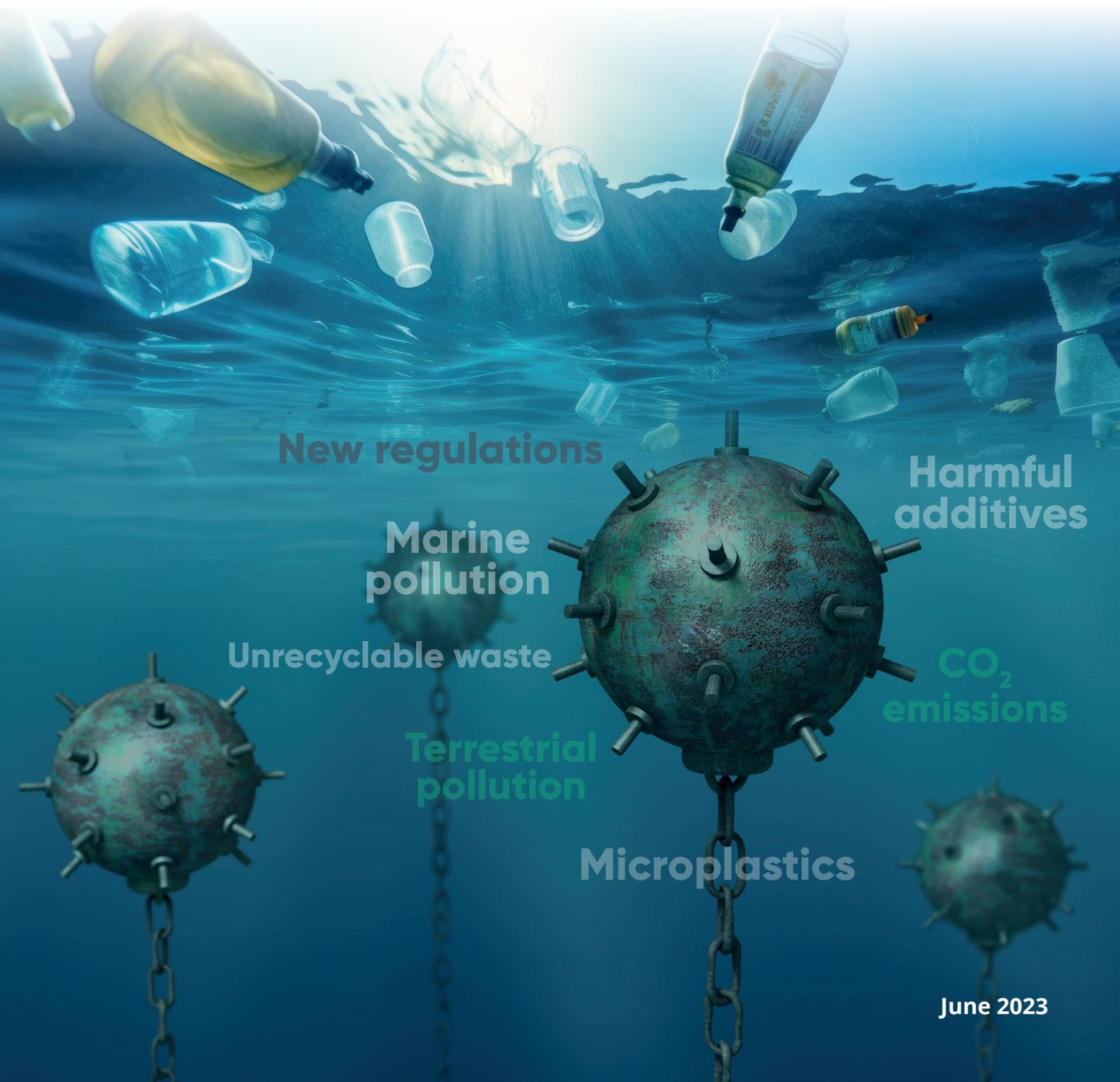


# PlasticRISK

Measuring investors' risk in the plastic sector



New regulations

Harmful additives

Marine pollution

Unrecyclable waste

CO<sub>2</sub> emissions

Terrestrial pollution

Microplastics

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## KEY TAKEAWAYS

- Corporates in the plastic value chain face physical, transitional, legal and reputational risks. Each plastic company's risk register should include exposure to CO<sub>2</sub> emissions, harmful toxic discharges, visible and invisible plastic pollution (for land, sea and air), chemical additives exposure and rising harm to people and nature.
- Risk, as measured by the equity risk premium<sup>1</sup>, has remained fairly stable since 2012 for companies in the plastic value chain; however, it started declining (i.e., perceived as less risky) in 2022.
- When compared to those industries which are similarly materials-based – construction, paper & forest products, metals & mining, and chemicals – the plastic-exposed sector trades on the lowest risk premium (i.e., perceived as less risky).
- Between 2012 and 2022, 731 plastic pollution policies have been introduced worldwide. Presently, investors in the plastic value chain are ignoring this rising regulatory threat.
- Within the plastic value chain, the single-use plastic producers are generally perceived as the riskiest segment and the consumer staples the least. Packaging and container companies mostly fluctuate between these two.
- Financial investors and lenders need to decide whether the risk premium not only adequately reflects the present backdrop of tightening regulation but also the increasing possibility of significant litigation from a variety of sources.
- The universality of plastics, for which demand continues to rise, may make the plastic industry appear like an attractive growth story, but it also increases the sector's regulatory and litigation exposure.

# RISK

<sup>1</sup> The term equity risk premium refers to an excess return that investing in the stock market provides over a risk-free rate. This excess return compensates investors for taking on the relatively higher risk of equity investing.



# EXECUTIVE SUMMARY

**T**he planet is unable to cope with the avalanche of waste and pollution resulting from plastic products. In turn, this is causing significant environmental degradation. But worse is forecast; **plastic production is anticipated to almost triple by 2060.**<sup>i</sup> Plastic pollution changes habitats and natural processes and impacts human health and social welfare.

In this research paper, Planet Tracker examines over time **the risk that the financial markets have priced into the plastic value chain** and its three major segments – the single-use plastic (SUP) producers, the container and packaging converters, and the downstream consumer staples companies.

Planet Tracker has calculated **the implicit risk priced into 150 companies in the plastic value chain by analysing their equity risk premia**, where possible. The equity risk premium is the difference between returns of individual stocks with that of the risk-free rate of return, which is normally a longer-term government bond, which assumes no default risk by the issuer. A higher risk premium signifies that the investor requires a greater level of compensation for taking the perceived risk.

**The equity risk premium of the plastic supply chain has remained pretty stable for much of the last 11 years** – i.e., investors are not forecasting a change in the industry's risk profile – but **more recently there has been a perceptible decline in investors' risk perception for this value chain and its three main segments**, down to its lowest level in 2022. This implies that **investors are pricing in lower risks associated with this industry.**

Planet Tracker is surprised by this finding especially against a backdrop of tightening regulation, rising litigation exposure and the possibility of a [Global Plastic Pollution Treaty](#) on the horizon.



# THE PLASTIC RISK REGISTER

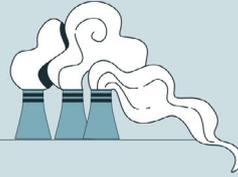
## SOURCE



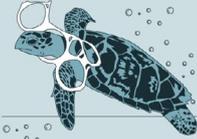
TOXIC RELEASES



HARMFUL ADDITIVES



CO<sub>2</sub> EMISSIONS



MARINE AND TERRESTRIAL POLLUTION



MICROPLASTICS



UNRECYCLABLE WASTE



NEW REGULATIONS

## TYPE OF RISK



REPUTATIONAL



LEGAL

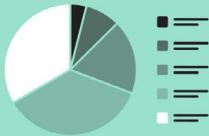


PHYSICAL



TRANSITIONAL

## FINANCIAL IMPACT



EQUITY RISK PREMIUM



COST OF DEBT



CAPITAL FLOWS



LITIGATION LIABILITIES



ENGAGEMENT AND STEWARDSHIP



OPERATING COSTS



INSURANCE PREMIUM

Source: Planet Tracker



## The widely and lesser known risks

**Many risks associated with plastic are well-known:** high CO<sub>2</sub> emissions – chemicals and petrochemicals are categorised as hard-to-abate sectors – terrestrial and marine plastic pollution and microplastic ingestion. **But others are not as widely recognised** – e.g. toxic emissions, harmful additives within plastic and plastic which cannot be recycled. Plastic production, use and disposal can be linked to significant harms to human health and the environment and causes societal injustices.<sup>ii</sup> Despite this, plastic use has grown over thirty times since 1964<sup>iii</sup> and is anticipated to almost triple by 2060.<sup>iv</sup>

## Four main risk categories

Investors, lenders and insurers can categorise the register of plastic risks into **four categories: physical, legal, reputational and transitional**. These range from threats to human health to legal liability claims.<sup>v</sup>

### 1 Physical risks

- Plastic has a large carbon footprint and released 1.8 billion tonnes of greenhouse gas emissions in 2019 (3.4% of global emissions). It is estimated that these emissions will more than double by 2060.<sup>vi</sup> The intensity of the emissions per tonne produced by plastic will drop, but this will not be enough to trigger a decrease in total emissions as production will almost triple.<sup>iv</sup>

### 2 Legal risks

- Toxic emissions<sup>2</sup> are frequent and are known to impact human health and the environment.<sup>vii</sup> Some of the chemical additives used in plastics are linked to harmful health impacts in humans, including infertility, developmental issues and metabolic disorders.<sup>viii</sup>
- Liability cases linked to plastic pollution are expected to grow; it is estimated that the social costs associated with these additives triggered between 2022 and 2030 will surpass USD 100 billion per annum globally.<sup>viii</sup>
- Corporate liabilities from plastics litigation between 2022 and 2030 are forecast to rise above USD 20 billion and even further beyond 2030.<sup>viii</sup>

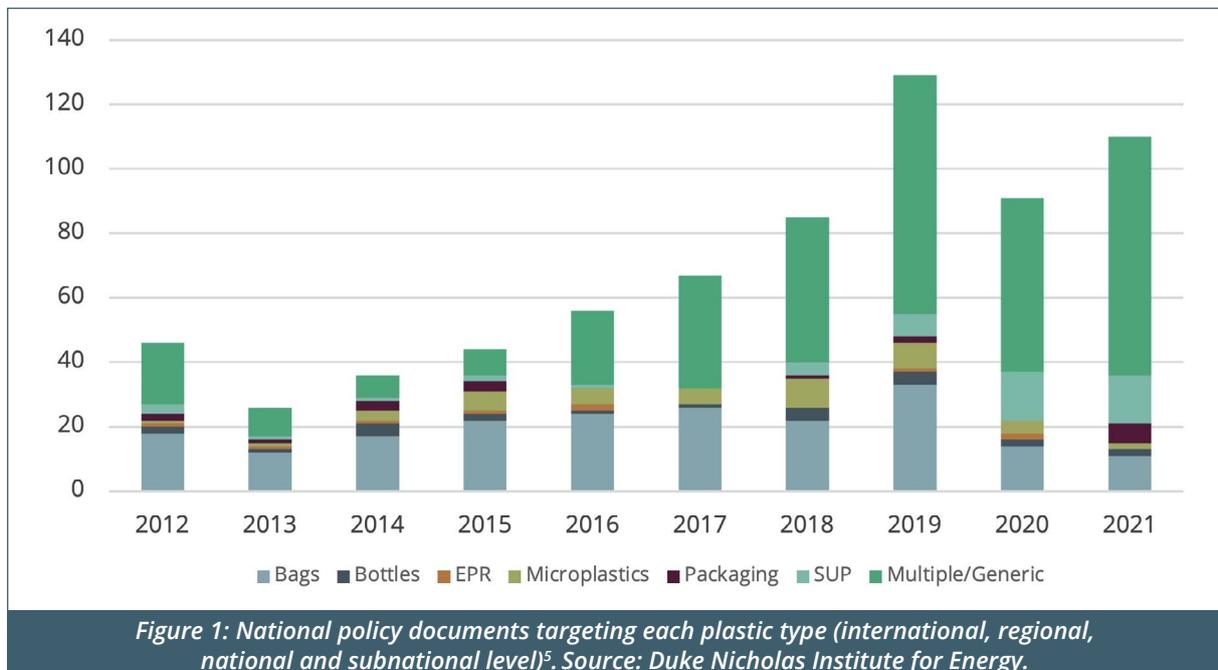
<sup>2</sup> See Toxic Footprints [dashboards](#) for toxic emissions in the Gulf of Mexico, USA.

### 3 Reputational risks

- Greenwashing, whereby companies make themselves appear more environmentally friendly than they really are, has become very sophisticated and threatens the reputation of the corporates and the investors supporting them.<sup>ix</sup> We note that some major companies are now recognising greenwashing claims as a significant risk in their legal filings<sup>3</sup>.
- Reputational risks of transacting with, and investing in, businesses perceived as high plastic polluters; as public awareness of plastic pollution grows, an association with those polluters could turn into a liability, as with the coal and tobacco sectors.<sup>x</sup>

### 4 Transition risks

- Single-use packaging (SUP) is responsible for approximately USD 40 billion annually in externalities<sup>4</sup>. This figure likely exceeds the total profits of the packaging industry.<sup>v</sup>
- Some costs are likely to be borne by corporates if schemes such as Extended Producer Responsibility (EPR) or container take-back systems are more widely adopted.<sup>v</sup>
- There has been a noticeable increase in new national regulations on tackling plastic pollution since 2013. In 2020, there was a significant decline, which is possibly linked to COVID-19. Looking forward, regulations are widely expected to grow especially if the Global Plastic Treaty negotiation is successful in limiting plastic pollution<sup>xi</sup> – see Figure 1.<sup>xii</sup>



<sup>3</sup> For example, HSBC added 'greenwashing' to its list of risks in its [2022 Annual Report and Accounts](#).

<sup>4</sup> An **externality** is a cost or benefit caused by a producer that is not financially incurred or received by that producer.

<sup>5</sup> Note that the Plastics Policy Inventory is an updateable and searchable database consisting of public policy documents targeting plastic pollution in several languages.

# ANALYSING THE PLASTIC VALUE CHAIN

## From upstream to downstream

We examine **three main segments of the plastic value chain**: the **upstream** (single-use plastic, SUP) producers, the **midstream** containers and packaging converters, and the **downstream** consumer staple companies, which rely on plastic packaging to sell their goods. Planet Tracker has analysed the risk premia of the top 50 corporates in each segment, ranked by their market capitalisation<sup>6</sup>. Most of these plastic-exposed corporates are concentrated in Asia, North America or Europe.



<sup>6</sup> Based on share price as of 30/12/2022

## Upstream – SUP Producers

The **SUP producers** are almost entirely made up of **fossil fuel-based manufacturers**. The top 50 petrochemical SUP producers include ExxonMobil (XOM), Sinopec (SNP) and Dow (DOW), which are responsible for over 60 million tonnes of SUP.<sup>xiii</sup> The top 10 of these SUP producers have a total market capitalisation (cap) of USD 3.7 trillion making this by far the largest of the three plastic value chain segments – see Figure 2. In Figure 3, we show the ranking by market cap, rather than by SUP production. By market cap the largest companies, ranked in declining value, are Saudi Aramco (ARAMCO), Exxon (XOM) and Chevron (CVX).

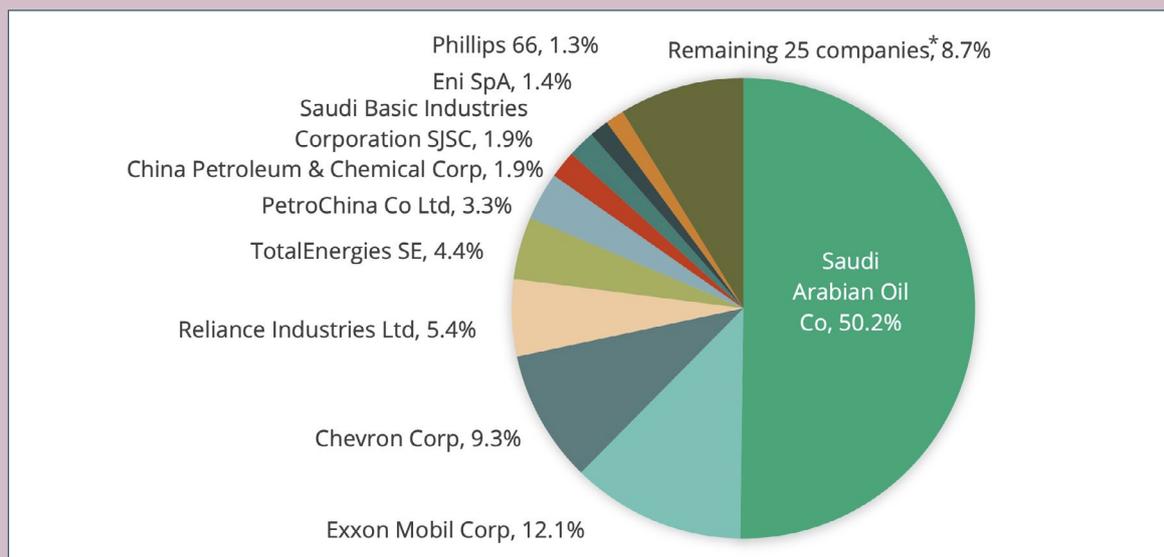


Figure 3: Top 50 SUP virgin producers ranked by market cap in 2022 (based on share price as of 30/12/2022). Source: Refinitiv, Minderoo Foundation, Planet Tracker.

\*15 companies are excluded as their 2022 market cap was not disclosed.

Saudi Arabian Oil Co (Aramco) accounts for 50.2% of the total market cap of the top 50 SUP producers and therefore in order to avoid distorting the analysis we have omitted it from the calculations in the rest of this report.

## Midstream – Containers and packaging converters

The **container and packaging converters** segment is midstream in the plastic value chain<sup>7</sup> of which the largest is company is Amcor (AMC), which develops and produces flexible packaging and rigid containers, followed by Ball Corp (BLL), which mainly produces aluminium containers and then Avery Dennison (AVY), which manufactures pressure-sensitive adhesive materials, apparel branding labels and tags, and specialty medical products. In this packaging segment, the top 10 corporates have a total market cap of USD 119.9 billion – see Figure 4. In Figure 4, we show the split of the top 50 container and packaging converters by market cap. This is the smallest of the three plastic value chain segments by value.

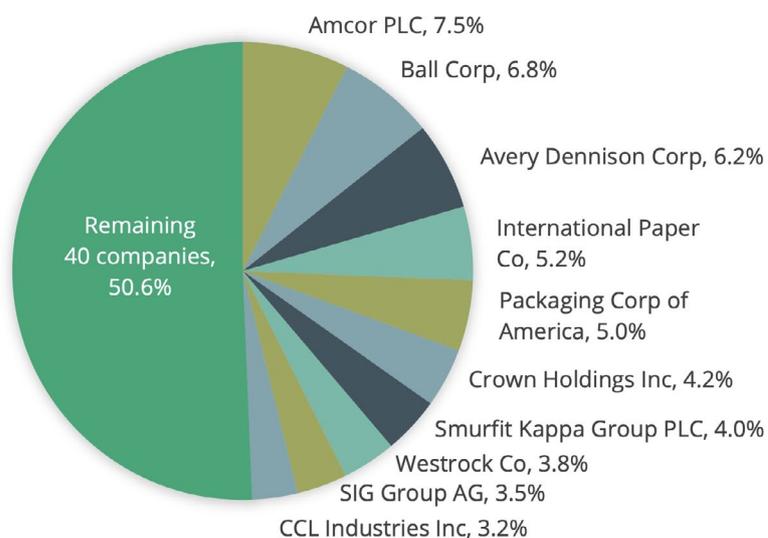


Figure 4: Top 50 Containers & Packaging converters ranked by market cap in 2022 (based on share price as of 30/12/2022). Source: Refinitiv, Bloomberg, Planet Tracker.

<sup>7</sup> The containers and packaging converters sector includes all packaging companies (e.g. paper, metal, glass etc)

## Downstream – Consumer staples

The **downstream consumer staples segment** is led by Walmart (WMT), followed by Procter & Gamble (PG) and then Nestlé (NESN). The total market cap of the top 10 consumer staples companies is USD 2.1 trillion, with an average size of USD 257 billion. In Figure 5, we show the split of the top 50 consumer staple companies by market cap.

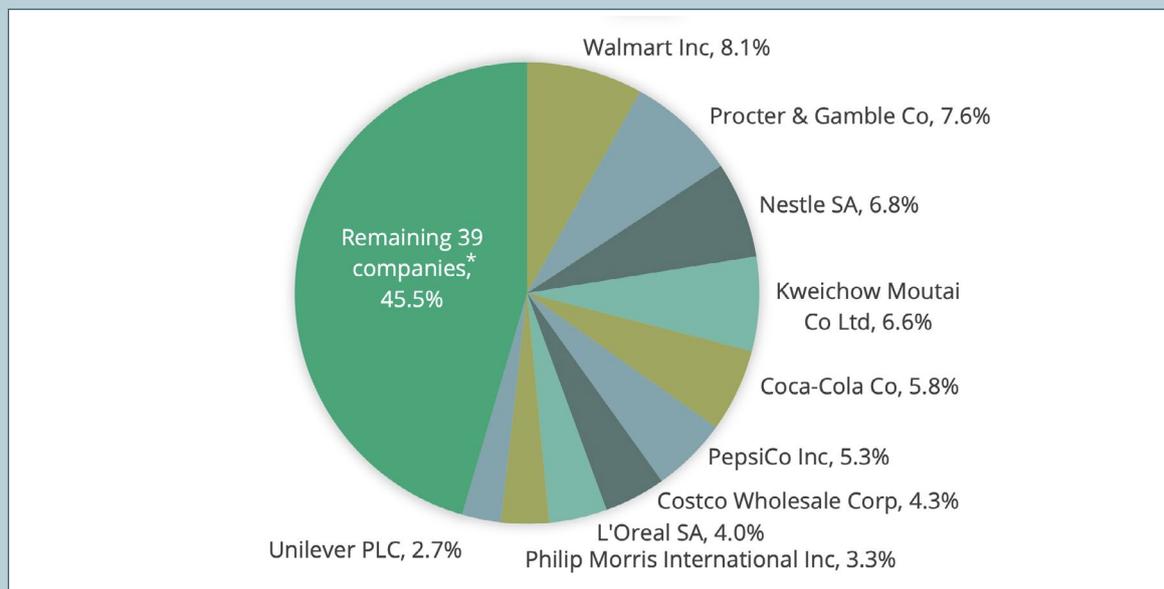


Figure 5: Top 50 Consumer Staples producers ranked by market cap in 2022 (based on share price as of 30/12/2022). Source: Refinitiv, Bloomberg, Planet Tracker.

\*Haleon Plc is excluded as its 2022 market cap was not disclosed.

<sup>6</sup> The containers and packaging converters sector includes all packaging companies (e.g. paper, metal, glass etc)



# WHAT RISK DO INVESTORS ANTICIPATE?

## Measuring risk

The expected return on any investment can be written as the sum of the risk-free rate and an extra return to compensate for the risk. To calculate this extra return, equity risk premia (ERP) are central to risk and return models in finance.<sup>xiv</sup>

The ERP is a good measure for examining the amount of risk investors require for investing in equities, above the risk-free rate. It is calculated as follows:

**Equity Risk Premium (ERP) =  $R_a - R_f = \beta a (R_m - R_f)$ , where:**

**$R_a$  = expected return on investment in a or an equity investment of some kind**

**$R_f$  = risk-free rate of return**

**$\beta a$  = beta of a (risk coefficient of the stock a which is unique to that stock)**

**$R_m$  = expected return of the market**

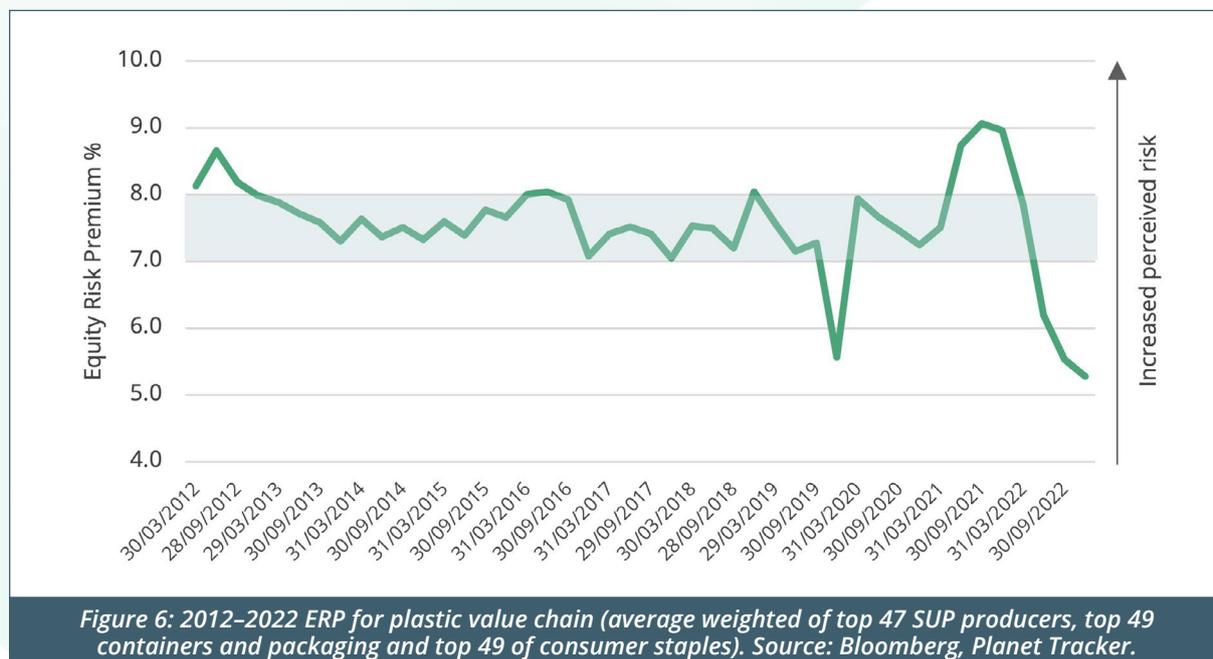
To determine the risk premium of the global plastic value chain, **we have initially taken the top 50 companies ranked by market cap, for three value chain segments** – SUP producers<sup>8</sup>, plastic container & packaging converters and consumer staples companies. Respectively they represent the upstream, midstream and downstream segments of the plastic supply chain. To calculate the risk premium for each part, we weighted the 50 top constituents by the market cap, where possible<sup>8</sup>. When we calculated the equity risk premium for the whole plastic value chain, this was possible for 145 companies. We were also able to calculate the average ERP of these three segments – see more in Methodology section.

## Risk in the plastic value chain

Since the beginning of 2012, the plastic value chain, as measured by the 145 companies in our universe, has **traded on an average ERP of 7.5%**. It reached a peak in September 2021 of 9.1% - the point of investors' highest perceived risk – and a low in December 2022 of 5.3%. More recently, the average ERP reached 5.8%, at the end of March 2023.

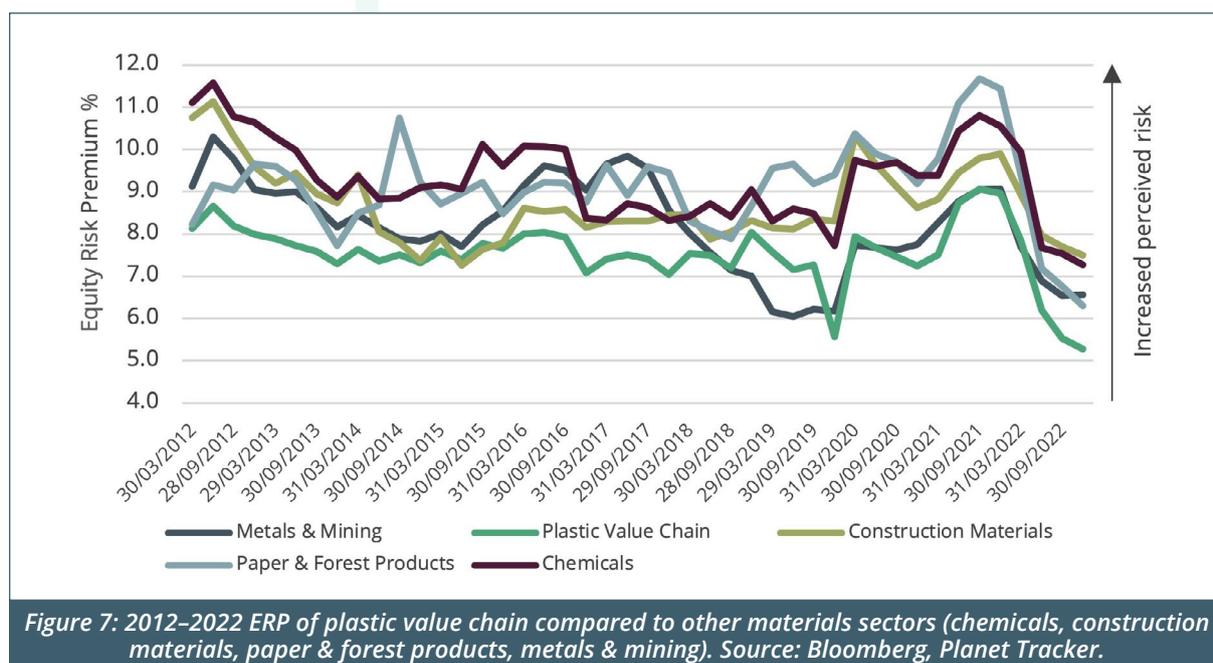
<sup>8</sup> In the SUP Producers segment we have taken 47 companies based on the top 50 SUP virgin producers of the Plastic Waste Makers Index, Minderoo Foundation; we have excluded two private companies and Saudi Aramco. From both containers & Packaging and Consumer Staples segments we have excluded one IPO each – see Methodology.

For much of the last 11 years, **the risk premium has been fairly stable**, often staying within a range of between 7% and 8%, although after September 2021 it started declining, implying that investors saw a decreasing risk of investing in these plastic exposed companies – see Figure 6.



### Comparing with other material sectors

When comparing the plastic value chain with other industries within the materials group – i.e. construction materials, paper & forest products, metals & mining and chemicals – we note that all risk premia fluctuate in a broadly similar way. **The plastic value chain risk premium most closely tracks the variations of the construction materials industry** – see Figure 7.



**Between 2012 and 2022, the plastic value chain demonstrated the lowest average ERP of 7.5% compared to these other material sectors**, which on average is 0.6% lower than the metals and mining materials (the second lowest in the materials group). Furthermore, the plastic value chain has registered the lowest ERP level of all these material sectors, at 5.3% in December 2022, while the maximum ERP was witnessed in the , paper & forest products sector at 11.7% in September 2021, followed by the chemical sector at 11.6% in June 2012.

It is interesting to observe that **the differential between the chemicals and plastic sectors has averaged 1.8% over the last 11 years**. In other words, chemicals are perceived as a notably higher risk sector than their more specialised plastic sub-sector – see Figures 8 and 9.

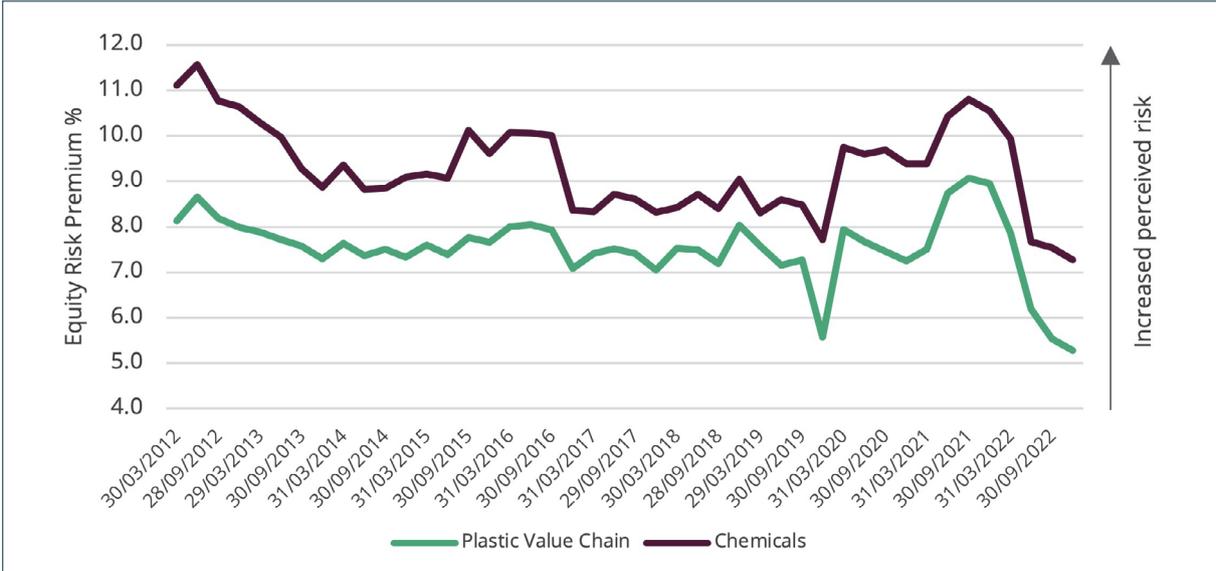


Figure 8: 2012–2022 average ERP of plastic value chain in comparison to the chemicals sector. Source: Bloomberg, Planet Tracker.

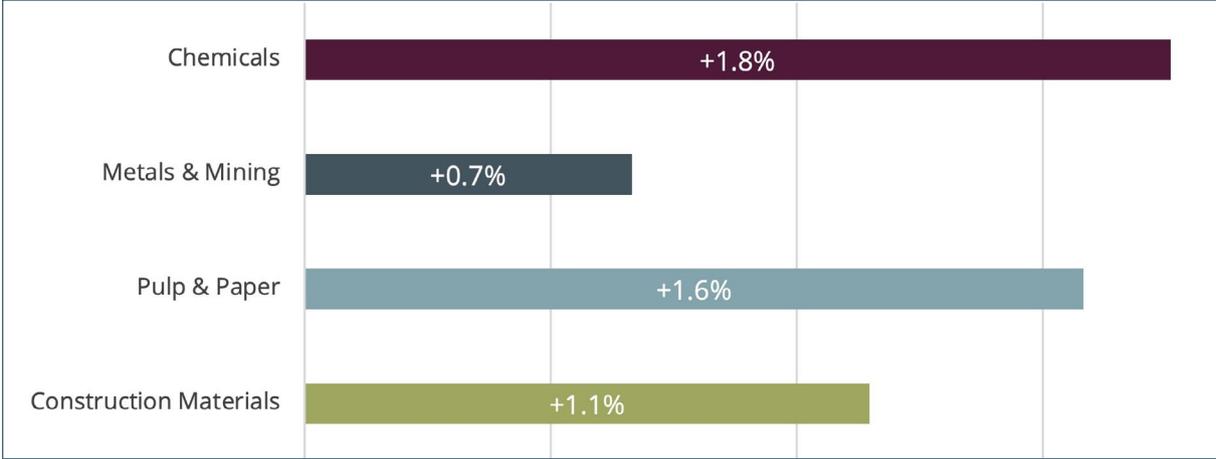


Figure 9: 2012–2022 average differential in ERP between the plastic value chain and other materials sectors. Source: Bloomberg, Planet Tracker.



Table 1 shows the comparison of the ERP between the plastic value chain and other material sectors in more detail.

*Table 1: 2012–2022 average ERP comparison between plastic value chain and other material sectors. Source: Bloomberg, Planet Tracker.*

Period	Plastic value chain	Construction materials	Paper & forest products	Metals & mining	Chemicals
2012-2022 Average Weighted (%)	7.5	8.7	9.1	8.2	9.3
2012-2022 Max (%)	9.1	11.1	11.7	10.3	11.6
2012-2022 Min (%)	5.3	7.3	6.3	6.0	7.3
Dec 2022 (%)	5.3	7.5	6.3	6.6	7.3
Mar 2023 (%)	5.8	7.5	6.7	7.6	7.9

### Plastic value chain

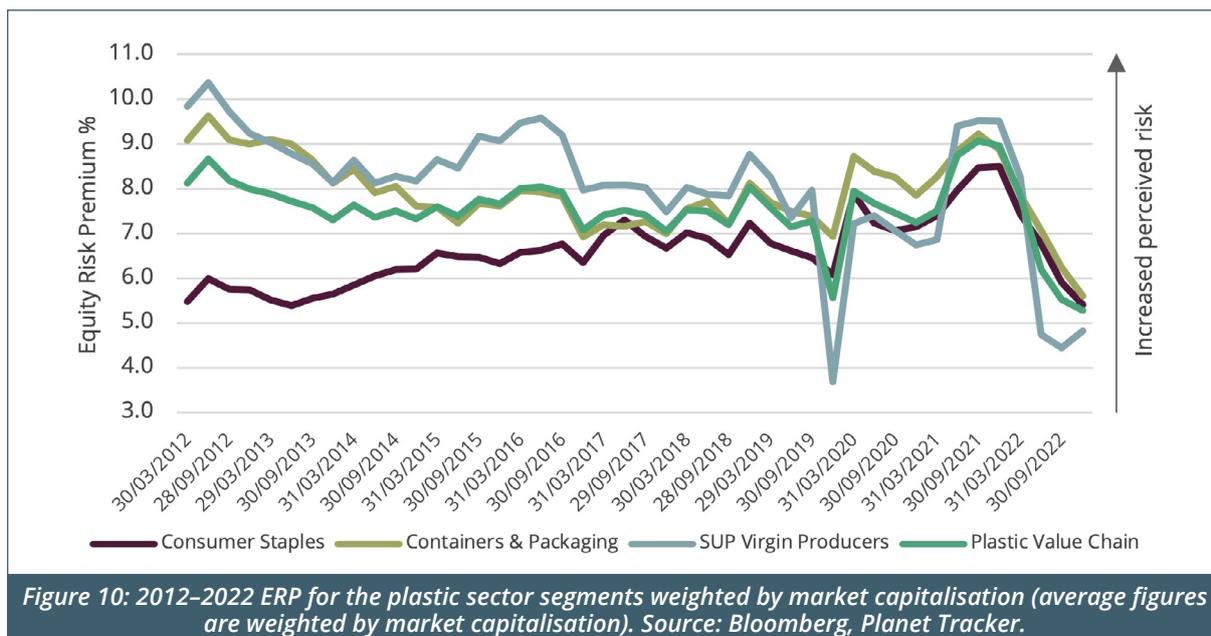
Inevitably, Planet Tracker’s sample of 145<sup>9</sup> companies in the plastic value chain – split into three segments – hides considerable variation. If we take the three segments of the plastic supply chain, we can observe that **the average ERP for all three groups has fluctuated in a broadly similar way, for most of the examined period (2012-2022).**

For the examined period, the company with the highest risk premium was Sibur Holdings (SIBH), from the SUP producers segment, with an average risk premium of 14.8%. This was almost five times greater than that of Ambev SA (ABEV) also from the consumer staple segment, which had the lowest average ERP of 3.1%.

Over much of this period, **there has been a persistent risk differential between the three plastic value chain segments, but this has changed more recently.**

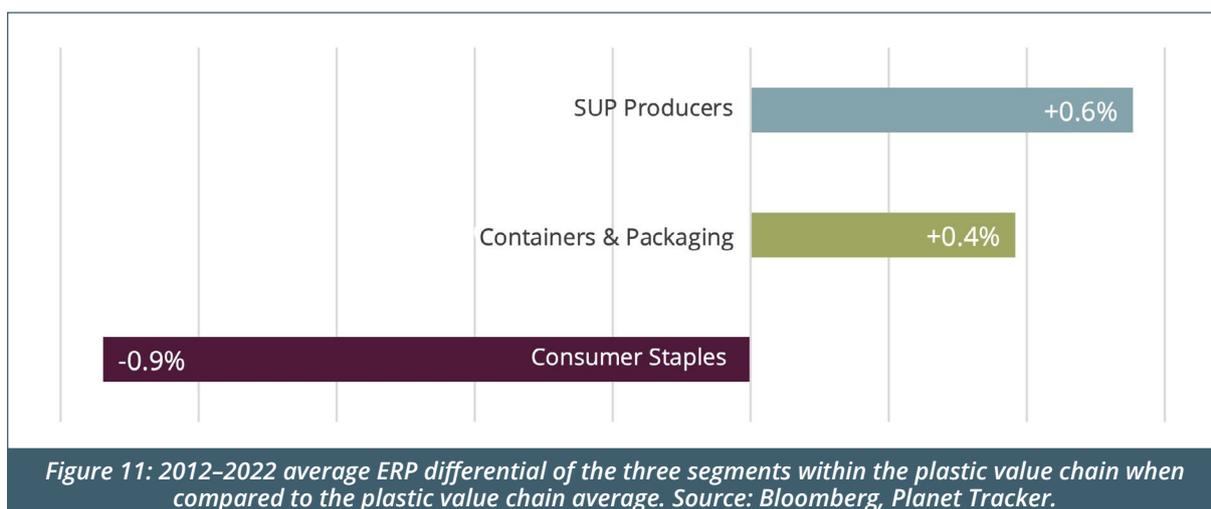
**The SUP producers have, for the vast majority of the last 11 years, carried the highest risk premium, while the consumer staples segment has had the lowest.** Fluctuating between these two have been the containers and packaging companies. Since 2012, the SUP producers have had an average risk premium of 8.1% (also 8.1 % with Saudi Aramco’s inclusion), the containers & packaging converters 7.9%, and the consumer staples companies 6.6% - see Figure 10.

<sup>9</sup> In the SUP Producers segment we have taken 47 companies based on the top 50 SUP virgin producers of the Plastic Waste Makers Index, Minderoo Foundation; we have excluded two private companies and Saudi Aramco. From both containers & Packaging and Consumer Staples segments we have excluded one IPO each – see Methodology.



Broadly, these ERP rankings may be as many investors would expect. **The safer consumer staples stocks trade on the lowest equity risk premium** as it represents companies which sell essential products with businesses which are less sensitive to economic cycles. In contrast, **the SUP producers and the containers & packaging segment are more vulnerable to economic cyclicalities and their input prices are vulnerable to commodity price volatility.**

However, more recently, particularly from early 2022, **the differential has been squeezed, leaving these three sub-groups on minimal risk premia differentials when compared to the plastic value chain average** – see Figure 11.



It is possible that the marked decline in the ERP of the SUP producers, which is dominated by oil and gas companies, has been driven by the popularity of the oil producers as an investment. The oil & gas sector was a stand-out performer for much of the last year. Note that **the plastic value chain's risk profile follows a very similar pattern to that of the chemicals sector, albeit with an identifiable differential** – see Figure 8.

## SUP producers segment

If we focus on just the **SUP producer segment**, we can observe that their ERP has remained relatively steady over much between 2012 and 2022 with average ERP of 8.1%. There was a sharp **decline in the ERP in September 2019 at 3.7%** which is the lowest ERP in the 11-year period and bounced back again to above 7% in March 2020 – see Figure 12.

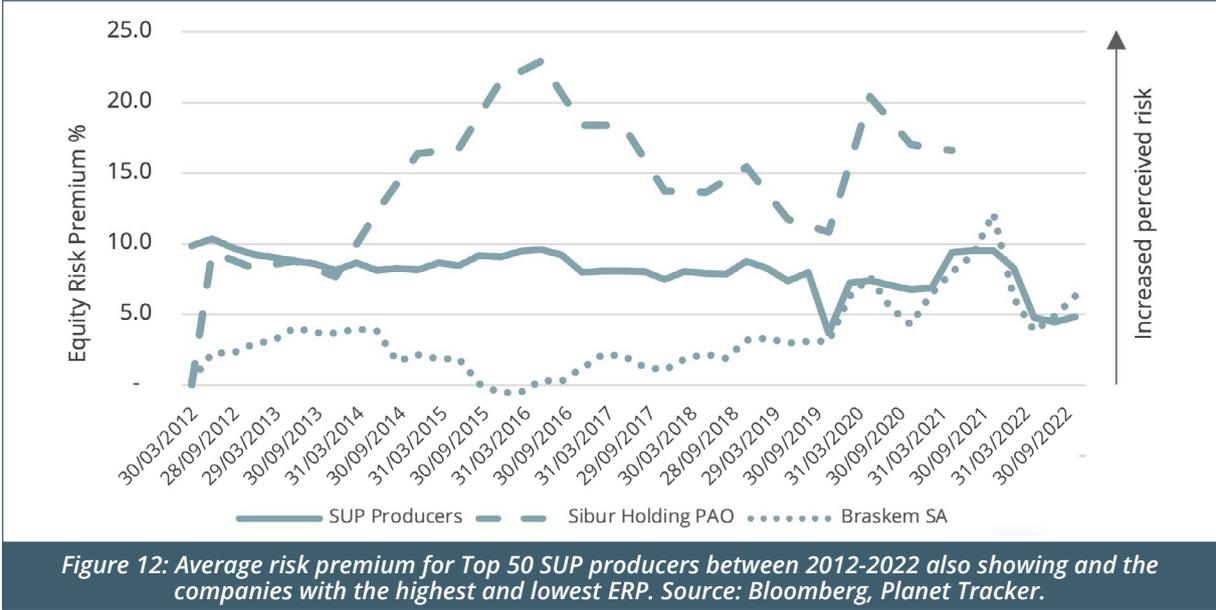


Figure 12: Average risk premium for Top 50 SUP producers between 2012-2022 also showing and the companies with the highest and lowest ERP. Source: Bloomberg, Planet Tracker.

If Saudi Aramco was included in the SUP Producers segment then the average ERP for the segment would be a decline by 0.7% to 8.1%. The oil giant had an average 5.3% ERP between 2012 and 2022.

Of the SUP producers, Sibur Holding (SIBH), the Russian petrochemical company, has the highest risk in this segment with an average of 14.8%, while Braskem (PNE), Latin America's largest petrochemical company, has the lowest at 3.3% – see Table 2 and Figure 12.

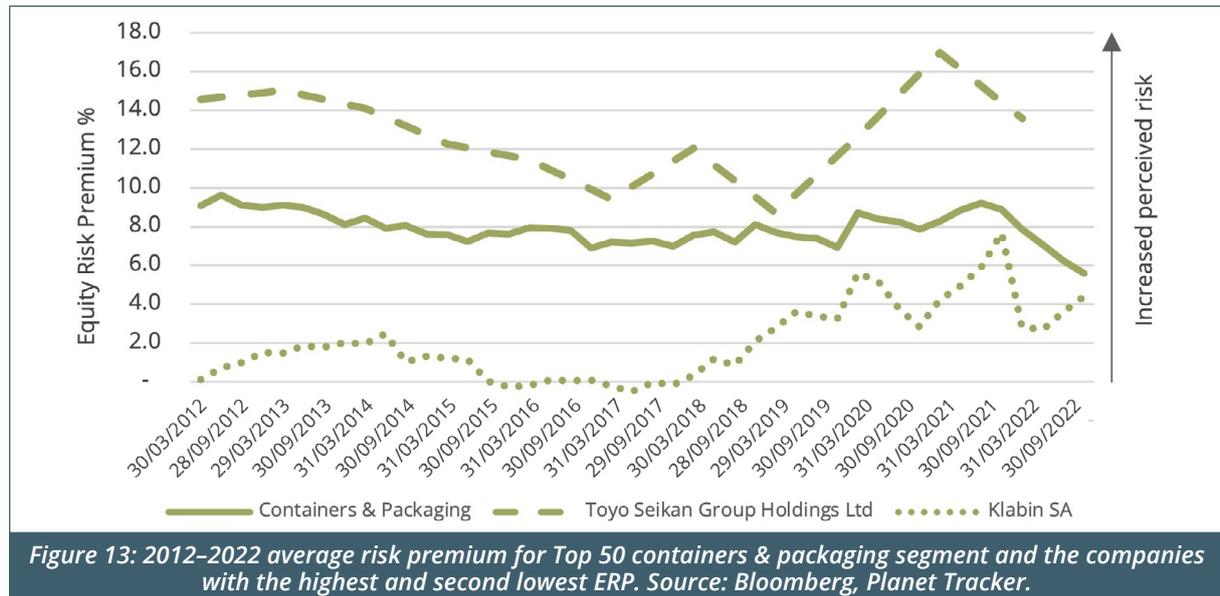
Table 2: 2012–2022 ERP highlights of SUP producers segment. Source: Bloomberg, Planet Tracker.

Characteristic	Company	Ave	Max	Min	Dec 2022	Mar 2023
Company with highest ERP in the segment (%)	Sibur Holding PAO	14.8	22.9	7.7	no data	5.8
Company with lowest ERP in the segment (%)	Braskem SA	3.3	12.2	-0.5	6.3	2.4
Overall SUP producers segment (%)	SUP producers	8.8	10.8	6.1	6.1	6.7



## Containers and packaging segment

The equity risk premium of the **containers & packaging** segment has been relatively steady with an average risk premium of 7.9% between 2012 and 2022, recording a peak of 9.6% in June 2012. More recently, we have seen this halve to its lowest level of 5.6%, in December 2022 and stayed the same in March 2023 – see Figure 13.



The company with the highest risk premium in this segment was Tokyo Seikan Group Holdings Ltd (TYO), a Japanese packaging container manufacturing company, with an ERP of 12.7%, while the lowest was ShenZhen YUTO Packaging Technology Co Ltd (“YUTO”) (SHE: 002831) a Chinese packager, at -8.3%. This high negative risk premium is highly unusual and reached -379.9% when there was the IPO of the company in December 2016. In Figure 13, we have removed the YUTO outlier and show Klabin SA instead, which had the second lowest risk premium in this segment with average of 2% between 2012 and 2022 – See Table 3.

**Table 3: 2012–2022 ERP highlights of containers and packaging segment. Source: Bloomberg, Planet Tracker.**

Characteristic	Company	Ave	Max	Min	Dec 2022	Mar 2023
Company with highest ERP in the segment (%)	Toyo Seikan Group Holdings Ltd	12.7	17.0	8.7	no data	no data
Company with lowest ERP in the segment (%)	Klabin SA	2.0	7.7	-0.5	4.4	2.0
Overall SUP producers segment (%)	Containers and Packaging	7.9	9.6	5.6	5.6	5.6

This sector comprises many types of container & packaging companies including glass, paper and metal packaging, not just those associated with plastic. Of the purer plastic container companies, ten of the companies in this segment are also the largest global plastic container & packaging converters. Of this sub-set, the lowest ERP between 2012 and 2022 was recorded by Wipak Ltd (WPK) at 5.3% and the highest by Jiangsu Shuangxing Color Plastic New Materials Co Ltd (002585) at 11.5%.

## Consumer staples segment

Finally, in the **consumer staples segment**, for the majority of the examined period, we can again identify a fairly flat equity risk premium, averaging 6.6%. The segment peaked with a risk premium of 8.5% in the last half of 2021 and a low of 3.7% at December 2019. The segment also was in relatively low level in December 2022 (5.9%) and at the end of March 2023, the ERP fall further to 5.4% - see Figure 15.

Within this consumer segment, the highest average risk premium between 2012 and 2022 was 19.8% (also the highest in the entire plastic value chain), for Yihai Kerry Arawana Holdings Co Ltd (SHE: 300999). It is a Chinese wholesaler, which had an IPO in 2022. The risk premium data was limited so we have replaced it with the second highest of the segment, Nongfu Spring Co Ltd (HKG: 9633) with average ERP of 13.3%. The lowest ERP of the segment was for Ambev (ABEV), a Brazilian brewery company subsidiary of AB InBev (ABI) with average between 2012-2022 of 3.1% – see Table 4 and Figure 14.

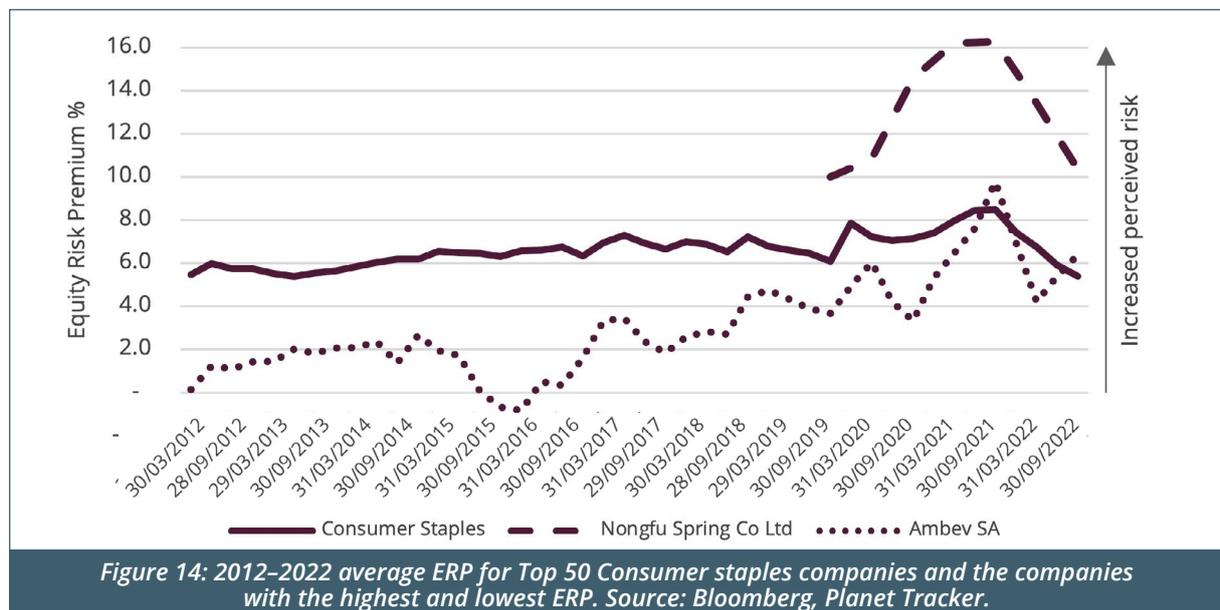
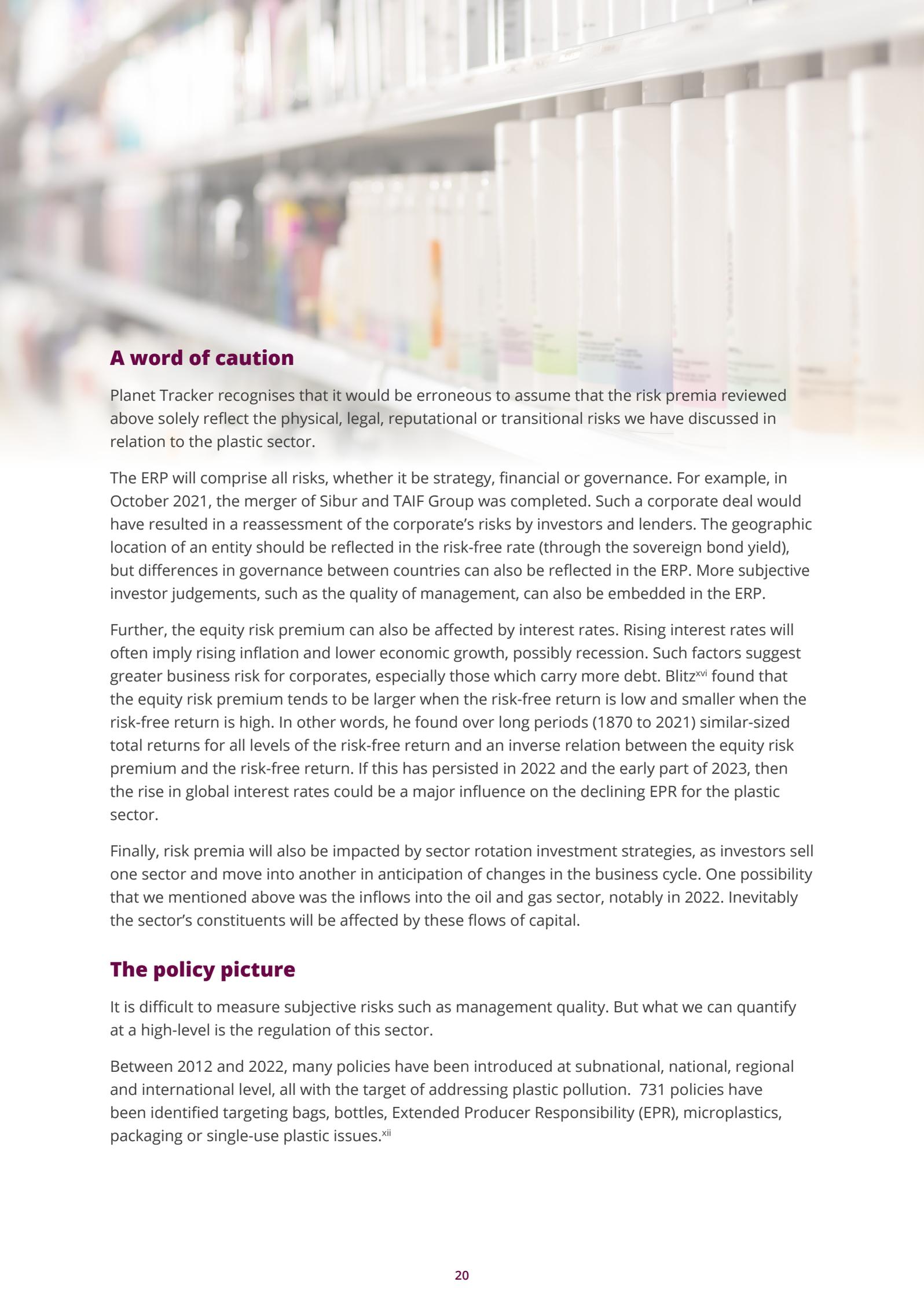


Table 4: 2012–2022 ERP highlights of consumer staples segment. Source: Bloomberg, Planet Tracker.

Characteristic	Company	Ave	Max	Min	Dec 2022	Mar 2023
Company with highest ERP in the segment (%)	Nongfu Spring Co Ltd	13.3	16.3	10.0	10.4	no data
Company with lowest ERP in the segment (%)	Ambev SA	3.1	9.8	-0.8	6.4	2.8
Overall consumer staples segment (%)	Consumer Staples	6.6	8.5	5.4	5.5	6.0





## A word of caution

Planet Tracker recognises that it would be erroneous to assume that the risk premia reviewed above solely reflect the physical, legal, reputational or transitional risks we have discussed in relation to the plastic sector.

The ERP will comprise all risks, whether it be strategy, financial or governance. For example, in October 2021, the merger of Sibur and TAIF Group was completed. Such a corporate deal would have resulted in a reassessment of the corporate's risks by investors and lenders. The geographic location of an entity should be reflected in the risk-free rate (through the sovereign bond yield), but differences in governance between countries can also be reflected in the ERP. More subjective investor judgements, such as the quality of management, can also be embedded in the ERP.

Further, the equity risk premium can also be affected by interest rates. Rising interest rates will often imply rising inflation and lower economic growth, possibly recession. Such factors suggest greater business risk for corporates, especially those which carry more debt. Blitz<sup>xvi</sup> found that the equity risk premium tends to be larger when the risk-free return is low and smaller when the risk-free return is high. In other words, he found over long periods (1870 to 2021) similar-sized total returns for all levels of the risk-free return and an inverse relation between the equity risk premium and the risk-free return. If this has persisted in 2022 and the early part of 2023, then the rise in global interest rates could be a major influence on the declining EPR for the plastic sector.

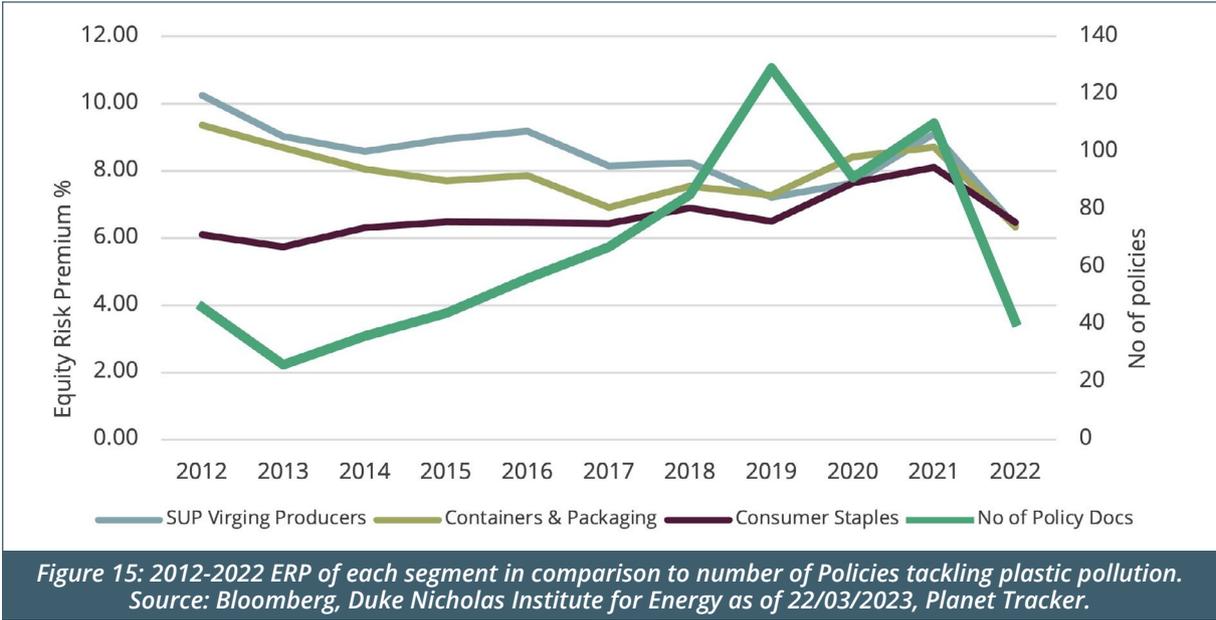
Finally, risk premia will also be impacted by sector rotation investment strategies, as investors sell one sector and move into another in anticipation of changes in the business cycle. One possibility that we mentioned above was the inflows into the oil and gas sector, notably in 2022. Inevitably the sector's constituents will be affected by these flows of capital.

## The policy picture

It is difficult to measure subjective risks such as management quality. But what we can quantify at a high-level is the regulation of this sector.

Between 2012 and 2022, many policies have been introduced at subnational, national, regional and international level, all with the target of addressing plastic pollution. 731 policies have been identified targeting bags, bottles, Extended Producer Responsibility (EPR), microplastics, packaging or single-use plastic issues.<sup>xii</sup>

Despite this, the movement in the ERP for the plastic value chain or its segments, seems largely unrelated to the introduction of these policies - see Figure 16. Above, we propose that the dip in the number of policies in the last couple of years is largely driven by the COVID-19 effect.



It would appear that investors are viewing these policies and regulations as too marginal to impact the finances of these plastic companies – i.e., investor returns will be unaffected. As policies are introduced, investors could have an eye on the horizon, but are assessing the impact on investor returns over a short time period. For example, if there were to be an agreement on a Global Plastic Pollution Treaty, this would most likely be signed off in 2025 and then ratification would probably take another couple of years. Therefore, investors could be viewing this as a distant problem. Although equity investors may wish to take a short-term view, holders of long-dated bonds or loans cannot afford to do the same.

Another explanation is that investors do see the various risks associated with the plastic value chain but believe that future growth prospects for the sector remain strong and therefore the corporates will have adequate financial resources to weather regulation and litigation. Furthermore, substitution risks such as an alternative material to plastic, could be seen as low. In other words, potential returns more than compensate for the perceived risks, at least for the time being.

However, even for equity investors there are dangers in using a short-term investment horizon. It is possible that an agreement on a Global Plastic Pollution Treaty could trigger a landslide of regulation and change governments’ views on the impact of plastics on society. Furthermore, the clean-up of plastic waste generally falls on the financially poorest part of the supply chain – the local municipalities – which in turn need urgent funding. Governments could consider financing this shortfall through corporate regulation, until the production of plastics is addressed. Perhaps the largest uncertainty facing investors and lenders is litigation risk. Evidence of the impact of plastic products on human health continues to increase and at some stage major litigation will stick, possibly opening the floodgates to claims. No doubt insurers, in particular, are watching out for a change in legal momentum. Research suggesting that such legal claims could equal the revenue of the sector should not be dismissed without careful consideration.<sup>viii</sup>

## Methodology

Planet Tracker has used market cap data from Refinitiv based on the share price as of 30th of December 2022. The ERP data have been gathered from Bloomberg between 2012 and 2022 (inclusive). However, the ERP data are aligned with the earnings reporting period of each company, e.g., if a company reports earnings every quarter, then it will have quarterly ERP data. Our data set includes a mixture of quarterly, bi-annual, and annual data. Where data was unavailable on a quarterly basis, we interpolated data using the bi-annual and annual data on a linear basis. Finally, values were inserted only if there was one period between two values missing. If there was more than one quarter, six-month or annual period missing, then the value was omitted.

In order to compare the plastic value chain with other industries, we gathered from Bloomberg the 50 entities with highest market capitalisation identified in Global Industry Classification Standards (GICS) sub-industries – i.e., construction materials, paper and forest products, metals and mining, and chemicals. When values were missing, they were filled with the average value of each sub-industry.

To provide further insight into the risk premium of the global plastic value chain, we have examined three value chain segments. However, it is worth noting the following for each segment.

**SUP producers:** The top 50 single-use-plastic producers based on fossil fuel feedstock as provided in the 2021 Plastic Waste Index<sup>xvii</sup> by Minderoo Foundation. Planet Tracker has removed Private Investors and Bakhtar Petrochemical from the segment as they are privately owned as well as Saudi Arabian Oil Co (Aramco), as it accounts 50.2% of the market cap of the SUP sector. As the ERP is market cap weighted, Aramco would significantly have distorted the segment average. Therefore, the SUP Producers segment comprises 47 companies in total.

**Containers and packaging converters:** Top 50 containers and packaging converters. This sector is not limited to plastic companies but comprises other types of container & packaging companies including glass, paper and metal packaging. Planet Tracker has removed ShenZhen YUTO Packaging Technology Co Ltd (YUTO) (SHE: 002831), a Chinese packager from the segment as at the end of 2016, when the corporate initially listed on the stock exchange, it caused an abrupt decline in the risk premium of the containers packaging segment, to a negative level and such a large negative risk premium is unusual. Therefore, the containers and packaging segment comprises 49 companies in total.

**Consumer staple companies:** Top 50 consumer staple companies includes food and staples, household products, beverages, food products, personal products and tobacco retailers. Planet Tracker has removed Yihai Kerry Arawana (300999) as the entity was listed on the Shenzhen Stock Exchange ChiNext Board in 2020 with 35.9% and we have limited data entries since then distorting the average risk premium of the segment. Therefore, the consumer staples segment comprises 49 companies in total.



## CONCLUSION

Since the outbreak of COVID-19, plastic producers, packaging converters and consumer brands reliant on plastic, have seen their risk premia decline to the lowest level between 2012 and 2022. This implies investors view this value chain as one operating in a declining risk environment.

**Planet Tracker finds this surprising.** As we have stated above, we recognise that the equity risk premium encompasses all risks, not just regulatory ones. However, plastics is a sector with a significant risk register and hoping none of these will be significantly material to corporates in this value chain appears a bold decision. For holders of long-dated bonds and loans, as well as insurers, these risks should be priced into the cost of capital now. We encourage investors, lenders and insurers to remain mindful of the plastic sector's full list of risks and ensure this is adequately priced into their plastic related financial instruments.

# RISK



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## ABOUT PLANET TRACKER

Planet Tracker is a non-profit financial think tank producing analytics and reports to align capital markets with planetary boundaries. Our mission is to create significant and irreversible transformation of global financial activities by 2030. By informing, enabling and mobilising the transformative power of capital markets we aim to deliver a financial system that is fully aligned with a Net Zero, nature-positive economy. Planet Tracker proactively engages with financial institutions to drive change in their investment strategies. We ensure they know exactly what risk is built into their investments and identify opportunities from funding the systems transformations we advocate.

## PLASTIC TRACKER

The goal of Plastics Tracker is to stem the flow of environmentally damaging plastics and related-products that are creating global waste and health issues by transparently mapping capital flows and influence in the sector starting from resins production through to product-use. By illuminating risks related to natural capital degradation and depletion, investors, lenders and corporate interests across the economy will be enabled to create more sustainable plastics products.

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