

# The Loss of Truss in the UK

Featuring:

Dimitris Melas, Executive Director, MSCI Research

Thomas Verbraken, Managing Director, MSCI Research

Adam Bass, Host

# Adam Bass (00:03):

This is MSCI Perspectives, your source for insights for global investors and access to research and expertise from across the investment industry. I'm your host, Adam Bass, and today is October 27th, 2022. In case, you haven't heard, there's a new prime minister in the UK. Rishi Sunak has the distinction not only of being Britain's first prime minister of color, but also of following the prime minister with the shortest tenure. Liz Truss, you could say was pushed out in large part by the bond and currency markets.

# (<u>00:40</u>):

So what exactly happened and more importantly, what happens now? We sat with MSCI researchers Dimitris Melas, and Thomas Verbraken to find out. Okay, so Dimitris and Thomas, thank you for, for joining us, Thomas, uh, you've been a pretty regular guest all year, uh, we always love having you on. And Dimitris it's, it's been a while so welcome back.

# Dimitris Melas (01:04):

It's great to be back.

# Thomas Verbraken (01:07):

Likewise, I like being here.

Adam Bass (01:09):





For purposes of our listeners, I'd like to start off by just asking each of you to introduce yourself very briefly. Remind the folks at home who you are. Dimitris, why don't we start with you?

#### Dimitris Melas (01:23):

Certainly, I'm Dimitris Melas, based in, uh, London in the UK, and I ran index research and product development at MSCI. I have been with MSCI for the last 16 years. And it's been, uh, an incredible period in, in markets, but also for, uh, the products and services we provide to investors.

#### Thomas Verbraken (01:41):

And I'm Thomas Verbraken. I'm nine years with, uh, with MSCI now, and I work in the risk management solutions research team. I'm focusing also a lot on what's happening in markets and how we can help investors managing and navigating all the uncertainty that's going on now.

#### Adam Bass (01:56):

Uncertainty is definitely the topic we're here to talk about today. But one thing we do know for sure, we should say we're recording this on Monday, October 24th, the day that we learned that we would have yet another new prime minister i- in the UK, Rishi Sunak was named, and certainly historic appointment on, on many levels. But politics aside, let's jump into how the markets are interpreting this. I know, sterling was up, the gilt yields were down. But is this just a sigh of relief or is there something else going on?

#### Dimitris Melas (02:37):

I think it's certainly a sigh of relief. And in fact, the markets reacted positively when, uh, Boris Johnson, uh, one of our past Prime Ministers withdrew his, um, uh, candidacy to become yet again the prime minister. So once that announcement went out, I think markets assumed that, uh, we would have hopefully a period of stability and, uh, reacted positive.

#### Thomas Verbraken (03:03):

I think, in, in Europe more generally, um, we should be prepared for, for similar episodes. So what happened in the UK was, uh, basically the, the mini budget announced which, you know, made markets move. And then we had that sell off in, in gilts, which then at the pension funds, which were having some leverage. It triggered some, some margin calls, collateral calls, and then, uh, they had to sell more. So hit that feedback loop. And I think, um, that's something that's, you know, investors worldwide are keeping an eye on because, you know, in, in these uncertain times, when there's leverage, when there are liquidity constraints, potentially, and when there's crowding, that could lead to very volatile markets, and it's definitely something in- investors should keep an eye on.





#### Adam Bass (03:45):

Let's, let's back up a little bit to, to the story, Liz Truss comes in, after Boris Johnson resigns early September, Dimitris, can you, can you walk us through a little bit high level, what- what's happened in the six, seven weeks since then?

#### Dimitris Melas (04:01):

It might be worth reminding ourselves and our listeners, uh, of the global context. You know, going back, uh, 40 years, we had the period of, uh, what has come to be known as the Great Moderation between 1980 and 2020, low inflation, low interest rates, growing economies and pretty good performance across, uh, most, uh, asset classes and markets. Of course, we had cyclical peaks and troughs, we had recessions in the early '90s, early 2000s, more recently, the global financial crisis. But overall, you know, we enjoyed a very long period of low inflation, low interest rates, good economic growth, and pretty good market performance.

# (<u>04:38</u>):

Now, all of that, of course, changed in the last two or three years. We suffered globally, uh, some pretty severe supply shocks, as economists call them, the rest of us call them shocks. So we had, of course, the pandemic, the invasion of Ukraine, China that had been the, uh, the engine of, uh, global economic growth for, you know, the last, uh, 15, 20 years, at least, is experiencing a pretty severe slowdown. And then also we've had the last few years the trade war between, the tension between US China, uh, in terms of, uh, trade and putting up barriers.

#### (<u>05:12</u>):

In the UK, in addition to these global supply shocks, of course, we can add another self-inflicted, inflicted supply shock, which was, uh, Brexit. And then, given that backdrop, we have a new prime minister coming to power in the UK in early September, as you said, Adam, and swiftly announcing some pretty big unfunded tax cuts and, uh, increases in government spending. Now, you know, if you don't need a PhD in economics, if you cut government revenue from taxes, and at the same time, you increase government spending, well, the only way to pay for these expenditures is through higher borrowing.

# (<u>05:46</u>):

So markets immediately reacted, you know, uh, uh, a- and we have this sharp decline in, uh, in UK government bonds called gilts and also a decline in, in sterling. And that was literally the day the mini budget was announced on September 23rd, the markets reacted. Then during the, the weekend, after the September 23rd,



actually, the, uh, the finance minister went to the media, and in fact, rather than trying to calm the markets down, he sort of double down on his policies, he said that, "Actually, there's more tax cuts to come, and this is the only way to promote growth." A- and then, of course, the following week, we had even more, you know, swift and severe, uh, market, uh, declines. A- and this led, uh, to a, a liquidity crisis for these LDI strategies that some, uh, defined benefit pension funds in the UK used to match assets with liabilities. And that's pretty much where we, we are at the moment or where we were until a few days ago.

#### Adam Bass (<u>06:45</u>):

Now, as you mentioned, the UK, the world was not in great shape, economically, even before all of this with, with the back and forth at, uh, 10 Downing Street. So I guess the question is, what if anything can Sunak do?

#### Dimitris Melas (07:04):

If we take a step back, of course, we have the government sector and the private sector. In the private sector, we have three main actors, we have consumers, we have companies, and we have investors, right? The private sector, they just need one thing from, from, uh, this new administration, in fact, from any government administration, and that one thing is stability, certainty, right? So I think that's really what... the greatest thing that, you know, Sunak and, and the new administration can bring, some stability, some certainty, even some, uh, Downer, right? We've, we've had, I think, more than enough excitement in British politics. So let's hope that we will now go into a period of stability and even Downer.

#### Adam Bass (07:44):

Downers. Yeah, I think the was at the FT they talked about the Downers dividend, is that right?

#### Dimitris Melas (07:49):

E- exactly. Yes, uh, we had the, obviously the, you know, uh, journalists and, and market participants, uh, are quite, uh, inventive in terms of new terms. Uh, we had the, the so-called Moron Premium, when, uh, you know, the sterling fell, (laughs) and then government bonds declined. Now that apparently is being replaced by a Downers dividend. So, so that sounds like the, you know, early reaction, at least from, from markets is, is positive on the change in, uh, in administration.

#### Adam Bass (08:21):

Thomas, I'm curious from, from your end, and the research that you've done on... in terms of past crises, how does, how does what's going on now compare to say, the global financial crisis or, or even the pandemic?





But I think like, like Dimitris said, that, that currently we're dealing with supply shocks, right. And, and, um, the global financial crisis was more of a demand, uh, shock. So we had the real estate bubble in the, in the US. And once house prices started to go down, mortgages started to default. And because of the high leverage in the financial system, this caused enormous, enormous stresses, now, then central banks stepped in they lowered interest rates, and, you know, they had the quantitative easing programs, and also government stepped in stimulus, um, and they both stakes in financial firms to, to save them.

# (<u>09:10</u>):

So the nature of this crisis was, was very different, although some would say that the policy responses, you know, at that time, and, you know, maybe how long, um, they were maintained, maintained, might have led to some of the current vulnerabilities. But if we go back further in the past, and people also sometimes compare, um, to the '70s with, you know, surging oil prices as well, um, which is sort of a parallel. Um, but some say we might even go back to the '40s, 'cause at that time, we, we also had debt levels, um, and I'm talking here about private plus, um, government debt, which were, which were really high. Interest rates were low at that point and, and there was like, large fiscal spending due to the Second World War. And we see some elements of that now as well with, you know, increasing fiscal spending, you know, high debt levels, um, and interest rates which had below, um, until a while ago. So that's also an interesting parallel.

#### Adam Bass (10:08):

Dimitris also mentioned stability being important in the UK. But Thomas, again, you know, with your wider European lens on how are we looking elsewhere how... in Europe or, or throughout the world? Is instability possible in the short term?

# Thomas Verbraken (10:27):

That- that's a good question. And I, I think we'll go through a period of, um, higher, higher volatility. So, um, aas I mentioned earlier, like, there was this, you know, this pocket of leverage in, in, in the UK with the pension funds, and it somehow, um, caused this, this violent market reaction. And I don't know what exactly could trigger it, but I can imagine something similar will happen in, in Europe. So, um, we do have the tightening path that the ECB is on. But at the same time, they also have, um, announced the, the transmission protection instrument, um, which is there to support sovereign bonds, when the yields on those sovereign bonds wouldn't reflect, um, the fundamentals.

(<u>11:09</u>):



So for example, if Italian sovereign yields would go through the roof. They might start buying that. So we see that also in Europe, they have these instruments, they might embark on, on similar bond buying programs as the, as the Bank of England to step in and calm markets. And that's, that's for a reason, right? So I, I can imagine that in Europe, we might see similar volatility in markets once, uh, an episode like that occurs here.

#### Dimitris Melas (11:35):

Hopefully, what happened in the UK can, uh, serve as a warning for other, you know, e- economies around the world, especially other governments around the world that, uh, you know, e- even if you have some legitimate pro-growth policies, like the tax cuts, and the timing of announcing those policies, but also, you know, making sure that once... when these such policies are announced, they are fully funded by other measures is critically important. It's critically important at any time, but especially in a time, right now, where we're experiencing what we have just experienced is pretty, uh, you know, severe supply side shocks.

# (<u>12:15</u>):

And we're also... You know, some, uh, some would argue that we've also experienced policy mistakes, i- irecently, meaning, with hindsight, we know that, uh, you know, governments and the central banks, in response to the pandemic, were perhaps too aggressive, in some cases, in, in, uh, implementing loose monetary and fiscal policy, right? So now we're dealing with a... an environment where inflation is high. And, you know, the, the best we can hope for, I think, is for, you know, very resolved in the concentrated, uh, eeffort to, to address this hyperinflation.

# Thomas Verbraken (12:53):

So, yeah, one thing I'd like to, to, to add to that is that when we're speaking about central banks and, and stability, I also think that the credibility of central banks is an important, uh, an important factor. So, you know, when a, when a central bank has a lot of credibility, they can move markets by merely saying it will do something, like think about Mario Draghi's whatever-it-takes speech, but once credibility is lost, it's, it's hard to get them back. And, you know, they would need to take a lot stronger action, more aggressive action to achieve the same objective. And we've seen in, you know, the UK that there were some U-turns, um, at, at the Bank of England. So I think it's important for central banks to maintain that credibility and provide stability.

# Adam Bass (<u>13:38</u>):

Do central banks have that level of credibility now, especially given what Dimitris just said about looking back about their reaction during the pandemic?

#### Dimitris Melas (13:48):

You know, I think the, the premise that, uh, independent central banks play an important role in, uh, you know, keeping inflation low and, and promoting, uh, economic growth, that, that premise is still very much valid. But



central bank independence should not, uh, be considered, uh, to, to assume that policy should be uncoordinated. I think it's important for policy across governments and central banks to be coordinated.

# (<u>14:16</u>):

The authorities have these two important levers, you know, fiscal and, and, and monetary policy, and, and they, you know, they need to be used in a thoughtful way, but also in a coordinated way, you know, depending on economic circumstances. And, and the circumstances we face now is, you know, double digit inflation in, in most of the larger economies around the world, and that must be the priority. In other words, you know, making sure that this high inflation doesn't become entrenched, and especially high inflation expectations don't become entrenched.

# Thomas Verbraken (14:47):

Yeah. I, I think that coordination is, is a very good point and, and like it's actually interesting what, what we see now that, uh, on one hand, we have the central banks, you know, tightening, uh, monetary policy, the same time we see governments, you know, doing some fiscal stimulus for example, in, in Europe related to the, to the energy crisis or the, the increased energy prices. There have been liquidity provisions for utility companies, which are based in margin calls. They're not talking about price caps on energy.

# (<u>15:20</u>):

So this is, uh, you know, some fiscal stimulus, which kind of achieved the opposite of what, what, what the ECB is trying to do by tightening policy. And even on the, on the last ECB policy meeting, um, Christine Lagarde mentioned that she made a comment that fiscal spending should be targeted, you know, to only those who need it, otherwise, it will further fuel inflation. So I think this coordination is, uh... I mean, I fully agree with Dimitris, that it's an, an important, uh, component of the solution.

#### Adam Bass (15:48):

Have we had moments before maybe the global financial crisis again, but others where we've seen this kind of coordination and how successful was it?

# Dimitris Melas (15:59):

Well, I, I think certainly the, the global financial crisis were a good example where we did have coordinated policy, not only between different authorities, such as governments, central banks, but importantly, authorities across the world. S- so, so I think back then the, the reaction was, uh, pretty determined, swift, a- and it was coordinated across different jurisdictions around the world. Unfortunately, the, the political and the



geopolitical environment today has changed, has deteriorated. And, you know, we may have, uh, less, uh, less coordination across, uh, different, uh, you know, countries. A- a- and certainly the evidence from this episode in the UK suggests that also coordination of action between, uh, you know, different authorities within a country is, is cr- as critical as ever.

#### Adam Bass (<u>16:47</u>):

So as all this is going on and, and central banks, such as the fed, ECB, Bank of England, take action, what kind of reactions have we've seen in other markets around the world?

#### Thomas Verbraken (16:59):

Yeah, I, I think it's, it's, um, similar environment in, in, in all these, uh, in all these markets, in the sense that they are, uh, very much following what, what central banks are, are communicating what they're doing. And I, yeah, I think that that's driving markets, to, uh, to a large extent, uh, I think a- all around the world. Central bank policy is, is a main factor.

#### Adam Bass (17:20):

So earlier on, Thomas, actually, both of you mentioned the liquidity crisis that was going on in terms of leverage in UK pension funds. But is there any parallel between this leverage in the pension funds and what's going on with energy companies?

# Thomas Verbraken (17:37):

There is a parallel in the sense that energy companies, um, also entered into derivatives contracts to, to hedge their exposure to, to price fluctuations. But as energy prices soared, they were facing, uh, collateral calls. Um, and, and they had liquidity issues. So, um, in that sense, we... I mean, we can also, uh... we, we see the parallel, um, that also the, the, you know, various European governments had to, to step in. They allocated funds to support these collateral requirements. You know, when there's, when there's leverage liquidity constraints and, you know, in market is potentially crowding. Um, and this can really, you know, move markets in a, in a, in a very, uh, violent way.And, and it's interesting also, if you look at, uh... go back to the UK, and, and the pension funds, like at some point, the Bank of England was buying nominal gilts, but, um, not inflation-linked gilts. And your moves in the breakeven inflation yields coming from, you know, basically used to price those, uh, inflation-linked guilds, there were a lot more, uh, violent than, than the nominal guilds. And you should keep in mind that the private pension, uh, sector in, in the UK owns about 70 or 80%, um, of the inflation-linked guild.



# (<u>18:53</u>):

So, you know, it's, it's a crowded trade, so to say. So, you know, if, if these components are there, and there is no buyer of last resorts, we can see, you know, really wild swings in, in, in markets. And, you know, after a couple of days, the, the Bank of England also stepped into the inflation lending markets to kind of support, uh, support those bonds too. And the interesting question is where, where it might happen next?

# Adam Bass (<u>19:19</u>):

So, Thomas, you mentioned about looking forward, let's, let's go there, um, keeping in mind, we have no idea what is going to happen, what are the kinds of things that investors may be looking for, perhaps, beyond stability, as Dimitris mentioned?

# Thomas Verbraken (19:35):

Uh, I, I think the energy crisis will, will play a crucial role. And the, the big question is whether we will see, you know, high en- energy prices in 2023. Um, now, they're coming down. Uh, I mean, speaking about the Europe, um, they're coming down now, because, um, the natural gas reserves have been replenished, I think they're nearly full, and we have, uh, a relatively mild autumn here. Um, but the question is next... you know, after the winter next year, uh, the supply of energy won't be solved over the winter, I assume. So how will, you know, those energy prices be, um, affected next, next year, and will governments have to, you know, continue, uh, support their economies with, um, with fiscal policies to, you know, to, uh, to counter those high energy prices?

#### (<u>20:23</u>):

Like if we see a prolonged fiscal intervention to, to, to battle these high energy prices, then the risk for, you know, a higher medium term inflation, um, of course, becomes higher. Also, how much will the monetary tightening slow down the economy? Like how much damage will we, will we see? Will, will we enter, you know, a, a very deep recession or, um, or won't it be that bad? So we can think about, um, you know, some scenarios. We, um, we, we looked at, uh, I think, you know, couple of scenarios, but to, um, to stand out.

# (<u>20:56</u>):

One where the ECB policy causes like severe slowdown in the economy, but manages to get inflation down, and then another alternative scenario is where... you know, it's, it's the stagflation scenario, where the ECB is, credibility deteriorates, like we were talking about earlier, inflation expectations become unanchored, and then long term economic growth takes a hit. And in our analysis, we kind of looked at, uh, you know, portfolios of, of, fo equities, uh, and bonds. And it s- it seems like that the circulation scenario would be the worst outcome for portfolios with, you know, significant hits to both equities and, and bonds.



# TRANSCRIPT

# Dimitris Melas (21:34):

So, so Adam I- I'm afraid, I'm, uh, less optimistic compared to, to (laughs), Thomas, a- and, uh, Thomas rightly described a range of scenarios. But I, I personally can only see two scenarios. One is bad, and the other one is very bad. Uh, you know, the bad scenario is that, uh, the policymakers remain steadfast and committed to fighting inflation. Obviously, this would require coordinated fiscal monetary policies, uh, a- and it may very well lead to a global recession. But if we succeed in bringing inflation and inflation expectations down, at least the recession may be short, followed by a more benign period of economic and, and market conditions. So that's the bad scenario, right?The, the, the very bad scenario would be if we suffer policy mistakes, for example, if government stand, uh... start to, to, um, you know, implement, uh, unfunded tax cut or increased spending, or even central banks, you know, lose their nerve and stop, uh, fighting inflation or stop tightening too soon, the risk there is that these high inflation expectations will become more entrenched, uh, a- and that may lead to a period of stagflation similar or even worse to what we actually had back in the 1970s.

#### (<u>22:50</u>):

Uh, but actually, I think we should also, uh, highlight some positives that come out of the, the, the recent experience in the UK, to some of our friends in other countries that, uh, may be laughing at how often we change prime ministers in the UK, I would tell them, this is a feature, it's not a bad of our system. And it's a feature of liberal, liberal democracy. A- and, you know, we're able to remove our leaders when they fail, and hopefully, uh, um, you know, bring, uh, uh, leaders that will succeed in, in, in their role.

#### (<u>23:21</u>):

Uh, I think we should also celebrate the fact that in the UK, we have replaced our third female prime minister with a new prime minister, who comes from an ethnic minority and who's a second generation immigrant. So I think it's admirable and very positive and something to celebrate that, you know, we see diversity in action at the, you know, the higher levels of government in, in the UK.

#### Adam Bass (23:43):

You were talking earlier about how maybe the policies from the global financial crisis lasted a bit too long. Could we be looking at another potential overreaction?

#### Dimitris Melas (23:55):

I think, uh, the danger is probably under correction, meaning i- in this case, uh, you know, we may see a tight monetary policy be abandoned too soon, before we actually bring inflation under control. So, so here, I think I would more err on the side of, let's keep our nerve, let's, uh, have coordinated action to, to... because this is really what we're fighting against and this is hopefully something that we can bring under control, this very high inflation that we haven't really seen for 40 years or more, right? And now, y- you know, the- there is pain



involved, right? And we may even have a global recession. But as I, as I mentioned earlier, if that were to happen, hopefully, that will be relatively short. But again, we all need some, some, uh, g- good news as well from these different supply, supply shocks and, uh, uh, because the danger, the downside danger is, is stagflation, and that's really something that, uh, hopefully y- you know, we can avoid.

#### Adam Bass (24:53):

And then Dimitris, I'd like to give you as a resident of the UK the last word here. If you had the opportunity to you to, to sit with the new prime minister, what words of wisdom, what advice would you give to him?

#### Dimitris Melas (25:07):

Look, I, I wouldn't assume that I can provide advice to the new, uh, prime minister. Uh, I think what we've experienced, uh, in the UK, but globally as well, uh, with, uh, with Brexit, with some populist leaders, uh, coming to power was a period that, i- it was almost the end of expertise. That's an expression that we've, we've heard a lot. Uh, but hopefully what happened in the UK, the last few weeks demonstrated that, uh, you know, re- reality has, uh, reasserted itself and, and expertise matters, and, and taking into account consequences of policies and policy announcements is important.

# (<u>25:47</u>):

Uh, a- and, uh, you know, maybe our grandparents were right, you can either have your cake or eat it, you cannot, uh, have both, which was one of the favorite, uh, expressions of one of our former prime ministers. I think what's, what's important is, uh, let's go into a period of, uh, stability, uh, with, uh, you know, appropriate coordination of policy, a- and, uh, you know, hopefully that will be critical in, uh, in, in helping us, uh, weather the storm, the economic, uh, storm over the, the coming few, few months, and, and maybe a couple of years.

#### Adam Bass (26:23):

That's all for this week. A big thank you from Joe and me to Dimitris and Thomas, and to all of you for listening. As you know, we love feedback. So why not leave a rating or let us know what you think? In either case, we'll be back next time looking for answers to the questions investors are asking. Until then, I'm your host, Adam Bass, and this is MSCI Perspectives. Stay safe everyone.





# About MSCI

MSCI is a leading provider of critical decision support tools and services for the global investment community. With over 50 years of expertise in research, data and technology, we power better investment decisions by enabling clients to understand and analyze key drivers of risk and return and confidently build more effective portfolios. We create industry-leading research-enhanced solutions that clients use to gain insight into and improve transparency across the investment process. To learn more, please visit **www.msci.com**.

Without limiting any of the foregoing and to the maximum extent permitted by applicable law, in no event shall any Information Provider have any liability regarding any of the Information for any direct, indirect, special, punitive, consequential (including lost profits) or any other damages even if notified of the possibility of such damages. The foregoing shall not exclude or limit any liability that may not by applicable law be excluded or limited, including without limitation (as applicable), any liability for death or personal injury to the extent that such injury results from the negligence or willful default of itself, its servants, agents or sub-contractors.

Information containing any historical information, data or analysis should not be taken as an indication or guarantee of any future performance, analysis, forecast or prediction. Past performance does not guarantee future results.

The Information should not be relied on and is not a substitute for the skill, judgment and experience of the user, its management, employees, advisors and/or clients when making investment and other business decisions. All Information is impersonal and not tailored to the needs of any person, entity or group of persons.

None of the Information constitutes an offer to sell (or a solicitation of an offer to buy), any security, financial product or other investment vehicle or any trading strategy.

This document and all of the information contained in it, including without limitation all text, data, graphs, charts (collectively, the "Information") is the property of MSCI Inc. or its subsidiaries (collectively, "MSCI"), or MSCI's licensors, direct or indirect suppliers or any third party involved in making or compiling any Information (collectively, with MSCI, the "Information Providers") and is provided for informational purposes only. The Information may not be modified, reverse-engineered, reproduced or redisseminated in whole or in part without prior written permission from MSCI.

The Information may not be used to create derivative works or to verify or correct other data or information. For example (but without limitation), the Information may not be used to create indexes, databases, risk models, analytics, software, or in connection with the issuing, offering, sponsoring, managing or marketing of any securities, portfolios, financial products or other investment vehicles utilizing or based on, linked to, tracking or otherwise derived from the Information or any other MSCI data, information, products or services.

The user of the Information assumes the entire risk of any use it may make or permit to be made of the Information. NONE OF THE INFORMATION PROVIDERS MAKES ANY EXPRESS OR IMPLIED WARRANTIES OR REPRESENTATIONS WITH RESPECT TO THE INFORMATION (OR THE RESULTS TO BE OBTAINED BY THE USE THEREOF), AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, EACH INFORMATION PROVIDER EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES (INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF ORGINALITY, ACCURACY, TIMELINESS, NON-INFRINGEMENT, COMPLETENESS, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) WITH RESPECT TO ANY OF THE INFORMATION.

It is not possible to invest directly in an index. Exposure to an asset class or trading strategy or other category represented by an index is only available through third party investable instruments (if any) based on that index. MSCI does not issue, sponsor, endorse, market, offer, review or otherwise express any opinion regarding any fund, ETF, derivative or other security, investment, financial product or trading strategy that is based on, linked to or seeks to provide an investment return related to the performance of any MSCI index (collectively, "Index Linked Investments"). MSCI makes no assurance that any Index Linked Investments will accurately track index performance or provide positive investment returns. MSCI Inc. is not an investment adviser or fiduciary and MSCI makes no representation regarding the advisability of investing in any Index Linked Investments.

Index returns do not represent the results of actual trading of investible assets/securities. MSCI maintains and calculates indexes, but does not manage actual assets. Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the index or Index Linked Investments. The imposition of these fees and charges would cause the performance of an Index Linked Investment to be different than the MSCI index performance.

The Information may contain back tested data. Back-tested performance is not actual performance, but is hypothetical. There are frequently material differences between back tested performance results and actual results subsequently achieved by any investment strategy.

Constituents of MSCI equity indexes are listed companies, which are included in or excluded from the indexes according to the application of the relevant index methodologies. Accordingly, constituents in MSCI equity indexes may include MSCI Inc., clients of MSCI or suppliers to MSCI. Inclusion of a security within an MSCI index is not a recommendation by MSCI to buy, sell, or hold such security, nor is it considered to be investment advice.

Data and information produced by various affiliates of MSCI Inc., including MSCI ESG Research LLC and Barra LLC, may be used in calculating certain MSCI indexes. More information can be found in the relevant index methodologies on www.msci.com.

MSCI receives compensation in connection with licensing its indexes to third parties. MSCI Inc.'s revenue includes fees based on assets in Index Linked Investments. Information can be found in MSCI Inc.'s company filings on the Investor Relations section of www.msci.com.

MSCI ESG Research LLC is a Registered Investment Adviser under the Investment Advisers Act of 1940 and a subsidiary of MSCI Inc. Except with respect to any applicable products or services from MSCI ESG Research, neither MSCI nor any of its products or services recommends, endorses, approves or otherwise expresses any opinion regarding any issuer, securities,





financial products or instruments or trading strategies and MSCI's products or services are not intended to constitute investment advice or a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such. Issuers mentioned or included in any MSCI ESG Research materials may include MSCI Inc., clients of MSCI or suppliers to MSCI, and may also purchase research or other products or services from MSCI ESG Research. MSCI ESG Research materials, including materials utilized in any MSCI ESG Indexes or other products, have not been submitted to, nor received approval from, the United States Securities and Exchange Commission or any other regulatory body.

Any use of or access to products, services or information of MSCI requires a license from MSCI. MSCI, Barra, RiskMetrics, IPD and other MSCI brands and product names are the trademarks, service marks, or registered trademarks of MSCI or its subsidiaries in the United States and other jurisdictions. The Global Industry Classification Standard (GICS) was developed by and is the exclusive property of MSCI and Standard & Poor's. "Global Industry Classification Standard (GICS)" is a service mark of MSCI and Standard & Poor's.

MIFID2/MIFIR notice: MSCI ESG Research LLC does not distribute or act as an intermediary for financial instruments or structured deposits, nor does it deal on its own account, provide execution services for others or manage client accounts. No MSCI ESG Research product or service supports, promotes or is intended to support or promote any such activity. MSCI ESG Research is an independent provider of ESG data, reports and ratings based on published methodologies and available to clients on a subscription basis. We do not provide custom or one-off ratings or recommendations of securities or other financial instruments upon request.

Privacy notice: For information about how MSCI ESG Research LLC collects and uses personal data concerning officers and directors, please refer to our Privacy Notice at https://www.msci.com/privacy-pledge.