) In-depth reviews of strategic areas
[26] World Bank Blogs (March 2022) Climate migration – deepening our solutions
[27] Office of the Director of National Intelligence USA (October 2021) National Intelligence Estimate on Climate Change

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Addressing climate change

Three sectors require radical transformation to drive the continent's net zero ambitions. These are:

1. Transportation

Emissions in the European transport sector represent almost 27% of the GHG emissions as well as a cause of air pollution. The priority investment areas in the transport sector are EV charging infrastructure for rural areas, rail infrastructure, and innovation funding for batteries.

2. Buildings

Buildings are the single largest energy consumer in Europe, using 40% of the continent's energy and creating 36% of its greenhouse gas emissions. The European Commission has proposed that by 2030 all new buildings must be zero-emission. This still leaves the existing building stock, 85% of which will still be standing in 2050. Plans will need to include roadmaps for phasing out fossil fuels in heating and cooling by 2040 at the latest[28]. There is also an urgent need to boost the retrofitting rate and policymakers should focus on realizing the "renovation wave", proposed in the EU Green Deal.

3. Energy

Power generation is the largest GHG-emitting sector in Europe today. A complete decarbonisation of the electricity sector is needed in order to meet the EU's objective of becoming the first climate-neutral continent by 2050. **To reach European energy and climate targets, five to eight times the current market share of onshore wind and solar energy is needed until 2050.**

Beyond climate

Fixing the food-land link

Food and land use systems can help bring climate change under control, safeguard biological diversity, improve food security and create more inclusive rural economies. And they can do that while reaping a societal return that is more than 15 times the related investment cost (estimated at less than 0.5 percent of global GDP) and creating new business opportunities worth up to US$4.5 trillion a year by 2030[29].

Biodiversity repair

The EU's Biodiversity Strategy[30] tackles the key drivers of biodiversity loss, such as unsustainable use of land and sea, overexploitation of natural resources, pollution, and invasive alien species. It aims to build our societies' resilience to future threats such as climate change impacts, forest fires, food insecurity or disease outbreaks, including by protecting wildlife and fighting illegal wildlife trade. The strategy brings forward concrete steps to put Europe's biodiversity on a path to recovery by 2030, including transforming at least 30% of Europe's lands and seas into effectively managed protected areas and bringing back at least 10% of agricultural area under high-diversity landscape features.

Circular economy

Our current economic model is primarily linear and bears significant costs. For example, 95% of plastic packaging value – or US$80-120 billion annually – is lost after first use. A circular plastics system could create more jobs, reduce environmental impacts and unlock an estimated US$700 billion in economic opportunities. Improving circularity of plastic use would dramatically reduce reliance on fossil fuels – an important medium-term action for reducing exposure to foreign fossil fuel suppliers[31].

[28] European Commission (December 2021) Proposal to boost renovation and decarbonisation of buildings
[29] The Food and Land Use Coalition (September 2019) Ten Critical Transitions to Transform Food and Land Use
[30] European Commission Biodiversity Strategy for 2030
[31] SYSTEMIQ (2022). ReShaping Plastics: Pathways to a Circular, Climate Neutral Plastics System in Europe

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3 / Transformation from a micro perspective

European listed companies may struggle in the new normal

In this section we analyse a representative sample of European listed companies versus their global peers with a view to assessing if European listed companies are fit for the transformational challenges that the continent faces.

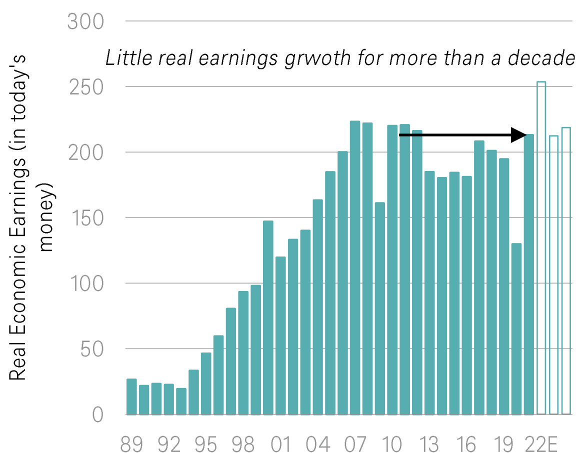
We conclude that European companies are yet to recognise the structural challenges which lie ahead.

This has important implications for investors who are looking at European equities as a long-term alternative to fixed income, or as a proxy for long-term exposure to real growth. However, they may be disappointed.

A health check of European corporate equities

A more detailed analysis of the state of the European corporate sector shows how, when adjusted for inflation, real earnings (pre-financing costs) have been flat since 2007 for the non-financial part of the market, Figure 4.

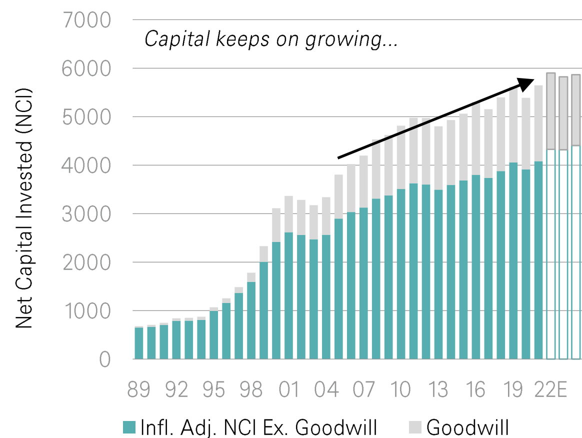
Figure 4: EU (non-financial) – Real Earnings (EUR bn)



Source: DWS CROCI. Data as of November 01, 2022, includes CROCI's coverage universe within European Union (ex UK)

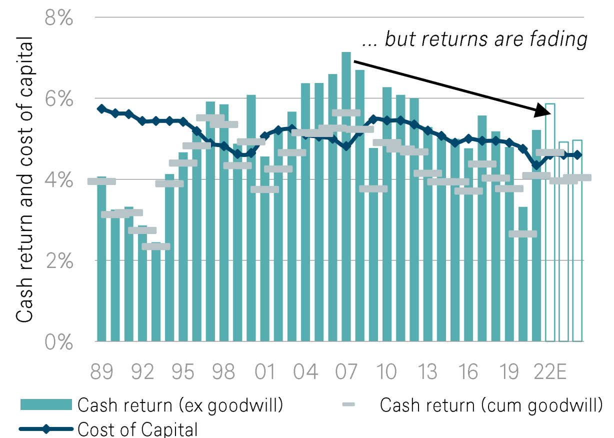
Earnings are a function of capital employed (CE) and cash returns ((ROCE*CE = Operating Earnings), and looking at the drivers of operating earnings (Figure 5 and 6), we note that **capital has steadily increased, but cash returns are fading.**

Figure 5: EU – Net Capital Invested* (EUR bn)



Source: DWS CROCI. Data as of November 01, 2022, includes CROCI's coverage universe within European Union (ex UK). * Displayed in today's money

Figure 6: EU – Cash return against long-term cost of capital



Source: DWS CROCI. Data as of November 01, 2022, includes CROCI's coverage universe within European Union (ex UK)

This is not a healthy picture for businesses, especially compared to the U.S. market, where we see much higher cash returns, growing capital and higher earnings.

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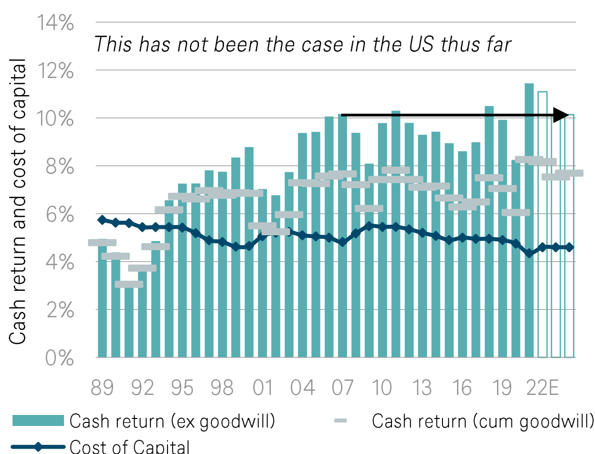
While there are certainly oligopolistic considerations that may justify the high level of cash returns for the U.S. market, we note that:

- estimates of cash return are a measure of regional competitive advantage
- fading cash returns and increasing capital are an early sign of capital mis-allocation and that fading cash returns will eventually hamper the ability of companies to create a return for its debt and equity holders as all cash is then used to maintain capital.

This is not a great starting point on the onset of a major geopolitical change.

Figure 7: US – Cash return against long-term cost of capital



Source: DWS CROCI. Data as of November 01, 2022, includes CROCI's coverage universe within US

Capital productivity is fading for European stocks

A further analysis of why cash returns are under pressure comes from depressed operating returns as a result of a falling productivity of fixed capital. The two simple drivers of operating returns are revenue margins and revenues over capital, the former is increasing but the latter has been steadily declining since 2006.

Valuation is not reflecting the challenge

One would expect that the headline valuation of European non-financial companies does reflect the regional challenges and be at significant discount to global peers. However, our research suggests that the value call for Europe does not have a sound foundation. Figure 8 shows the aggregated valuation for some of the main regions. Significant differences exist when using headline or Accounting Price to Earnings ratios, but disappear when using Economic PE (which accounts for cash return) or FCF Yield, suggesting that investors are looking at cash, and rightly so.

Figure 8: Valuation comparison across regions

Region	Accounting PE	Economic PE	FCF yield
US	19.2x	29.9x	4.1%
EU	12.7x	26.9x	4.6%
Germany	10.8x	33.5x	3.6%
UK	10.4x	20.0x	6.3%
Japan	12.8x	30.5x	2.6%
EM	10.9x	20.3x	5.8%

Source: DWS CROCI data for 2022. Data as of November 01, 2022

The troubles for European listed firms run deep

It is possible that an aggregated returns picture may be misleading and hence Figure 9 looks at ratios that aim to highlight how deep the problem of low profitability amongst European companies is. We note that 39% of the sampled European companies have cash returns below the cost of capital, compared to 18% for the U.S.. We also note how European companies have a higher level of financial leverage to their U.S. peers, 30% vs 23%. The fact that European companies have a lower profitability and higher financial leverage is a cause of concern. As a starting point, they will struggle in the current stagflationary environment with rising interest rates to make the necessary investments to transition to the new low-carbon economy.

Figure 9: Cash return & financial leverage

Region	Ratio of companies with cash returns below cost of capital	Financial Leverage
US	17.8%	22.6%
EU	38.6%	29.8%

Source: DWS CROCI data for 2022. The sample companies represent CROCI's coverage in the U.S. and European Union. Financial Leverage is calculated as Financial Liabilities divided by Market Capitalisation using CROCI database. Data as of November 01, 2022.

Operational dynamics are of concern specifically for the European auto sector

The operational challenges become acute when looking at the European auto sector, which is capital intensive and where the proprietary leasing business has been a primary beneficiary of the low interest rates environment of the past decade, but where cash returns on the combined industrial and finance operations are very low.

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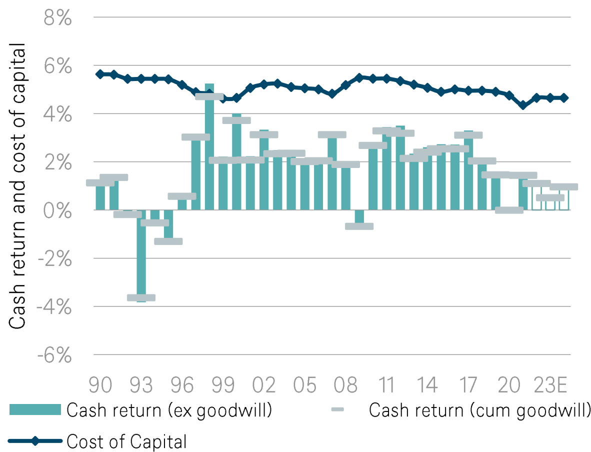
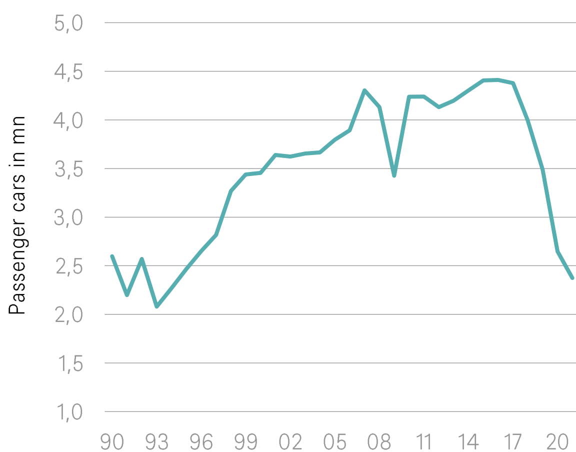
Figure 10: EU Automobiles – Cash return against long-term cost of capital



Source: DWS CROCI. Data as of November 01, 2022, includes CROCI's coverage universe within European Union, Automobiles sector

The auto sector has been one of the primary beneficiaries of globalisation and the strength of the German manufacturing engineering. However, the outsourcing of the OEMs to Asia and the rise in EV now presents structural challenges for the sector.

Figure 11: Exports of passenger cars from Germany (mn)



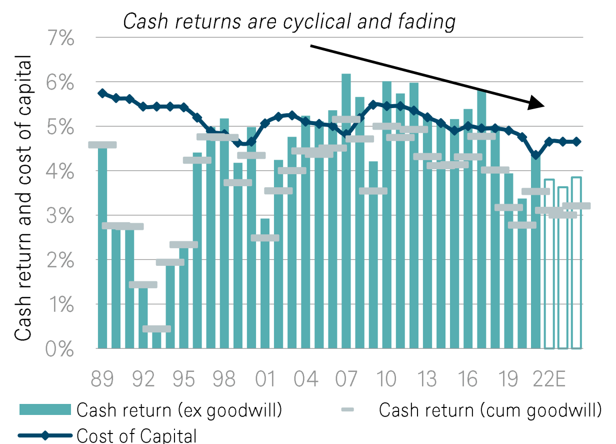
Source: DWS CROCI. Data as of 2021

The challenges are highlighted in a more recent McKinsey report[32], that looks at the auto sector supply chain. "Not many automotive-supply executives would dispute that these questions are important. But executives' full agendas mean they are generally not in a position to step back and take a strategic long-term view. Much of the decision making in automotive manufacturing is, indeed, incremental – focused on something happening a year from now (such as where to put in an efficiency program) or two years from now (such as which plant to use for a new product). This incrementalism could leave suppliers in the wrong place, from a physical-footprint perspective, as the industry reinvents itself over the next decade." This is precisely the transformation risk we highlight at the beginning. Not recognising the structural challenges we face, focusing on the short term and not on the long term, will have a negative long term impact on society.

Path to net zero creates major challenges for the German industrial sector

Some of the challenges exposed in this section are particularly relevant for German non-financial listed equities, where we have (i) cash returns below the cost of capital, (ii) growing capital and (iii) fading returns.

Figure 12: Germany – Cash return against long-term cost of capital



Source: DWS CROCI. Data as of November 01, 2022, includes CROCI's coverage universe within Germany

A further in-depth analysis of large-cap German equities indicate that they have a much higher level of Scope 1, 2 and 3 emissions compared to other global large-cap investment benchmarks, with the auto sector contributing 61% of total Scope 3 emissions by German companies. We deem scope 3 emissions a better indicator of the challenges large German manufacturing sector face in the global arena[33].

[32] McKinsey (April 2022) automotive suppliers must reimagine their footprints
[33] The inclusion of Scope 3 emissions is controversial, as it implies double counting emissions of Energy and Utilities with those Scope 2 emissions of their 'final clients' (industrials/consumers). But since our German coverage has no Energy company, and given that the bulk of emissions are Scope 3 from the Auto sector (which fuel suppliers' emissions are not in Germany), it is more reflective of the reality in

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Our estimates indicate that in a world where German companies were to bear the full carbon emission costs of USD 75/ton, cash returns would be negative, i.e. the non-financial sector would structurally be loss making.

This assumes companies are not able to pass on higher carbon costs into product prices. Higher product prices could in turn lead to higher inflation.

the case of Listed Germany to integrate the carbon price/cost based on all Scope 1+2+3 emissions

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4 / Why Europe is struggling to finance transformative projects

The investment gap

Research from the World Economic Forum[34] is a useful starting point in defining the investment gap and helping investors understand both the challenges and opportunities that lie ahead.

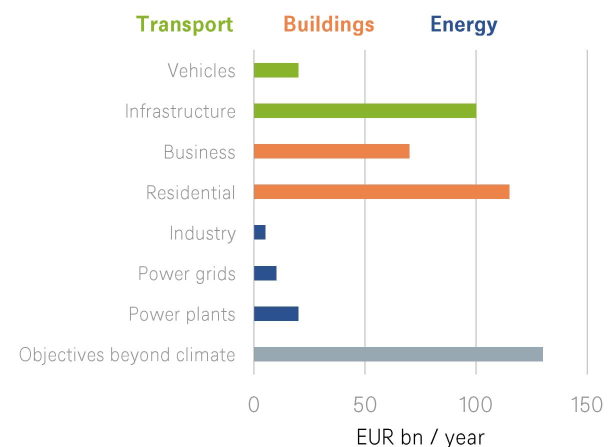
Figure 13: Global systemic risks for asset owners

Global systemic risk	Global Investment gap (per year)	Transformation investment examples
Climate change	$ 2.4 trillion	Cleantech infrastructure, renewable energy, sustainable natural resources
Geopolitical stability	Cross-trend opportunities	Infrastructure, renewable energy, climate-resilient infrastructure, automated manufacturing
Technological evolution	$ 1.7 trillion	Tech related VC, electric vehicles, renewable energy, global connectivity, battery storage, mobile networks, fintech
Demographic shifts	$ 1.5 trillion	Education, healthcare, infrastructure, care of ageing population
Water security	$ 0.67 trillion	Food and energy production, water quality infrastructure
Total	$6.27 trillion	

Source: World Economic Forum (May 2020), Transformational Investment: Converting Global Systemic Risks into Sustainable Returns.

Adapting the analysis for Europe shows that the EU green transition will require EUR 470bn of investment per annum in the transport, buildings, power, and industrial sectors until 2027[35]. Part of this will be EU financed, but there will still be an estimated annual funding shortfall of EUR 250bn to meet these targets. This will be difficult to finance, and will likely fall heavily on the shoulders of the private sector[36].

Figure 14: Breakdown of Europe's green transition investment gap[37]



Source: European Commission (2020)

Public equities are not financing transformative projects in Europe

Public equities ought to be a risky asset, providing capital at risk for long-term projects. The simple reality is that European listed equities in the current format is not the most appropriate mechanism to finance long-term projects.

Equities are thought of as a perpetuity, however it is best to say that equity benchmarks are a perpetuity, but their components are not. If one were to look at the DJIA components over the past 100 years, one would, for example, note how few companies are still there. Figure 15 shows the top 10 companies by market cap in the U.S. and in the EU. It is evident that on average the U.S. components are younger entities than their EU counterparts.

[34] WEF (May 2020) Converting systemic risks into sustainable returns
[35] Climate & Company study for Agora Energiewende "Critical review of the potential contribution of the European Commission proposal for an EU Recovery and Resilience Programme and a new Multiannual Financial Framework to achieving the objectives of the Green Deal and the 2030 and 2050 climate targets"
[36] IEA (2022) World Energy Outlook
[37] Until 2030. As communicated by the European Commission (2020). Data source: Commission Staff Working Document, 2020. Estimates do not represent the raised ambition of GHG emission reductions of 50-55%

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Figure 15: Top 10 companies by market cap in both the regions

USA	EU
Apple (IT)	LVMH (CD)
Microsoft (IT)	Novo-Nordisk (HC)
Alphabet (CSvc)	ASML (IT)
Amazon.com (CD)	L'Oreal (CS)
Tesla Motors (CD)	TotalEnergies (EN)
Exxon Mobil (EN)	Hermes (CD)
J&J (HC)	Unilever (CS)
Visa Inc (IT)	SAP (IT)
Wal-Mart (CS)	Sanofi (HC)
Chevron (EN)	AB InBev (CS)

Source: DWS CROCI. Based on the CROCI coverage in both US and EU (ex-Financials), data as of November 01, 2022

The dynamism in U.S. equity benchmarks has provided long-term investors access to the growth in the U.S. economy. The U.S. also has a functioning framework for sourcing capital for risk taking, compared to the EU where it is still nascent.

Figure 16, for example, shows how European investors have already missed the boat when it comes to the IT-led transformation of the world economy.

IT has more than three times the weight in the U.S than in Europe, which explains 60% of the outperformance of U.S. vs. Europe. If we consider that Amazon and Tesla are in the consumer discretionary and new economy stocks, the ratio would be even higher.

An ex-post 200% differential in performance between Europe and the U.S. is a gap big enough to highlight the risks of not embarking in transformative projects, especially given the poor micro dynamics highlighted in section 3.

Financing private ventures to scale-up before bringing them to the market has been decisive in the U.S.. Venture capital has been growing slowly in Europe and is currently estimated to be just 0.1% of EU GDP[38] . This needs to be addressed.

While Europe may have had the innovation edge, it has failed to capitalise on it. Take the example of the world wide web. It was developed by a British scientist while working at CERN[39], but US-based businesses were able to make the most out of it. Another example is the mp3-audio format, developed by Germany's Frauenhofer institute.

Figure 16: 10-years total return breakdown by sector

	MSCI USA		MSCI Europe	
Sectors	**Weights**	**Total return contribution**	**Weights**	**Total return contribution**
Communication services	10.1%	7.5%	3.5%	2.9%
Consumer discretionary	12.6%	63.2%	11.5%	20.8%
Consumer staples	5.7%	24.4%	12.8%	23.6%
Energy	2.5%	1.1%	4.6%	3.9%
Financials	10.5%	45.6%	15.7%	23.9%
Healthcare	13.1%	47.3%	14.6%	27.6%
Industrials	7.8%	29.0%	15.4%	26.6%
IT	29.9%	141.6%	8.6%	12.1%
Materials	2.5%	8.4%	8.0%	14.8%
Real estate	2.9%	2.7%	1.2%	0.1%
Utilities	2.4%	6.7%	4.2%	7.5%
Total	100.0%	377.5%	100.0%	163.9%

Source: DWS, Bloomberg, MSCI, Weights as of December 31, 2021, Total Returns contribution based on DWS calculation.

Banking sector still living in the shadow of the Euro crisis

The issue is that more than twenty years after the launch of the euro, much of the expectations about how this would herald a transformation of the European financial system are still to be fulfilled.

As pointed out by a S&P study conducted by Broer & Doyle (2020)[40], "the fragmentation of European financial markets has increased since the financial crisis on the back of higher risk aversion, tighter banking regulation, and the need to wind down nonperforming loans. The result has been less capital mobility within the eurozone, especially less capital flowing from core countries to

[38] European Commission (July 2022) CMU Progress
[39] Cern (1989) The birth of the Web
[40] S&P Global (June 2020) The EU Capital Markets Union: Turning the Tide

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noncore countries, which prevents the European economic and monetary union from reaping all of the benefits of the single currency."

At an operational level, the European financial integration has yet to recover to its pre-crisis level. Furthermore, since 2009, Europeans have been less inclined to pool their resources to lend to each other. The result is that the vast amount of savings does not find a way into productive activities and is thus getting below-inflation returns.

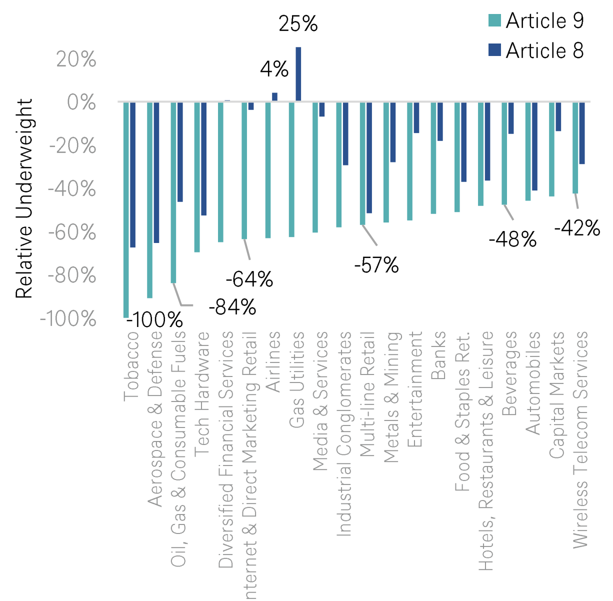
The challenge was best exposed in a 2021 paper by the World Economic Forum[41], highlighting how Europe will undergo a major transformation and banks can either "join with policymakers and businesses in setting the agenda to solve the biggest issues facing Europe's economy, (which will enable them) to renew their sense of purpose, ensure their ongoing relevance, grow the bottom line, and reap reputational benefits from their newfound vim and vigour, or let others lead. Gradually, they are pushed into a diminished role by a combination of public policy measures and new competition that results in decreasing relevance, shrinking market share and a backlash from stakeholders."

The Capital Market Union is an excellent starting point to enable banks to find a new role in the upcoming transformation of Europe, but it is essential that the economic slowdown and other macro dynamics do not work as a distraction on the urgency of the matter.

Sustainable finance regulations encourages divestment rather than transformation or transition

One of the main regulations that has been implemented in the EU over the past few years is the Sustainable Finance Disclosure Regulation. Its aim is to create a framework for better disclosure of sustainability risks and encourage a shift in capital towards sustainable activities. The aim is certainly noble, however Figure 17 shows that a large part of Article 8 and 9 funds are significantly underweight some of the fundamental economic activities of our economy. **The concern is that regulation is not helping to transition the European economy into a sustainable future.** What is likely to happen is that activities which remain legal, such as the burning of fossil fuels, simply end up in private hands where there is lower level of scrutiny.

Figure 17: Carbon intensive sectors being underweighted by Article 8 and 9 disclosing funds



Source: Goldman Sachs Equity Research (October 2022) SFDR Updates

[41] World Economic Forum (August 2021) Why banks need to be in 'the room where it happens'

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5 / Transformative policymaking

"Geopolitics now weighs more heavily on us than at any time since the end of the Cold War", (the Blavatnik School of Government on the World Economic Forum website).

Within this context, Europe is an ageing continent with high levels of debt. Its competitive advantage in manufacturing and consumer is being challenged and the era of cheap oil and gas is over.
Most of its investments are focused on replacing current capex on the assumption that all is well in the world. Still, fresh capital is required to finance new emerging technologies and to transition real estate, infrastructure, transport, utilities and corporate assets to a new and better sustainable future.

Capital markets have not evolved much in the past decades, mainly relying on traditional methods. The Capital Market Union is addressing some of the problems that led successful companies to be starved of capital post the Euro crisis but the evolution is not fast enough.

This is the challenge that medium- to long-term investors face entering 2023.

Within this section we examine practical steps that are needed to enable a proper transformation of Europe at a policymaking level.

Transformative policymaking

Significant progress has been achieved through the implementation of the European Sustainable Finance Disclosure Regulation (SFDR); however the policy needs to be better enabled as:

- the sustainable investor is structurally at a disadvantage versus the financial investor
- the framework is resulting in a remarkable difference between what is legally possible and what is investable in certain funds, which will create problems over the long-term.

We propose to simplify policies in order to expedite action and differentiate between the *financial investor* and the *sustainable investor*, also known as single materiality vs. double materiality.

The focus of the financial investor is on the maximisation of financial risk adjusted returns. The focus of the sustainable investor is not just the maximisation of financial risk adjusted returns, but also using capital and influence to accelerate the transformation to a more resilient, sustainable and equitable society.

Figure 18: A sustainable investor is structurally disadvantaged

	Financial investor	Sustainable investor
Has access to free information that helps capital allocation	Yes	Limited
Information is audited by third parties	Yes	No
Availability of International Accounting Standard	Yes	No
Capital allocation is resulting in costs that are externalised to third parties	Yes	Maybe (though not audited)
Level of fees for financial products	Lower	Higher[42]
Additional costs for evaluating suitable investment products and securities	No	Yes – additional search costs
Additional costs for evaluating outcomes	No	Yes -but no clear guidance for engagement outcome assessment

Source: DWS Research Institute 2022

Today sustainable investors are discriminated against by regulation, resulting in additional costs, leading to capital mis-allocation. This ought to be a primary source of concern for regulators and policymakers, as illustrated in Figure 18. In effect, sustainable investors are today in the same situation as non-smokers were in the 1970s. During that time non-smokers were exposed to all the toxicity of allowing tobacco smoking in public places, while contributing to the additional tax costs associated with the health damage relating to tobacco.

[42] For instance, the European Securities and Markets (ESMA 2022) found that ESG passive funds have higher fees than traditional funds, reflecting data costs but not more stewardship activity

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Just consider that today average consumer fees for **pure 'financial products' are the lowest in the market while sustainable products are more expensive.** However, both have similar expected returns (by design as index providers wish to ensure they track each other) meaning that *sustainable investors* are at a disadvantage to *financial investors*. At the same time, having access to the cheapest products in the market means that companies management's primary objective remains the maximisation of financial returns, as higher level of profits will ensure large presence into investable benchmarks. In a nutshell, there are no economic incentive to take into consideration for companies to become more environmentally sustainable.

Policymaking ought to address the following issues with Europe's sustainable finance policies:

1. **There is still much confusion about the difference between ESG and Sustainability**[43]. We suggest a simplification of ESG. ESG is primarily a risk management framework to financial return. But burdens exist since ESG has grown to 10 million plus data points covering 35,000 issuers that highlight operational risk, but, are backward looking. Investors then need to spend a significant amount of time making sense of these datasets. Such an exercise ought to be simplified, integrated into financial reporting, based on materiality so enabling investors to focus on the more important matter of sustainability, or double materiality.
2. **Ensuring that investors in public markets are not at a structural disadvantage to either private investors or financial investors.** Public markets can play an important role in ensuring that 'troubled' economic activities have proper governance and are operating in line with the evolving requirement of sustainable investors. Not being invested is certainly an option, but Europe is an old economy (both in terms of age as well as infrastructure), and public markets can play an essential role in transitioning capital to a more sustainable future. This has recently been recognised by the FCA in the UK, but it is not a core part of SFDR. Today most of Article 8 and 9 disclosing funds are structurally underweight certain carbon intensive sectors. Investors may also be encouraging companies to sell troubled activities and possibly move them into private hands.
3. **Development of a 'double materiality' sustainable set of accounts managed by an independent body.** After the 1920s financial crash and Great Depression, requirements for independent accounting arose. In 1932, the New York stock exchange began requiring companies to have independent audited accounts. However, as of today investors are not able to assess the financial implications of companies' existing sustainability goals, let alone the implications of governments. There were hopes that the International Sustainability Standards Board (ISSB) would focus on sustainability issues, but their focus on climate and single materiality has been disappointing. We believe that sustainability requires sustainability standards that integrate science into finance, rather than the finance view of what sustainability means.
4. **Levelling up fees at consumer level for products that are only focused on financial return and products that are sustainable in nature, to ensure that sustainability is not at disadvantage in capital allocation decisions**[44]. Just as for tobacco, the additional fee would go to set-up a trusted framework to enable the transition into a sustainable future. Europe is in dire need of a European Center for Climate Change. The setting up of the European Organization for Nuclear Research or CERN in the 1950s provides a template in this regard.
5. **Development of a label and a framework for transitioning issuers whose economic activities are recognised as posing systemic risks to the environment.** In the aftermath of the Great Financial Crisis, certain banks that had the potential to destabilize an economy if it were to fail, were classified as 'systemic banks' and subject to special regulation. The same ought to be the case for companies whose economic activities are potentially at risk for destabilising earth systems since environmental risks are also recognised as systemic risks.
6. **Development of an investment framework for the sourcing of the resources that are of fundamental importance to climate transition.** The idea that we can transition to net zero with no investment in mines, steel, cement or gas is fundamentally flawed, but as we have highlighted most Article 8 and 9 disclosing funds ignore this fact. The net result is that Europe is creating global dependencies at the same time as other countries are developing strategic resources. That Canada has recently asked three Chinese

[43] This was highlighted by the FCA (Oct 2022) Consultation Paper - Sustainability Disclosure Requirements and investment labels. ESG is interpreted by the investment industry primary as a risk management framework (single materiality), but being interpreted by users in a different manner (double materiality)

44 DWS Research Institute (Nov 2020) Transformational framework for Water Risk

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companies to divest from lithium companies[45] within 90 days, shows how urgent it is for the EU to develop a net-zero sourcing strategy as a matter of urgency.

Transformative partnerships between industrial companies and asset managers

In the past few months, we have seen news of a large U.S. semiconductor company reaching consensus with a North American asset manager on the financing of a semiconductor plant in North America[46]. This was possible because of tax efficient financing structures, which are only available in the U.S., where government subsidies are generally frowned upon.

Given the significant levels of European debt, it would be good to see such mechanisms also introduced in Europe. This would be in line with the spirit of the CMU, especially for some of the major infrastructure projects whose financing will need to be led by publicly listed companies and where the further issuance of debt is not desirable.

Innovative finance can also include tax increment financing for urban regeneration, blended finance funds and new ways to finance green home renovation through property linked financing[47] as well as helping scale up nature restoration and carbon sequestration.

Transition in listed markets as a key to transformation

Transition is a better path than divestment. However, divestment is winning due to regulations. The implementation of the EU Sustainable Finance Disclosure Regulation (SFDR) is resulting in financial products which are biased against equity (and debt) investment into legally operating but carbon intensive economic activities that need to transform. Aligning what is legal with what is investable and pushing towards transition is necessary in order to ensure that capital markets work effectively. The risk of an asynchronous approach is that some troubled economic activities become owned by public market investors who do not care about sustainability and/or land into private markets with lower level of scrutiny.

Responsible and sustainable investing in Europe is currently becoming polarised: 'sustainable' products that only divest from controversial or difficult sectors versus 'traditional' investment products with no middle ground focused on ramping up investee engagement and policy advocacy.

The implementation of transformational investments must come from recognising that Europe is an old economy not just in terms of its population but also its stock of physical capital. This means some of these transformational investments are 'transitional' in nature, that is investments that support current capital to be fit for the future. **Within public equities there is a clear scope for a fund that is invested into 'dirty' unsustainable activities which are essential to the European economy but managed with a view to engaging for change.**

[45] Benchmark Mineral Intelligence (November 2022) Canada puts branks on China's $4 billion Lithium acquisition spree

[46] Invel, Brookfield to invest up to $30bn in Arizona chip factories (August 2022)

[47] Climate Strategy (Oct 2022) European Renovation Loan

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6 / Transformative investments

Regulation must be an enabler to transformation, but, capital can already play an important role in the transformation of Europe. Consequently, the investment industry should not hide behind regulation as an excuse for inaction.

The long term nature of transformative investment means that some of the most appropriate opportunities are in private markets, where investors can take the long-term view. **This is the primary focus of this section, whose primary contributors are Simon Wallace (Head of Research for Real Estate) and Richard Marshall (Head of Research for Infrastructure).**

Transforming European commercial real estate

Around 35% of all European commercial property with a total value of EUR 2.7 trillion+ is held as an investment. This includes private real estate funds, real estate companies listed on stock exchanges and buildings directly owned by institutional investors. Touching almost all parts of the economy and society, real estate will play a pivotal role in the European transformation.

As already mentioned, **real estate is by far one of the largest emitters of carbon within the European economy.** Private equity real estate is however starting to change this by setting strict net-zero carbon goals, undertaking asset management initiatives, and participating in environmental accreditation schemes.

In addition to improving the day-to-day operations, **net-zero will require real estate to transform the overall quality of the building stock.** This will not be achieved through development alone. Indeed, with between one-third and a half of a building's lifetime carbon retained, value-add strategies focused on refurbishment will play a major role in the future of institutional real estate.

DWS has previously written about the policy and market reforms that could enable stronger building renovation efforts[48]. DWS is an advisor to the EU Commission through the Energy Efficiency Financial Institutions Group[49].
Looking beyond carbon, real estate impacts other environmental concerns. From air quality[50] to biodiversity, water stress to physical climate risk, real estate investment will be both subject to, and part of the solution to, these risks. Given an expectation of further urbanisation, and population growth across Europe's major cities, real estate will play a role in supporting resilient urban areas.

Real estate will also be an important part of economic growth and supply chain resilience. In addition to the economic and productivity benefits of modern offices, life science, data centre and high-tech workspace, investors in real estate could have the opportunity to support supply chain resilience with the delivery of modern logistics facilities, in emerging locations that are supportive of near-shoring trends.

Transforming European residential buildings and cities

There are 100 million residential buildings in Europe that in total are worth in excess of EUR 17 trillion. Renovating these buildings is the largest part of the EU green investment gap, and is vital for Europe's energy security as buildings use 40% of Europe's energy. Many European cities also face an acute shortage of good quality, affordable housing.

Around 70% of European's live in the home they own and residential mortgages are worth EUR 6-7 trillion. Around 8% of homes are publicly owned, while 15% of Europeans own a second home. Residential assets such as rented apartments are a small but fast-growing part of European investors' private real estate assets.

Investors have a role to play in helping accelerate residential building renovation through their role as shareholder and bondholder in banks and other mortgage lenders, covered bonds, mortgage backed securities, private loans to real estate developers and through influence with governments.

While 9% of buildings are renovated in some way each year, only 1% of renovations impact energy performance and 0.2% optimise for energy efficiency. Thus new financing approaches are needed. For instance, an EU-backed collateralised loan could be distributed (for a fee) by mortgage providers to provide homeowners fair and equal access to long-term financing for deep-home

[48] DWS (May 2020) Green, healthy buildings as economic stimulus
[49] www.eefig.eu
[50] DWS and Global Action Plan (GAP) 2022

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renovation. Funding could be provided on a zero-coupon basis with repayment of principal and accrued interest at EU-borrowing costs upon a home's sale or a 30 year maturity[51].

Also, statistical analysis by multiple banks found that energy efficiency reduced mortgage portfolio default risk. More efficient homes can also be 10% more valuable than the least efficient or non-rated properties[52]. These type of findings could contribute to changes in mortgage capital weights.

Working alongside partner organisations, real estate investment may also be part of the solution to current demographic challenges ranging from the provision of educational and student housing facilities to graduate and corporate housing, as well as senior housing facilities to meet the needs of an ageing demographic.

Transforming European infrastructure

The transformation of Europe cannot occur without the foundational infrastructure that the economy and wider society relies upon being at the heart of that change. Capital requirements span across energy, industry, mobility and social infrastructure where old assets need transitioning and new assets need building.

As the largest contributor to emissions in the region, there is a multi-billion euro opportunity in shifting the electricity generation profile of Europe from thermal sources and towards renewable energy. As the most developed region, globally, in terms of renewables penetration and market integration, Europe is a test-bed for how energy systems can roll out new fuels, new technologies and ultimately new business models within infrastructure.

In terms of capital deployment, at one end of the scale there are ever-larger greenfield generation projects such as floating offshore wind in the North Sea and Atlantic Ocean that need project finance. However, such projects are only impactful if they can be properly integrated into grids and the supply they create managed. Energy management and service platforms - the so-called smart grid - will also need capital to be brought to scale[53].

Finance is needed at both ends of the scale, otherwise the energy transition will falter to the detriment of European transformation.

Similar capital requirements exist across other sectors such as mobility. This means transformational, multi-billion euro intercity rail projects required to reduce personal vehicle usage, all the way down to electric micro-mobility solutions in the shared-economy to move around towns. For freight, the more attractive carbon profile of moving volumes via rail will see demand to increase capacity continue to grow, as will the need to electrify the last-mile delivery services that have made the growth of e-commerce possible. Ultimately, the European economic model is still largely based on the infrastructure of previous centuries – even digital infrastructure in many cases.

Such is the capital requirement for the transformation of European infrastructure that public, private and blended capital will need to be deployed and innovative platforms designed in order to deliver the required assets. Not all investment requirements are economically viable for the private sector to take on and thus the public sector should focus its resources here. At the same time, governments will need to create a conducive environment for the private sector, through de-risking and incentivisation policies for sectors where the private sector can do the financial lifting, as well as be ready to utilise innovative financing mechanisms. Given the impact of cities on the environment, the demand they create and their infrastructure requirements, **Tax Increment Financing[54] and Land Value Capture are options that should be at the disposal of European cities**.

Of course, private capital alone also has a crucial role to play, particularly at the smaller end of the transaction tickets given the huge number of innovative infrastructure technologies and companies that need capital to bring their solutions to market. Green hydrogen is one example of how with the right policy environment in place, the private sector can and will commit capital and provide the transformational infrastructure required to see Europe achieve its goals.

[51] Climate Strategy (October 2022) EU Renovation Loan
[52] Climate Strategy (Oct 2022) European Renovation Loan
[53] EU Commission (2022) Smart grids and meters
[54] https://casestudies.uli.org/tag/tax-increment-financing

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Transforming the approach to nature-based solutions and carbon sequestration

All climate scenarios include a strong role for restoring and protecting natural ecosystems including oceans to enhance their ability to store carbon emissions. Also, Carbon Capture and Sequestration (CCS) and atmospheric carbon removal may have a role to play. This could include private equity investors helping to evaluate and scale-up promising approaches to capture and permanently store carbon emissions from the atmosphere.

The Energy Transition Commission[55] envisages a feasible scenario of carbon removals of 3.5 Gt/year by 2030 through restoring and better managing ecosystems, biomass with CCS and engineered carbon removals. A feasible carbon removal scenario would require annual investment of US$130bn/year, along with supportive payments by governments, corporates and investors.

Transforming emerging markets

Many sustainability priorities with the highest investment requirements and opportunities are in emerging markets. The climate challenge cannot be addressed just by cutting emissions in Europe. Emerging markets may need up to US$1 trillion per annum to build a net zero economy.

The Net-Zero Asset Owner Alliance has called[56] for governments, development finance institutions and investors to make greater use of blended finance risk sharing solutions in order to scale up green investment. Blended finance can help de-risk investments through the provision of a first-loss tranche.

Blended finance is currently a US$170 billion part of the private investment impact market. This market has been growing by ~US$14-37 billion per annum in recent years[57]. The interest from asset owners, governments and development banks is significant but needs to be harnessed to scale up transformation.

DWS has a strong history of blended finance funds to address food security in partnership[58] with the German government and KfW, to help Europe's public sector transition in partnership[59] with the European Commission and European Investment Bank and more recently to facilitate off-grid renewable energy in Africa in partnership with the UN Green Climate Fund.

[55] ETC (March 2022)
[56] UNEPFI (Nov 2021)
[57] Convergence 2022
[58] www.aatif.lu
[59] www.eeef.eu

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Appendix – Global State of Climate Action

Change in pace necessary	Indicator	
Off-track: change is heading in the right direction at a promising, but insufficient pace		
10x	Share of battery electric vehicles / fuel cells in new bus sales	
6x	Share of zero carbon sources in power generation	
5x	Share of electric vehicles in new light duty vehicle sales	
1.7x	Share of electricity in industry's final energy demand	
1.5x	Reforestation	
1.3x	Meat productivity/hectare	
Well off track: change is heading in the right direction, but well below the required pace		
>10x	Reduction in carbon intensity of cement production	
>10x	Green hydrogen production	
>10x	Share of electric vehicles in light duty vehicle fleet	
>10x	Kilometers of high quality bike lanes in largest 50 emitting cities per 1,000 inhabitants	
7x	Reduction of residential buildings energy intensity	
6x	Kilometers of rapid transit in largest 50 emitting cities per 1,000 inhabitants	
6x	Reduction in share of unabated coal in power generation	
6x	Improvement in crop yields	
5x	Reduction in carbon intensity of power generation	
5x	Reduction in meat consumption	
Insufficient data	Share of battery electric vehicles and fuel cell electric vehicles in medium- and heavy-duty vehicle sales	
Insufficient data	Share of sustainable aviation fuels in global aviation fuel supply	
Insufficient data	Share of zero-emission fuel in maritime shipping fuel supply	
Wrong direction: change is heading in the wrong direction and a U-turn is needed		
Share of unabated fossil gas in electricity generation	Carbon intensity of global steel production	
Share of kilometers traveled by passenger cars	Mangrove loss	Agricultural production greenhouse gas emissions
Insufficient data to assess the gap in action required for 2030		
Carbon intensity of building operations	Retrofitting rate of buildings	
Peatland degradation	Peatland restoration	Mangrove restoration
Share of food production lost	Food waste	Carbon intensity of land-based passenger transport

Source: WRI 2022 https://www.wri.org/research/state-climate-action-2022

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