

The Real Value of

Sin Stocks



Animal protein producer

JBS

A valuation methodology for quantifying the impact of ESG public issues and initiatives on companies operating in sectors with significant adverse ESG allegations

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1. Executive Summary

In this report, we set out a unique equity research valuation methodology for quantifying the investment risks associated with ESG-related allegations.

We focus on companies operating in sectors with significant ESG contention, as reported in publicly available sources such as digital media, civil society or governmental reports, referred to as 'public issues'.

These stocks have been named 'sin stocks' by the media. Historically, this term was used to refer to companies operating in the tobacco, alcohol, gambling and firearms sectors, but it now also includes so-called 'brown' companies, i.e., those operating in carbon-intensive industries, such as commodity producers like gold miners, oil & gas producers and agriculture and farming companies.

Through the application of the methodology to JBS S.A. (JBS), a Brazilian beef producer, we provide empirical evidence that waves of public issues have impacted company valuations. Periods of either high magnitude public issues or those with a noticeable increase in the number of public issues have coincided with periods of depressed valuations.

Although the shares may recover over time from the initial hits, we argue that in most cases a valuation discount (or an increased equity risk premium) is justified in order to account for the increased volatility and short-to-medium-term underperformance risks.

The methodology goes a step further, however, by assessing how much a company can offset that discount with increased disclosure, commitments, and implementation on specific ESG matters.

This is all compiled alongside an assessment of what is already priced in today.

The methodology therefore offers an evidence-based valuation tool to quantify the underperformance of 'sin stocks' but also assesses the potential valuation upside from company-specific ESG initiatives, hence revealing their real value to investors.

Implications for equity investors

With this report, we quantify the investment risks associated with 'sin stocks' and show how this can be reduced over time through a company's ESG commitments, disclosures and implementations.

We therefore argue that the 'sin stocks' that rank well could offer superior returns over time.

Over the shorter term, if fundamentals are good and if a company demonstrates improving ESG practices, the best time to buy these stocks is often within a few months following a large-scale public issue.

Over the longer run, we believe that the valuation differential between 'sin stocks' and sustainable stocks could narrow, as ESG initiatives are implemented, leading to fewer public issue reports.

Key components of the methodology

In this report, we set out the different components of the methodology (pages 7-18), including our:

- **Public Issue Index (PII[©])**, a timeline of a company's historical public issues, classified by type and 'magnitude' (itself a combination of gravity, reach and causality of each issue);
- **Public Issue Risk Profile (PIRP[©])**, a map of a company's valuation reaction (in P/E or EV/EBITDA terms) to certain types and magnitudes of public issues; and
- **ESG Credential[©] Valuation Offset**, an assessment of how much a company can limit the occurrence of public issues in the future, based on its current ESG initiatives.

The result is an 'ESG-adjusted target valuation'.

Key findings on JBS

The Brazilian beef production industry lends itself well to the analysis outlined above, given its strong association with adverse environmental impacts such as deforestation, greenhouse gas (GHG) emissions, negative effects from by-products (e.g., water pollution from leather manufacturing, animal welfare, together with a history of corruption). See pages 19-41 for our 'ESG Valuation Report' on JBS.

Our key findings on JBS S.A. are summarised as follows:

- Our Public Issue Index report shows a prominent corruption case in 2017 and environmental and social issues in 2020 and 2021.
- Over the last 10 years, the average valuation impact during the three months following each public issue of a high magnitude was a -21% P/E derating.
- We note a sharp valuation recovery three to six months after a high-magnitude public issue, suggesting that investors treated large-scale scandals as temporary and as good entry points to buy into a company with solid fundamentals.
- Based on the average P/E impact of each event, their frequency and magnitude, we derive a theoretical annualised P/E discount to our fundamental target valuation of 13%. This is under the assumption that future public issues will continue to impact the share price in the same way going forward.
- However, our analysis of the company's commitment, disclosure and implementation of environmental, social and governance matters suggests a likely reduction in the number and scale of public issues, reducing the above discount by 8% (i.e., we apply an 8% valuation offset or premium, effectively giving JBS credit for recent ESG initiatives).
- Looking at recent public issues and ESG initiatives, our analysis suggests that the current valuation does not include any discount from recent allegations. In fact, the valuation over the last three months shows a differential of 16% vs. the theoretical impact observed over the last 10 years.

- In summary, after adjusting for the different discounts and offsets mentioned above, we arrive at a total discount of 21% to our DCF-based target price of R\$49. The original 34% upside to the current share price of R\$36 has therefore been significantly reduced to a 6% upside after adjusting for ESG public issues.

To demonstrate how this analysis can be directly integrated into fundamental research, we have also included a fundamental report with ESG findings inserted into the valuation and risks sections (pages 42-56).

Our partnership

Denny Ellison is an independent provider of customised research. The research produced is initially delivered only to the client that has commissioned it, effectively acting as an extension of an internal buy-side research capability. The team is made up of senior equity research analysts with 15 years of research experience on average on the sell and/or buy side.

TDi Sustainability is a sustainability advisory firm with a purpose: to create an environmentally, economically and socially responsible system of connected enterprises, positively impacting communities and businesses the world over. The team comprises corporate sustainability strategists, compliance and corporate risk analysts, and ESG auditors. TDi Sustainability has completed dozens of mandates to build responsible supply chains for downstream companies in multiple sectors, covering agricultural products, raw materials, textiles, minerals, fragrances and plastics.

The partnership between Denny Ellison and TDi Sustainability was created to fill a substantial gap in the current research offering regarding the valuation impact of ESG factors.

Further applications

The methodology and analysis presented in this report are proprietary to Denny Ellison and TDi Sustainability.

While in this report we are using JBS as an example, the methodology is applicable to any large cap stock in which there are significant ESG controversies.

In this report, the section on JBS offers an example of the type of company reports you can request.

Each company report we produce is bespoke and sent only to the client that has commissioned it for an initial embargo period (typically three months).

If you would like us to apply the methodology to a company of interest within your universe, please contact us at info@dennyellison.com.

This report was produced by:

Eveline Varin
CEO
Denny Ellison Enterprises Limited

David Wilson
Analyst
Denny Ellison Enterprises Limited

Assheton Carter
CEO
TDi Sustainability

Andrew Moore
Analyst
TDi Sustainability

Jumana Miqdadi
Analyst
TDi Sustainability

Ben Payton
Analyst
TDi Sustainability

2. Valuation Methodology

A. Objectives

The methodology was created to address a substantial gap in current research offerings, from both fundamental and ESG providers.

Pairing a traditional research provider with an ESG data specialist, we offer a tool to bridge the gap between ESG data and fundamental research.

We go beyond merely assessing whether a company has received numerous ESG allegations in the past or ranks well on ESG practices. We also quantify the impact on the company's historical and target valuation using traditional finance terminology (P/E and EV/EBITDA valuation, DCF, equity risk premium, etc.), rather than arbitrary ESG scores and rankings that are difficult to integrate into fundamental research.

We address several topical questions from investors attempting to make sense of the proliferation of ESG data sets:

- Have the valuations of 'sin stocks' been impacted by the 'bad press' they have received?
- When investing in a 'sin stock', how much of an equity risk premium should I include to reflect its ESG risks?
- Do fundamentals always outweigh poor ESG practices in the long run?
- How much credit should we give to a 'sin stock' that is improving its ESG practices?

Our goal is to demonstrate to investors that sectors that have been associated with numerous ESG allegations also contain hidden value in individual companies that actively mitigate, or even reverse, the adverse effects of negative perception by making operational commitments to limit their environmental and social impact.

The research provides a clear investable outcome by selecting companies that are best able to mitigate the adverse impact of stakeholder conflict through demonstrable superior sustainability performance and the unlocking of long-term blended financial value.

This study is the first of its kind to mathematically link the impact of stakeholder allegations, company specific ESG initiatives and the potential value to equity shareholders in supporting the best players in 'sin sectors'.

We tailor our methodology to each company depending on the nature of the allegations against it and its fundamental earnings characteristics.

Investors can expect to gain material insight into the valuation of the companies, with a better understanding of the ESG reputational risks and/or potential hidden value.

B. Scope

The methodology focuses on 'sin stocks', i.e., stocks operating in sectors with significant ESG controversy from an equity research or investment standpoint.

It is applicable to companies operating globally and across a large variety of sectors.

The public issue data-scraping analysis typically looks at ~10,000 public issue reports over a period of 10 years. These are generally collected from more than 100 different public sources (newspapers, reports, etc.).

The ESG scoring uses information provided by the company in its sustainability or climate change reports, together with other external data providers.

The valuation analysis uses traditional sources of information, such as company financial statements and presentations, and data suppliers with consensus EPS forecasts.

C. Applied Theories from Academic Literature

The methodology uses academic longitudinal studies with proven empirical applications.

i. Stakeholder Theory

Among the many different definitions of 'stakeholder' used to suit various theories and applications and the absence of a single agreed-upon definition, we include all shareholders, employees, customers, suppliers, etc.

We specifically use Mitchell, Agle & Wood's (1997)¹ definition, in which a stakeholder is defined as "any group or individual who can affect or is affected by the achievement of the organisation's objectives".

Stakeholder theory looks at the impact of all company stakeholders and our methodology uses the following elements of the theory:

- Companies that manage stakeholders' interests should achieve a higher degree of performance, i.e., increased profitability, growth and sustainability. This should also reduce the risk associated with ongoing public issues.

¹ Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts. *The Academy of Management Review*, 22(4), 853.
<https://doi.org/10.2307/259247>

- It presumes that the stakeholders of a company have inherent value as they have legitimate stakes in corporate activity based on their vested interest in the corporation.

Instrumental stakeholder theory (Clarkson, 1995; Donaldson & Preston, 1995; Jones, 1995) argues that increasing stakeholder support enhances the financial valuation of a company, holding constant the other traditional valuation methodologies.

We especially build on the findings from the academic study '*Spinning Gold: The Financial Returns to Stakeholder Engagement, 2014*'² which analysed gold mines owned by 19 publicly traded firms over the period 1993-2008. The study coded more than 50,000 stakeholder events from media reports to develop an index of the degree of stakeholder conflict / cooperation for the mines.

By incorporating the index in a market capitalisation analysis, the findings reduced the discount financial markets placed on the net present value of the physical assets controlled by these firms from 72% to 13-37%.

ii. Salience Theory

As part of the body of literature on strategic management theory, Mitchell, Agle & Wood (1997) posited a descriptive theory of stakeholder salience to determine to what, or whom, managers should pay the most attention in their decision-making. Here, salience is defined as the "degree to which managers give priority to competing stakeholder claims."

In this investigation, stakeholder claims are framed as publicly available information disseminated by a range of entities, which describe allegations made against businesses regarding various environmental, social and governance (ESG) issues. Quantifying the salience of such claims allows the extent to which decision-makers should prioritise them to be measured.

Public ESG issues arise when a gap exists between company performance and stakeholder expectations, with such discrepancies highlighted by academic publications, company reports, media articles and various other publicly available sources.

Note that public issues declared by stakeholders relate to the alleged impact of company actions, rather than an actual event. So, while this does not mean that an impact did occur, the degree of confidence in the source of the allegation and its veracity are considered in quantifying salience.

In our methodology, Mitchell et al's description of salience is adapted to take into account the gravity, reach and causality of any allegations made. This is determined by the severity of the issue, who made the claim and the degree to which a company is responsible for failing to meet stakeholder expectations.

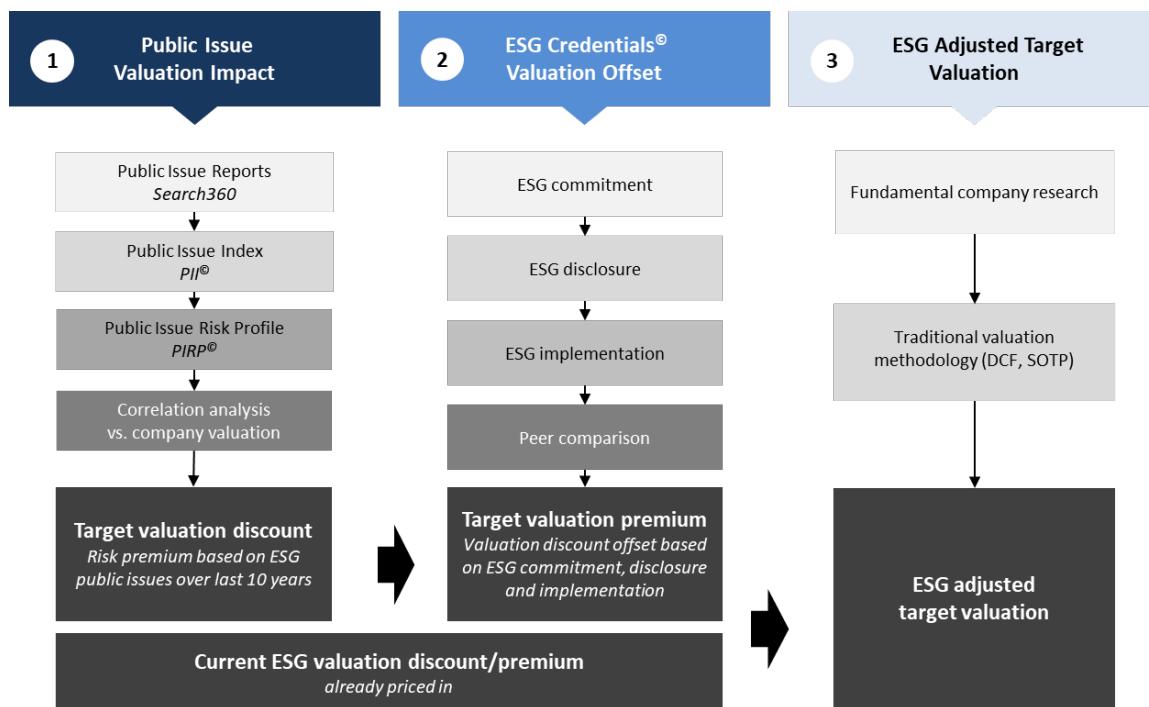
² Source: Spinning Gold: The Financial Returns to Stakeholder Engagement. Strategic Management Journal, 35 (12), 1727-1748

The weighting of these three sub-components of gravity, reach and causality help to quantify how salient competing issues are to company performance. Here, issues can refer to singular real-world events or multiple events that, depending on their level of interconnectedness, can be considered part of a common issue.

D. Methodology

The methodology follows three key steps, each incorporating our ESG and fundamental research expertise.

Figure 1 – ESG Valuation Methodology



Source: Denny Ellison & TDi Sustainability

i. Step 1 – Public Issue Valuation Impact

a. Public Issue Reports – TDi Search360

Data scraping

For this first phase of the analysis, we use TDi's proprietary 'Search360' ESG data analysis methodology, which utilises search engine optimisation to perform data 'scrapes' of publicly available sources.

It includes the following detailed and exhaustive pieces of analysis of publicly available reports:

- Automated internet searches are used to obtain a list of website links containing a range of keywords with established ties to ESG issues. The keywords have been selected for their relevance to well-known issues associated with supply chains in a specific industry.
- Removal of duplicate reports; re-ordering the list of search results based on counts of relevant keywords and Google search ranking.
- Removal of reports that do not discuss any potential issues connected to the company in question. The result is a compilation of public issues concerning each company under investigation.

Classification and salience

The reports gathered are then categorised by the public issue that is central to them – broadly classed as environmental, social or governance, with each class further divided into issue sub-areas.

Below is an example of the taxonomy of public issues that affect companies operating in the animal protein industry.

Figure 2 – Types of public issues

Environmental	Biodiversity	Negative biodiversity and conservation impact
	Deforestation	Deforestation
	Climate Change	Greenhouse gas emissions
	Landscape	Degraded landscapes Water and soil pollution
Social	Community	Company-community conflict
	Health	Disease prevalence in affected communities
	Human and animal rights	Gross human rights violations against workers Violation of indigenous peoples' rights Animal rights violations
	Labour	Labour rights infringements Workplace accidents, injuries and fatalities Child labour
Governance	Corruption	Major corruption issue Minor corruption issue Corruption and bribery
	Product quality	Misrepresentation of the origin of products
	Smuggling	Non-payment of taxes, fees and royalties due to governments, including smuggling
	Corporate citizenship	Negative perceptions of corporate citizenship

Source: Denny Ellison & TDi Sustainability

Note: Greenhouse gas emissions have also been included in public issues relating to deforestation. They have been singled out when the issue has been explicitly mentioned in the report.

Each public issue is also rated on a scale of 1 to 5 based on its gravity, reach and causality. TDi has adapted the salience theory to apply to quantifying public issues as it is a best attempt to assess the 'magnitude' of a public issue based on how serious the allegation is, the media coverage it has received and a specific company's involvement in the alleged issue.

Figure 3 shows how the three sub-components of salience are defined when measuring the magnitude of ESG public issues.

Figure 3 – Salience of public issues based on gravity, reach and causality

Gravity	<p>A rating based on the judgement of the overall seriousness of the allegation on a scale of 1 (least serious) to 5 (most serious).</p> <p>Factors to consider include:</p> <ul style="list-style-type: none"> ▪ Degree and scale of human suffering ▪ Degree of moral affront (e.g. premeditated murder by mine security is worse than accidental death through mine collapse). ▪ Degree and scale of irreparable damage (to communities, ecosystems, natural and archaeological heritage, etc) ▪ Scope of allegation: Does the allegation concern a one-off incident, or a pattern or culture of transgression? <p>The gravity score is inherently subjective to some extent.</p>												
Reach	<p>This category is intended to serve as a proxy for both the credibility and severity of the report.</p> <p>A report higher up the reach scale is more likely to have been thoroughly factchecked and scrutinised and less likely to be the product of a personal or institutional ulterior motive.</p> <p>Similarly, an issue that is reported on by major institutions is likely to be more severe than an issue that is only covered by local or unofficial sources.</p> <p>The ratings for the reach of the allegation are on a scale of 1 (lowest reach) to 5 (greatest reach).</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 2px;">Score</th><th style="padding: 2px;">Reach of Allegation</th></tr> </thead> <tbody> <tr> <td style="padding: 2px;">5</td><td style="padding: 2px;">Uptake by major international organisations (e.g., UNHRC) or major intervention by government regulator</td></tr> <tr> <td style="padding: 2px;">4</td><td style="padding: 2px;">Coverage in peer reviewed academic journals, or by educational or governmental institutions, or sustained NGO / legal campaigns</td></tr> <tr> <td style="padding: 2px;">3</td><td style="padding: 2px;">Uptake by international media or think tanks. "International media" is media based outside the country in which the issue occurred.</td></tr> <tr> <td style="padding: 2px;">2</td><td style="padding: 2px;">Local/national media coverage only</td></tr> <tr> <td style="padding: 2px;">1</td><td style="padding: 2px;">Confined to blogs and social media</td></tr> </tbody> </table>	Score	Reach of Allegation	5	Uptake by major international organisations (e.g., UNHRC) or major intervention by government regulator	4	Coverage in peer reviewed academic journals, or by educational or governmental institutions, or sustained NGO / legal campaigns	3	Uptake by international media or think tanks. "International media" is media based outside the country in which the issue occurred.	2	Local/national media coverage only	1	Confined to blogs and social media
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Causality	<p>This category is intended to serve as an indication of the level of involvement, responsibility or accountability the company has over the public issue that occurred.</p> <p>In addition to how directly a company's actions can reasonably be attributed to a negative impact, the degrees of separation of its business relationships to other malign actors is considered.</p> <p>For example, a public allegation involving producers of all types of food would have a lower causality for a specific beef producer as this is not specific to the nature of beef production.</p> <p>The ratings for causality are on a scale of 1 (lowest causality) to 5 (greatest causality).</p>												

Source: Denny Ellison & TDi Sustainability

We note that within every industry and sector, there are particular public issues that are likely to affect the valuation or share price of a company. Companies are likely to be negatively affected by the public issues that are most relevant to their core business operations. In the case of JBS, its business depends on productive land and livestock, so ESG issues that have a direct negative impact on these assets can be perceived as poor stewardship on the part of JBS, resulting from an incentive to increase profit.

b. Public Issue Index – PII[©]

We have created a Public Issue Index (PII[©]) specific to each sin stock by mapping each public issue on a timeline. This in turn has been divided into three sub-indices for environmental, social and governance issue areas.

Public Issue Index (PII[©]) = Gravity score (1 to 5) + Reach score (1 to 5) + Causality score (1 to 5)

A further three indices were created based on the nature of the public issues:

- ***Environmental Public Issue Index (E-PII[©])***
- ***Social Public Issue Index (S-PII[©])***
- ***Governance Public Issue Index (G-PII[©])***

PII[©] is calculated as the sum of the ratings for gravity, reach and causality for each public issue on a specific date. Representations of the index will have the data aggregated per month, week or day.

The index offers a clear perspective on the nature and magnitude of adverse reputational damage to specific companies over time. In this report, we have applied our methodology to JBS, the world's largest quoted producer of animal protein (see application to JBS, page 23).

c. Public Issue Risk Profile – PIRP[©]

Following the construction of the public issue indices for each company, we then conduct a correlation analysis with the company's past valuation.

This is conducted over a period of 10 years.

In order to exclude the impact of other fundamental factors on the valuation, we conduct a correlation analysis based on P/E (or EV/EBITDA) and relative to the relevant index, depending on the data available.

P/E valuation

We examine the financial performance of the company in P/E terms, and especially on a one-year forward rolling P/E, based on data suppliers with consensus expectations.

For years when a company has negative EPS and net income, we use EV/EBITDA as a proxy.

We note that changes in consensus earnings expectations understandably tend to lag the event. When a company announces an acquisition, the share price can react to the news immediately (or certainly within the same day), while consensus EPS expectations will adjust to the news sometime during the following three months, as analysts build the most recent actual numbers into their forecasts.

Relative valuation performance vs. an index

We also calculate the share price performance relative to its most relevant index. This can be a geographical index (e.g., the S&P 500 for example) or a sector index (e.g., the MSCI consumer discretionary index for example).

Taking the example of beef manufacturing in Brazil, any news that might affect the global supply and demand balance of beef worldwide – such as wildfires in Australia affecting local production and inflating global beef prices – will impact the share price of all quoted Brazilian beef producers, independent of any specific public issue allegation against a company.

‘Hit point’ correlation analysis

The Public Issue Index is a sparse data set, with a value of 0 for most days and weeks when there are no public issues facing a specific company.

Thus, a linear timeline correlation analysis between the valuation of a company and the Public Issue Index would yield very few results.

We therefore conduct a ‘hit point’ correlation analysis by looking at the company’s absolute P/E or relative P/E premium or discount to the index during the few months that follow a public issue report or article.

‘Hit point’ correlation analysis =

Correlation between

*Absolute or relative P/E movement in the few months after a public issue report
and*

Public Issue Index

We pick the timeframe that is the most relevant for each company depending on the level of correlation observed. This could be during the one, two, three or four months following a public issue report. We refer to the chosen timeframe with the letter ‘X’ below.

Public Issue Risk Profile (PIRP[©])

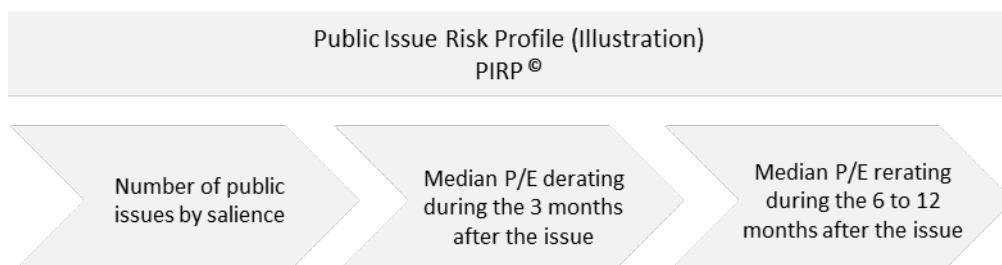
The Public Issue Risk Profile offers a useful insight into the number of public issue allegations a company has received over the last 10 years, the magnitude and type of issues (using the Public Issue Index) and the median P/E reaction during the months following the events (please refer to the JBS PIRP[©] on page 26).

We then analyse how the valuation recovers following the initial valuation hit.

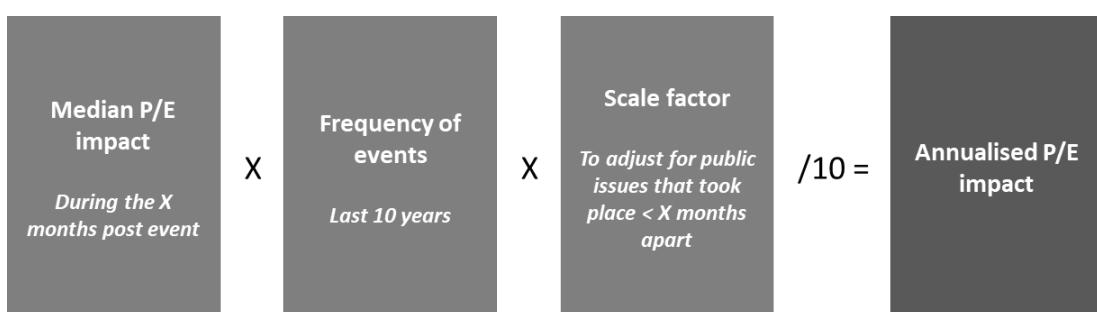
Some companies will see their valuation recover much more slowly from a particular type of public issue or from a public issue with a high salience.

Here, again, we adapt the selected timeframe on a case-by-case basis to find the one with the strongest signal, in which the reaction is most concentrated and thus likely to be correlated. As an example, for a liquid stock with strong fundamentals, the valuation recovery following a public issue will likely be shorter (one to two months), while it might be as long as three to four months for other stocks.

From the PIRP[©] analysis, we derive a summary of the company's risk profile, with the initial valuation impact, length and trajectory of recovery from public issues and the frequency of such events.



We derive an annualised valuation impact from public issues by multiplying the median P/E impact during the first X months following each event and the frequency of such events over the last 10 years. We also adjust the frequency by a scale factor to account for the events that took place within X months of the previous one.



Finally, we estimate a discount to the company's target valuation derived from fundamental analysis by adding up the annualised P/E impact for each range of salience of public issues.

Discount to target valuation = sum of annualised P/E impact for each range of salience of public issue

ii. Step 2 – ESG Credentials[®] Valuation Offset

The second step in the methodology is to quantify the long-term value created through a company's specific ESG policy commitments to respond to and manage these public issues.

How companies respond to external signals is a strong indicator of their ability to manage risk ('response-able'), adapt to market needs and create value for the long term, itself a core tenet of corporate sustainability and an important consideration for potential investors.

In response to stakeholder allegations, companies may have invested in political and social factors to win the cooperation of or reduce the conflict with external stakeholders. For example, seeking a 'social licence', or community approval for land extensions or increasing internal policy controls on labour rights and animal welfare standards are investments companies make that can improve their reputation.

To score companies on their positive ESG actions, each environmental, social and governance parameter is assessed on several subcategories relevant to the industry.

The table below shows an example of the subcategories in the animal protein production sector.

Figure 4 – ESG scoring categories example

Environmental	Social	Governance
Biodiversity	Community	Animal Welfare
Deforestation	Gender	Board
Energy	Human Rights	Corruption
Water	Labour Rights	Stakeholder Engagement
	Occupational Health & Safety	Supply Chain
		Sustainability

Source: Denny Ellison & TDi Sustainability

We then assess companies on their commitments, disclosures and implementations and allocate a coverage score to each subcategory. This shows the number of areas covered by a company's ESG initiatives out of the total number of subcategories identified. A percentage score is then allocated on how the company has performed in each area.

Although the scoring is to some extent subjective, it is based on rigorous peer analysis, TDi Sustainability's public issue matter expertise and a detailed benchmark for allocating the score (available upon request).

Figure 5 – ESG scoring

	ESG criteria	ESG area coverage	Performance score
Environmental	Commitment	Area covered / total number of subcategories	Score out of 100%
	Disclosure		
	Implementation		
Social	Commitment	Area covered / total number of subcategories	Score out of 100%
	Disclosure		
	Implementation		
Governance	Commitment	Area covered / total number of subcategories	Score out of 100%
	Disclosure		
	Implementation		

Source: Denny Ellison & TDi Sustainability

Application to valuation

While ESG commitments and disclosures can be made relatively easily and in a timely manner, their implementation is often a long-term goal that takes time to come to fruition.

We assume that a company needs a perfect (100%) ESG score to eliminate any risks of future public issues. We have assigned a weight of 0.6 to the ESG commitments and disclosures of each company and a weight of 1 to their implementation. Although the valuation may be more impacted by greater disclosure and more commitments, we believe it should be most closely correlated with the implementation thereof, which is likely to lead to tangible results.

We derive our target valuation offset by simply multiplying this ESG score by the discount calculated in step 1 and multiplying this by -1.

$$\text{Valuation discount offset} = -(\text{ESG score} \times \text{discount to target valuation})$$

Current valuation discount/premium already priced in

We estimate the current ESG valuation discount/premium already in the share price by looking at recent public issues and comparing the valuation that followed these events to the average valuation reaction over the last 10 years.

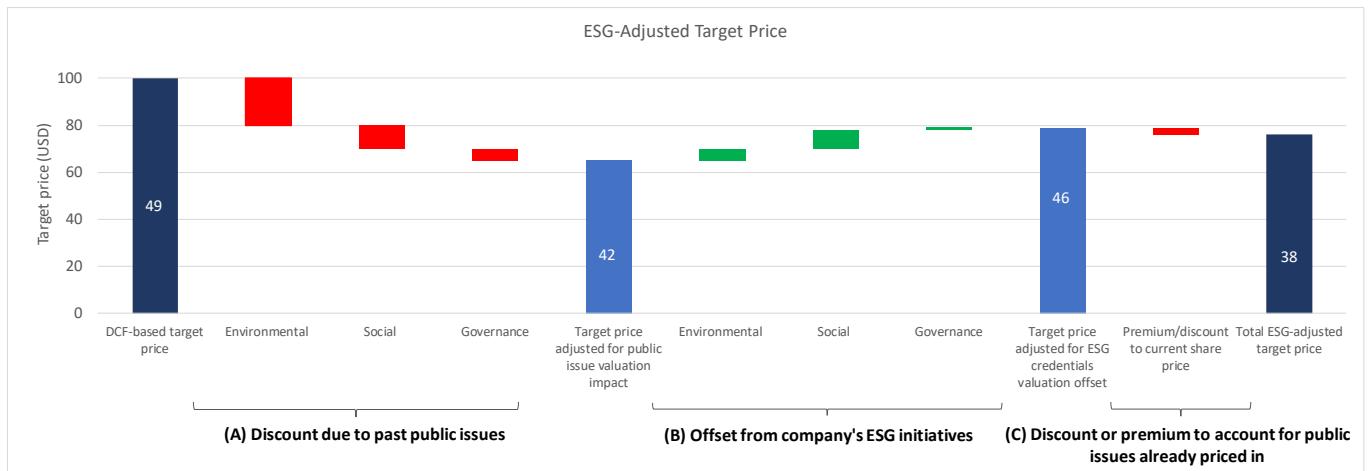
This analysis is coupled with fundamental research analysis.

iii. Step 3 – ESG Adjusted Target Valuation

We start the last step with a fundamental analysis of the company and derive a target valuation based on a DCF or SOTP.

We then derive a final valuation discount by combining (A) the discount due to past public issues, (B) the offset from the company's ESG initiatives and (C) the current discount or premium already priced in.

Figure 6 – ESG-adjusted target valuation – illustration



Source: Denny Ellison & TDi Sustainability

E. Limitations

While the methodology produces interesting and actionable results for investors in 'sin stocks', our analysis of the animal protein sector in Brazil has enabled us to discover two limitations to its application.

- **Size** – We have found that the methodology works best for large caps with high liquidity. This is mainly because their share prices are more sensitive to news items and are quicker to respond.
- **Fundamentals** – We found that if the company has periods of negative EPS or lacks certain fundamental qualities (positive earnings and long-term earnings progression), the methodology also falls short. This is because the valuation of such stocks, even on an EV/EBITDA basis, would be too volatile to apply the methodology.

Looking at the Brazilian animal protein sector, JBS's main competitors are Minerva and Marfrig. Both of these stocks have shown little valuation impact from public issues given the volatility of their earnings and their smaller market cap. A summary of their Public Issue Index can be found in the appendix.

JBS

ESG Valuation Report

JBS – ESG Valuation Report

Executive summary

A significant governance scandal in 2017 dominates JBS's history of public issues. JBS has been subject to many public allegations of misconduct over the last 10 years, resulting in ~180 public issues. Of these, ~50% were governance-related, 40% social and ~10% environmental. The governance allegations were mostly of high salience, with >40% scoring 13-15 on a salience scale of 3-15. These related to a significant corruption scandal in 2017 involving company management and a major shareholder. Social and environmental issues have been more prominent over the last two years.

Public issue valuation impact

The shares traded below their 10-year average during two distinct periods when public issues were particularly prominent. In 2017-18 and 2020-21, the shares traded at respective average discounts of 26% and 10% to their 10-year average P/E. The negative valuation impact was most significant for public issues of high salience (13-15), which prompted a 21% derating on average. Based on the median valuation reaction from public issues over the last 10 years, we derive a valuation discount of 13% to our target price.

-13%
discount

ESG credentials

JBS has shown some clear improvement on governance but needs to do more on environmental issues. JBS scores 55% for governance. This reflects some positive implementations such as a R\$10bn pay-out penalty for admitting to bribery. JBS scores best on social matters, with 72%. On environmental issues, the company scores 41%, suggesting some areas of improvement. In particular, the company failed to demonstrate deforestation-free operations and supply chains. Based on its ESG credentials, we apply an 8% valuation discount offset given the company's ESG initiatives that should limit the persistence of public issues going forward.

8% discount
offset

Recent public issues already priced in?

Over the last three months, the shares have performed particularly well, showing no signs of negative impact from 20 recent public issues. We apply a further 16% discount to our target valuation to account for these issues, which do not seem to be reflected in the current share price.

-16%
discount
offset

Investment recommendation and ESG-adjusted target valuation

Buy rating, with valuation upside restrained by ESG public issues. Our DCF-based target price is R\$49 per share, offering 34% upside potential to the current share price. Our analysis on ESG public issues and credentials results in a 21% discount to our fundamental target price. This leads to an ESG-adjusted target price upside of 6%.

Total -21%
discount to
target
valuation

Summary of public issues

JBS is a Brazil-based animal protein producer with operations in Brazil, the US, Australia and Canada. JBS also produces a wide range of convenience foods and value-added food products as well as a variety of derivative products, including leather, hygiene and cleaning products, collagen and biofuel.

Our analysis of public issues related to JBS found that major corruption issues were the most widely reported by various online sources, including international and local Brazilian media outlets. We provide a summary of other key issues below:

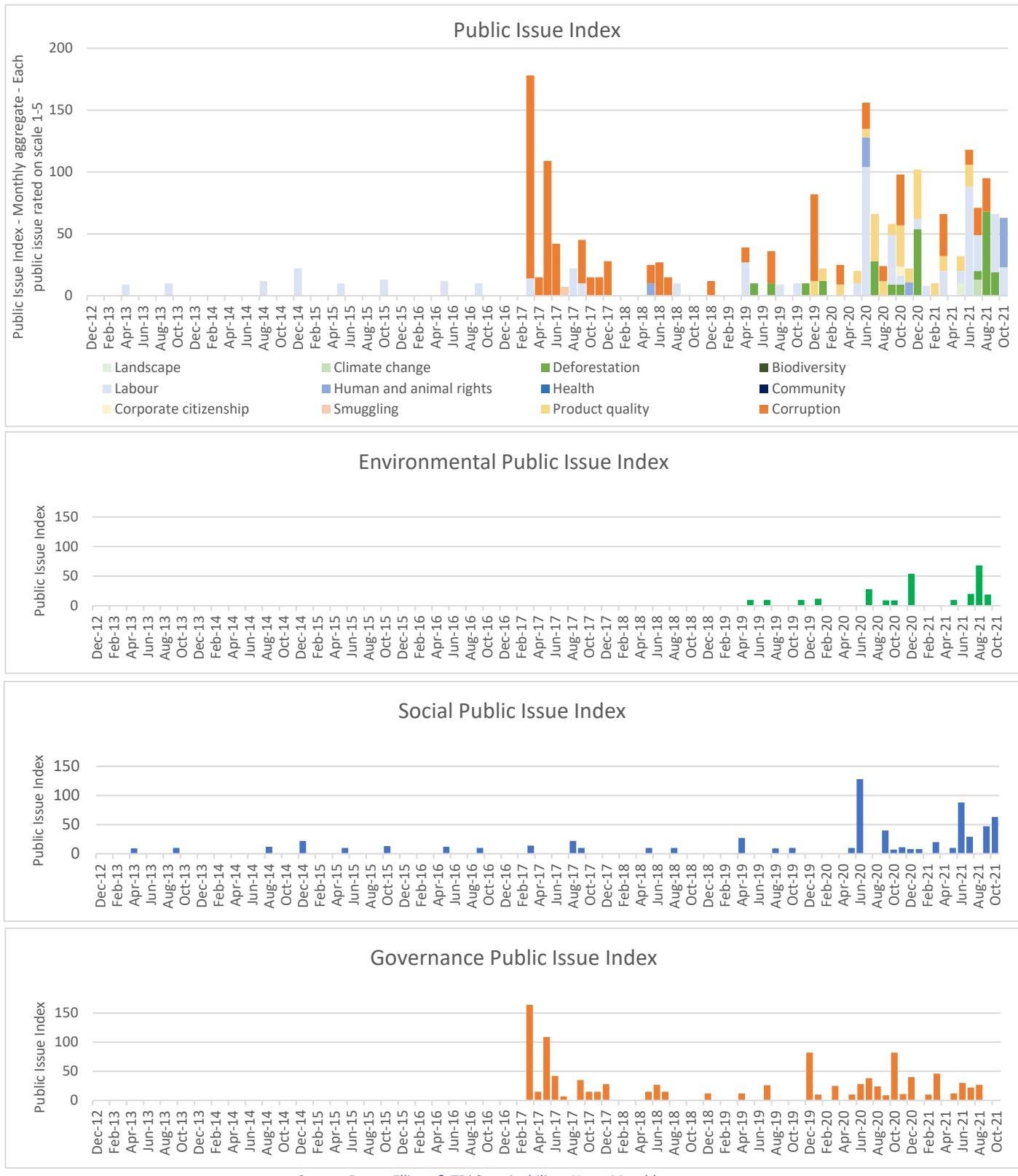
1. **Indictment of Joesley and Wesley Batista, former chairman and CEO of JBS.** In 2017, Joesley and Wesley Batista, who control JBS via their holding company J&F, were arrested for insider trading and sentenced to four years in jail. In connection with this significant Brazilian corruption scandal, more than 1,900 high-ranking politicians were bribed. Wesley was released from jail in February 2021 but was forbidden to be involved in the running of JBS. Joesley is still incarcerated.
2. **BNDES scandal.** In 2017, JBS was investigated by the Brazilian Government Agency of Law Enforcement regarding R\$8.1bn in loans made by the Brazilian National Bank for Economic and Social Development (BNDES, JBS's second-largest shareholder) – more specifically, the Bank's purchase of company shares at prices above market, in addition to the non-return of funds that it had released for a business acquisition that did not go ahead.
3. **Operation “Carne Fraca”.** A 2017 investigation of a fraud and corruption scheme in Brazilian slaughterhouses, in which Ministry of Agriculture inspectors were bribed to facilitate the production of adulterated foods and issue health certificates without carrying out inspections. BRF and JBS used ascorbic acid (over the limits imposed by law) and other carcinogens in meat to act as preservatives in an attempt to address the issue of its meat going bad quickly, which had received negative press. The EU and China temporarily restricted imports from Brazil, impacting revenue. Part of the money involved PMDB (Party of Brazilian Democratic Movement) and PP (Progressive Party) political parties.
4. **Misrepresentation and deforestation allegations along the supply chain.** Over the last ten years, there have been multiple reports highlighting the practice commonly known as “cattle laundering”. This practice begins with raising animals on legally restricted plots of land, such as indigenous demarcations or land reform areas. The cattle are then transported and mixed into legally operating properties and subsequently added to the supply chain. In the case of JBS, there has been evidence of a correlation between this practice and issues such as deforestation, poor working conditions and the violation of indigenous peoples' rights.
5. **Working conditions.** A study published in 2021 revealed that the number of accidents within JBS amounts to seven a day. There have been multiple reports suggesting a lack of proper

training (resulting in deaths) and systemic abuse of workers' rights due to unpaid working hours, as well as a conviction for child labour within the supply chain in 2016.

6. **COVID infection of indigenous communities.** The company has been accused by coronavirus experts of being the starting point of contagion for indigenous communities in June 2020, by failing to protect said members working in slaughterhouses. There were also attempts to dismiss the workers after the occurrence, which is unlawful during the pandemic, according to Brazilian law.
7. **Other issues.** The company has also been involved in several other minor and major corruption scandals between 2017 and 2021, including the bribery of government officials and public prosecutors.

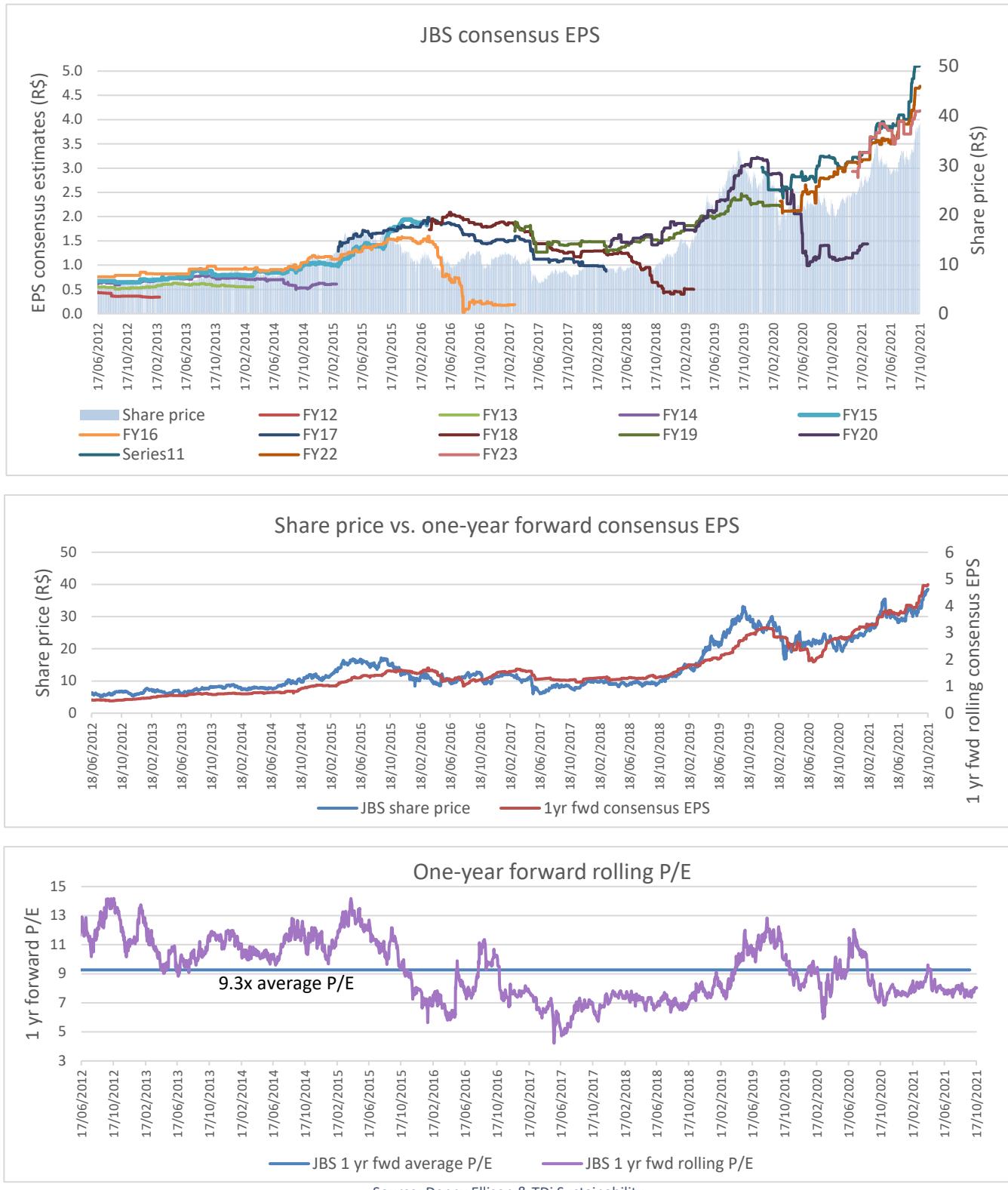
Public Issue Index

Figure 7 – JBS Public Issue Index (PII[©])



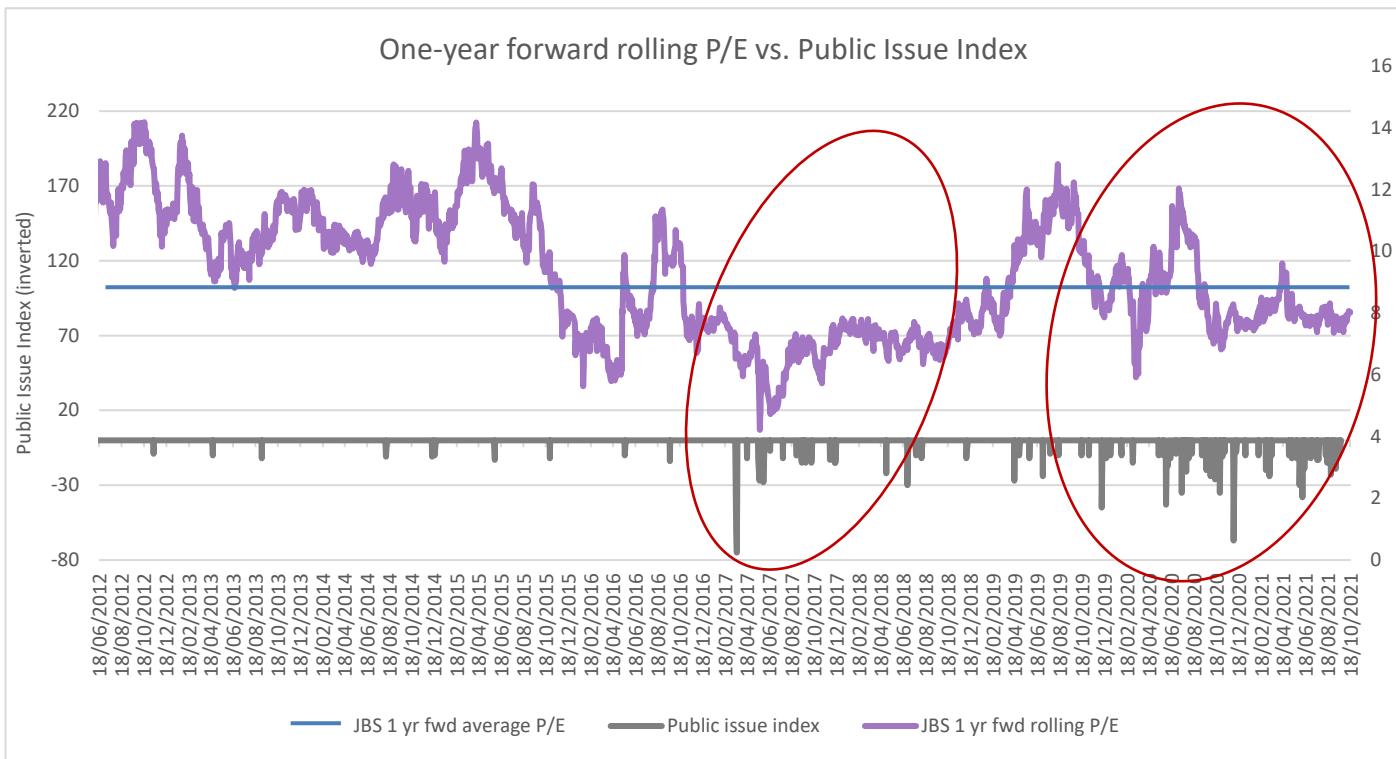
Historical valuation

Figure 8 – JBS share price and consensus EPS



Source: Denny Ellison & TDi Sustainability

Figure 9 – JBS valuation against public issue index



Source: Denny Ellison & TDi Sustainability - Note: The Public Issue Index is shown with negative values above

Our methodology looks at the relative P/E performance of a company against the relevant index. In the case of JBS, this is the IBOVESPA (Brazilian index).

However, during the COVID pandemic, the index valuation increased sharply to >80x P/E given that EPS turned negative for a large number of companies during that period.

We therefore conducted the correlation analysis for JBS on an absolute rather than relative P/E basis.

Figure 10 – JBS correlation analysis – Public Issue Index vs. valuation – past 10 years

Correlation coefficient

Timeframe	2012-21	2017-21	2019-21
Public issue index vs. P/E movement during the 3 months post event	-0.263	-0.255	-0.244
Timeframe	2017-2018	2020-2021	
Public issue index vs. P/E movement during the 3 months post event	-0.462	-0.135	

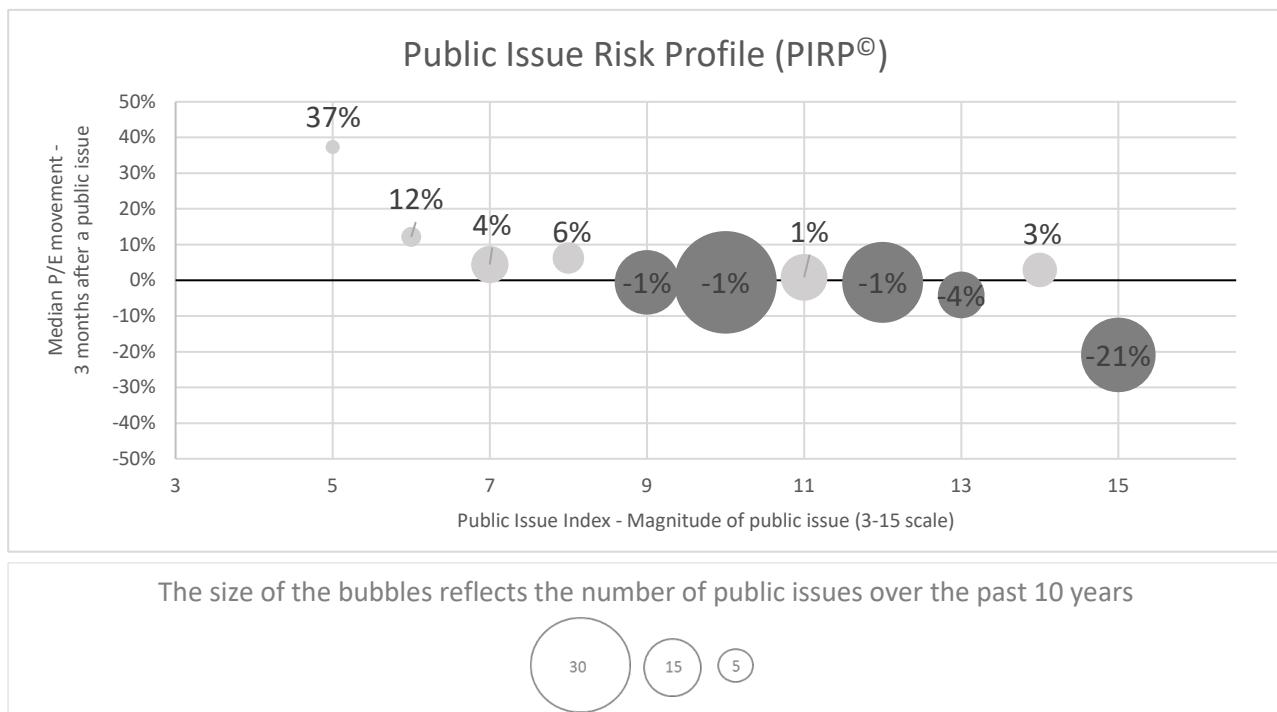
Source: Denny Ellison & TDi Sustainability

Public Issue Risk Profile (PIRP[©])

- The Public Issue Risk Profile shows a strong negative valuation impact from public issues of high salience, with a 21% valuation decline on average over the last 10 years for issues that rank 15 (the highest on the scale).
- We note a large number of high and very high-magnitude issues for JBS, with 88 cases that ranked 9-15 in magnitude and 44 cases that ranked 13-15 over the last 10 years, mainly comprised of governance issues.
- Governance issues seem to have the greatest impact on valuation, with a large number of high-magnitude public issues leading to a -21% median P/E derating during the following three months. These issues mainly relate to the 2017 scandals. Low-magnitude governance issues have had little impact on company valuation.
- A small number of high-magnitude environmental issues impacted the valuation, although the company was subject to relatively few public allegations on this front.
- There was some valuation impact from social issues, although the bulk of mid-range issues in this category had little effect on valuation.

Figure 11 – JBS Public Issue Risk Profile (PIRP[©])

Valuation impact in the three months following a public issue – Average of last 10 years



Source: Denny Ellison & TDi Sustainability - Note: Public issues that returned a positive value for the median P/E movement 3 months after the event are in light grey above and are deemed to have had no negative valuation impact

Figure 12 – JBS Public Issue Risk Profile (PIRP[©]) –
Valuation impact during the three months following a public issue – Average last 10 years

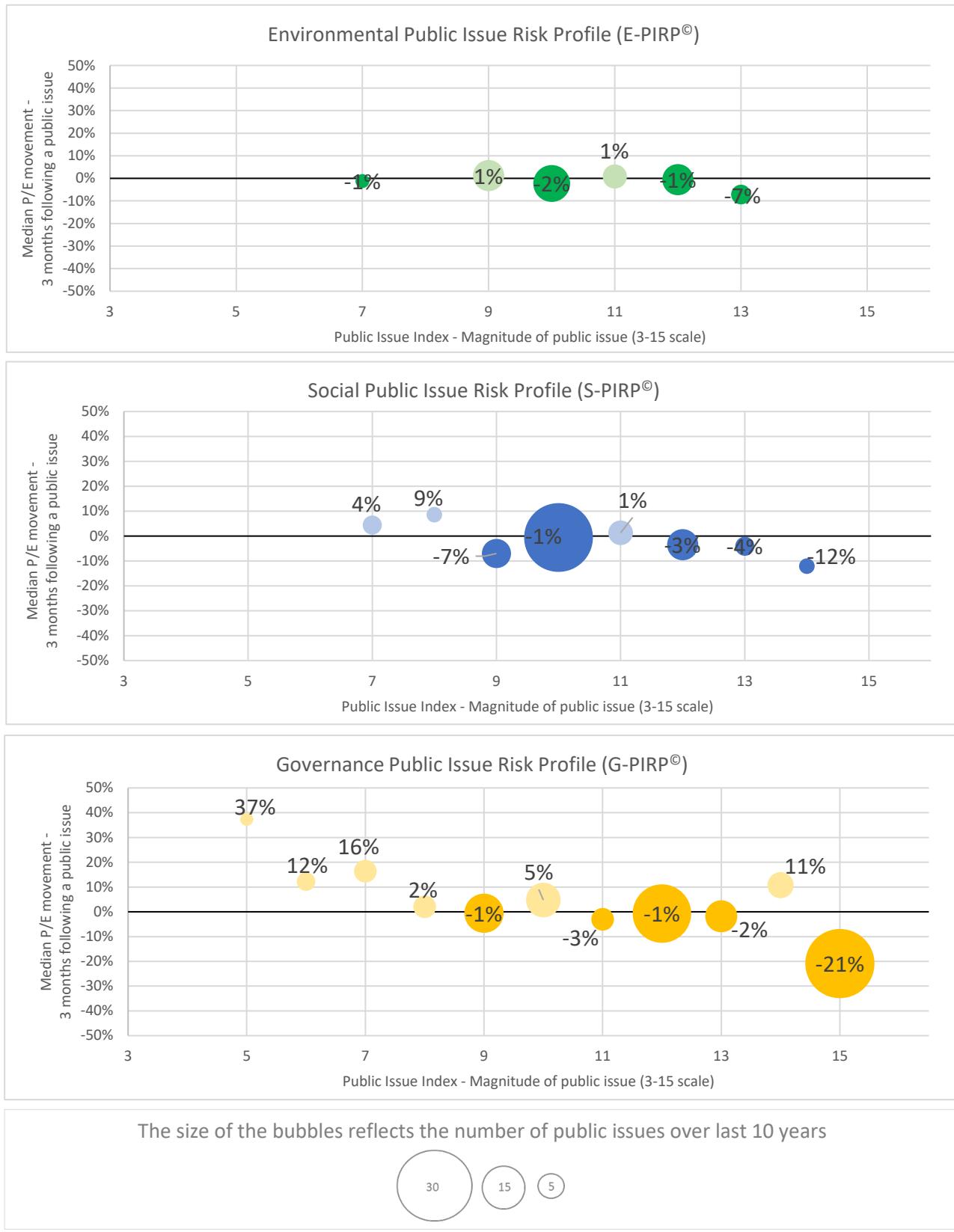
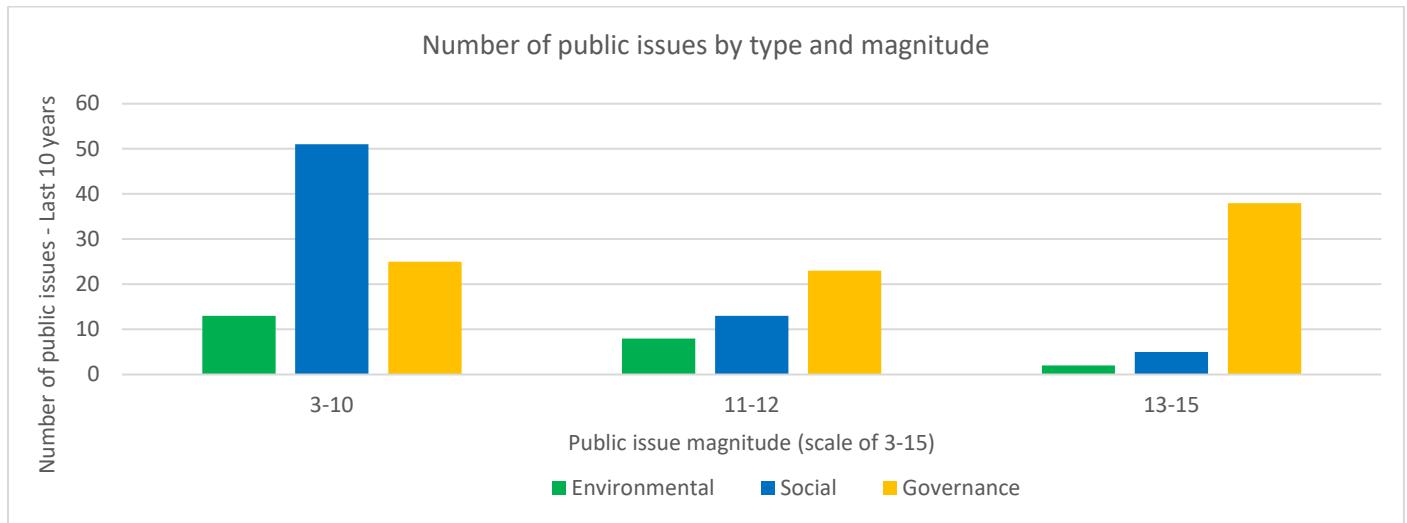


Figure 13 – JBS number of public issues by type and magnitude

Source: Denny Ellison & TDi Sustainability

Discount to target valuation based on public issue risks

As shown in the table below, we multiply the median valuation impact during the three months that follow each public issue by the frequency of the events over the last 10 years and multiply by a scale factor. The scale factor is calculated as the number of public issues that took place more than three months after the previous one divided by the total number of public issues. This is to prevent double counting the impact of two events that took place shortly one after another. We then divide the result by 10 to annualise the impact.

The primary valuation risk to JBS is from issues of magnitude 13-15, which have led to a 12% valuation derating on average in the last 10 years. Having received a large number of high-magnitude allegations (45 public issues), JBS's valuation has been hit 45 times by an average derating of 12%.

On an annualised basis, and adjusting for the events that took place close to each other, this leads to a total discount to our fundamental target valuation of 13% to reflect the public issue risks.

Note that the discount does not account for any initiatives the company has implemented to mitigate these issues going forward, which we analyse in the next section.

Figure 14 – JBS discount to target valuation to reflect public issue risks

Discount to target valuation to reflect public issue risks						
Public Issue Index (range of magnitude)	P/E impact - Following 3 months post event	Frequency - Last 10 years	Scale factor	Annualised P/E impact	Translated into extra equity risk premium	Translated into P/E discount
3-10	No impact	89				
11-12	-1%	44	11/44	-1%		
13-15	-13%	45	9/45	-12%		
Total discount to target valuation				-13%	2.81%	-1.36x

Source: Denny Ellison & TDi Sustainability

The tables below show how the discount is split between environmental, social and governance issues.

The largest discount comes from governance issues, with an 8% discount. We note that the public issues on governance took place within a relatively short period of time (mainly around the 2017 scandal). Thus, the scale factor reduced the overall discount on governance.

We also note the small discount allocated to environmental issues given the lower number public issues received and the fact that they seem to have occurred shortly one after another. The environmental public issues have also only increased in the last two years – hence, they have a relatively small overall impact in light of the past 10 years.

Figure 15 – JBS discount to target valuation to reflect public issue risks by type

Discount to fair value to reflect Environmental public issue risks						
Environmental Public Issue Index (range of magnitude)	P/E impact - Following 3 months post event	Frequency - Last 10 years	Scale factor	Annualised P/E impact	Translated into extra equity risk premium	Translated into P/E discount
3-10	-1%	15	5/15	0%		
11-12	0%	8	2/8	0%		
13-15	-7%	2	1/2	-1%		
Total discount to fair value				-1%	0.21%	-0.10x

Discount to fair value to reflect social public issue risks						
Social Public Issue Index (range of magnitude)	P/E impact - Following 3 months post event	Frequency - Last 10 years	Scale factor	Annualised P/E impact	Translated into extra equity risk premium	Translated into P/E discount
3-10	No impact	48				
11-12	-2%	13	8/13	-1%		
13-15	-7%	5	4/5	-3%		
Total discount to fair value				-4%	0.89%	-0.43x

Discount to fair value to reflect public issue risks						
Governance Public Issue Index (range of magnitude)	P/E impact - Following 3 months post event	Frequency - Last 10 years	Scale factor	Annualised P/E impact	Translated into extra equity risk premium	Translated into P/E discount
3-10	No impact	26				
11-12	-1%	23	9/23	-1%		
13-15	-15%	38	5/38	-7%		
Total discount to fair value				-8%	1.72%	-0.83x

Source: Denny Ellison & TDi Sustainability

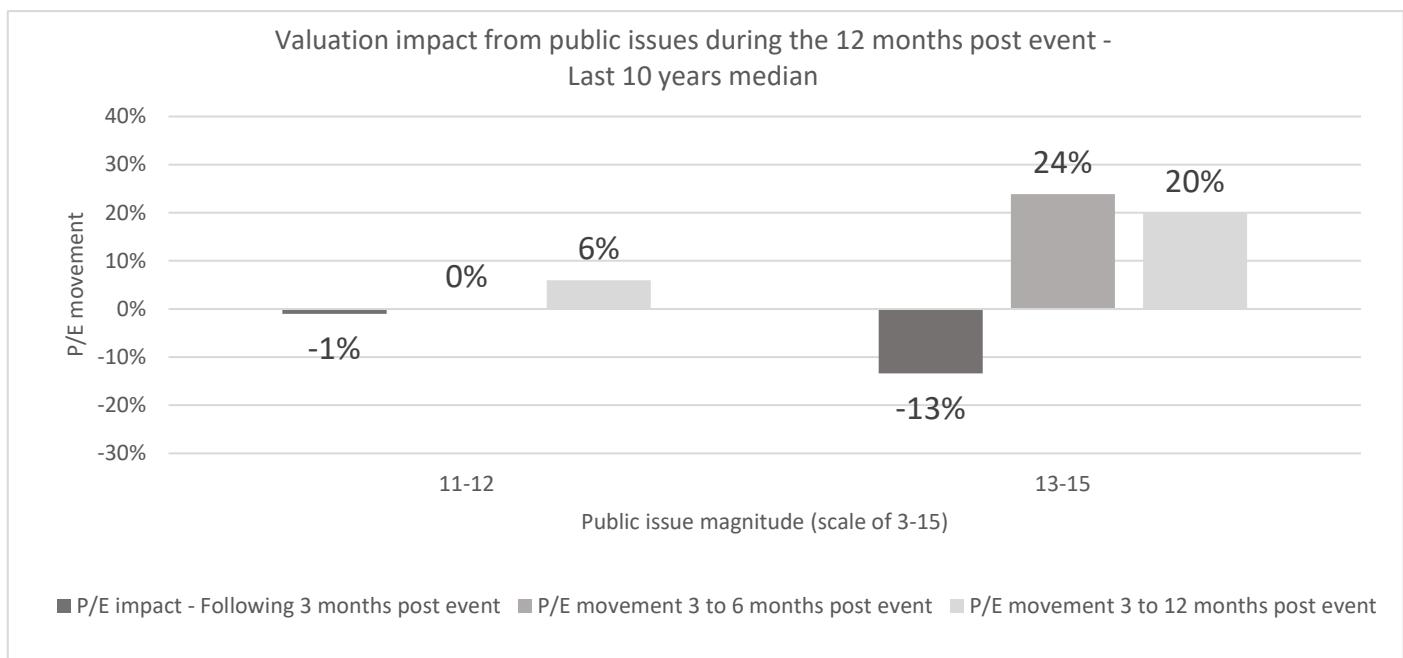
Valuation recovery following a public issue

Looking at the company's valuation recovery following each type of public issue, for those of high magnitude (13-15 out of a scale of 15), the valuation has recovered strongly during the three to six months that follow a public issue (the company P/E recovered from a -13% derating in the first three months to a rerating of +24% during the three to six months following a public issue).

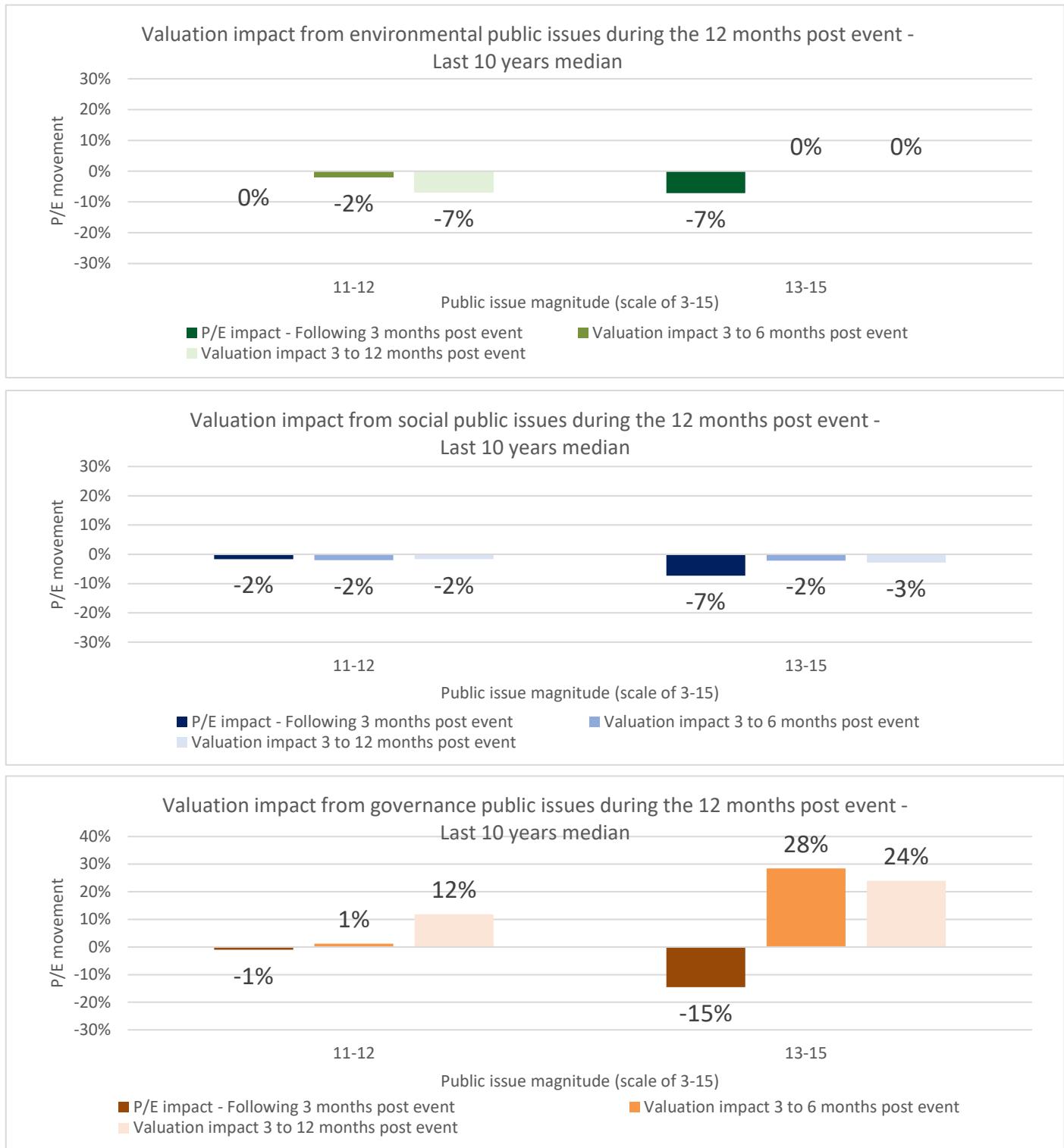
Our take on this is that investors seem to have used the share price dip that followed past high-magnitude public issues as an opportunity to buy the shares, given the solid fundamentals of the company.

Figure 16 – JBS Public Issue Risk Profile (PIRP[©])

Valuation recovery time after a public issue – Average last 10 years



The valuation recovery seems to be the highest following a public issue relating to governance, as shown below.

Figure 17 – JBS Public Issue Risk Profile (PIRP®)**Valuation recovery time after a public issue – Average last 10 years**

Source: Denny Ellison & TDi Sustainability - Note: P/E movement calculated as the weighted average P/E movement

Looking at the valuation over the last three months, we note that the shares have performed particularly well, showing no signs of negative impact from recent public issues.

As shown in the table below, the 20 public issues that arose over the last three months should have theoretically impacted the valuation by 9% (average one-year forward P/E) in the three months following each event. However, the actual valuation increased by 7% on average.

From our fundamental analysis (see our fundamental research report on pages 42-56), the company has reported strong results in recent months, given supportive global supply/demand balance and positive pricing.

This seems to have driven further rerating and overshadowed the recent ESG public issues.

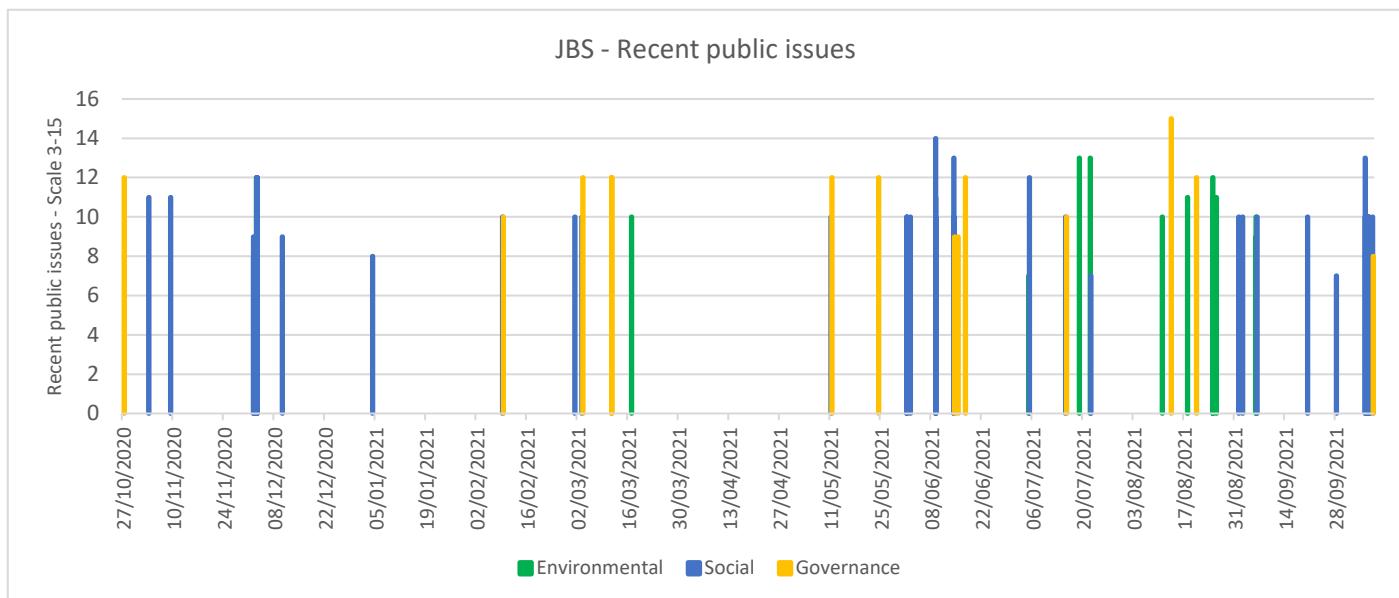
Figure 18 – JBS public issues in the last three months

Number of public issues	Theoretical 3-months P/E impact based on median over last 10 years	Total theoretical P/E impact - Last 3 months, time weighted	Actual P/E movement - Last 3 months	Difference
3-10	10	no impact		
11-12	6	-1%	0%	0%
13-15	4	-13%	-9%	7%
Total		-9%	7%	16%

Source: Denny Ellison & TDI Sustainability

Note: The theoretical P/E impact is calculated as the median of the three-month theoretical P/E impact adjusted for the when the event occurred within the last three months.

Figure 19 – JBS public issues in the last 12 months – Current valuation discount already priced in



Valuation discount offset given the company's ESG initiatives

The following tables show the summary of a comprehensive analysis of JBS's current ESG credentials on environmental, social and governance matters, as well as those of Minerva and Marfrig, its main competitors.

Figure 20– JBS ESG scoring summary and comparison vs. peers

ESG Criteria	ESG Area Coverage	Score
Environmental Commitment	5 / 6	49%
Environmental Disclosure	4 / 6	75%
Environmental Implementation	2 / 6	17%
Environment	6 / 6	41%
Social Commitment	5 / 5	81%
Social Disclosure	4 / 5	88%
Social Implementation	5 / 5	56%
Social	5 / 5	72%
Governance Commitment	6 / 7	42%
Governance Disclosure	4 / 7	54%
Governance Implementation	6 / 7	58%
Governance	6 / 7	53%
TOTAL	17 / 18	55%

Minerva

ESG Criteria	ESG Area Coverage	Score
Environmental Commitment	5 / 6	72%
Environmental Disclosure	5 / 6	96%
Environmental Implementation	4 / 6	50%
Environment	6 / 6	73%
Social Commitment	5 / 5	40%
Social Disclosure	4 / 5	75%
Social Implementation	5 / 5	58%
Social	5 / 5	58%
Governance Commitment	6 / 7	50%
Governance Disclosure	4 / 7	38%
Governance Implementation	6 / 7	71%
Governance	6 / 7	53%
TOTAL	17 / 18	61%

Marfrig

ESG Criteria	ESG Area Coverage	Score
Environmental Commitment	5 / 6	50%
Environmental Disclosure	2 / 6	50%
Environmental Implementation	3 / 6	13%
Environment	5 / 6	38%
Social Commitment	5 / 5	75%
Social Disclosure	3 / 5	50%
Social Implementation	3 / 5	21%
Social	5 / 5	49%
Governance Commitment	5 / 7	47%
Governance Disclosure	3 / 7	50%
Governance Implementation	5 / 7	54%
Governance	5 / 7	50%
TOTAL	15 / 18	46%

Source: Denny Ellison & TDI Sustainability

Each company is allocated a score of between 0 and 100%. The higher its score, the more we believe that the company will be able to limit future public issues from recurring given its strong ESG commitments, disclosures and implementation track record.

As an example, if a company receives a score of 60% and had a valuation discount of 20% from past public issues, we would add back 60% of the discount (i.e., 60% of 20% = 12%) to our target valuation.

Effectively, a score of 100% means that the company should prevent 100% of past public issues from recurring in the future.

The score is then broken down into three categories: environmental, social and governance. Within each, the company is scored on its commitment, disclosure and implementation.

For each score, the company is assessed on several different sub-categories (as depicted in Figure 4 on page 16). It is also given an 'ESG area coverage' score showing how many subcategories it has covered. As an example, if a company only covers two out of six subcategories within Social (i.e., community and gender), it would receive a score of 2/6.

Turning to JBS, the company was allocated an overall score of 55% for its current ESG practices. This is compared to 61% and 46% for its main competitors, Minerva and Marfrig, respectively.

The company scored best on social matters (72%), then governance (53%) and, finally, environmental (41%).

Environmental

On environmental issues, JBS achieved a relatively low overall score of 41%.

The company scored best for its disclosure of environmental issues (75%), which includes an A score received in 2020 for its GHG footprint via the Carbon Disclosure Project (CDP), a B score from CDP reporting on deforestation and reports against GRI 302 (energy) and 303 (water).

On environmental commitment, we note a slightly lower score than on disclosure with a 49% score. This reflects the company's commitment to net-zero global emissions by 2040 and a reduction in scope 1, 2 and 3 GHG emission intensity. We also note the company's pledge to "eliminate illegal Amazon deforestation from its supply chain including suppliers of its suppliers", together with "net-zero deforestation by 2035".

However, for implementation in environmental issues, JBS scored a meagre 17%.

This reflects its failure to adopt sustainable production and sourcing practices.

We also note that the company failed to demonstrate that it is achieving deforestation-free operations and supply chains, e.g., excluding the use of products originating from intact forest landscapes or tropical natural rainforest.

Social

JBS scores best on social matters, with a score of 72%.

We note its particularly high scores for commitment and disclosure (81% and 88%, respectively).

These include commitments to eliminate work-related injuries and achieve equal gender participation, disclosures against GRI standards 412 for human rights assessments, 402 labour/management relations and 403 for occupational health and safety.

Its social implementation score was slightly lower at 56%, given the small number of women in leadership positions and no meetings held with community representatives.

Governance

As discussed in the previous section on public issues, JBS has faced a particularly large number of high-salience issues regarding governance.

Considering what the company has done to address these allegations, we allocated it a score of 53% (in line with Minerva and slightly higher than Marfrig's 50%) for governance.

The score reflects the implementation of some encouraging governance measures, such as a ~R\$10bn pay-out penalty for admitting to bribery, together with stakeholder engagement with non-business entities, such as roundtables on sustainable beef.

Although the score is encouraging and will likely help to limit future public issues around governance, there are still some areas of improvement that need to be addressed to merit a higher score (such as a clear governance structure and assessments of governance performance).

The details of the ESG scoring are presented on pages 39-41.

We calculate the valuation discount offset from the company's ESG initiatives as follows:

Valuation offset from ESG score = - (JBS ESG score * Valuation discount from public issues)

Based on the peer comparison we estimate the following valuation offsets based on its ESG practices:

Figure 21 – JBS Valuation discount offset from ESG practices

Factors	Score (A)	Valuation discount from public issues (B)	Valuation offset from ESG score (C) = (-AxB)	Total discount to target valuation (D) = (B+C)
Environmental	41%	-1%	0%	
Social	72%	-4%	3%	
Governance	53%	-8%	4%	
Total	55%	-13%	8%	-5%

Source: Denny Ellison & TDi Sustainability

In summary, the table above shows that we apply an offset of 8% to the original theoretical valuation discount of 13% from past public issues. This means that we effectively give credit to the company for having conducted the necessary measures to limit the persistence of these issues in the future.

With the bulk of the original discount coming from governance public issues (-8% discount), we estimate that the company should be given some credit for its governance measures with a 4% valuation offset in that category.

Overall ESG adjusted target valuation and adjusted recommendation

In summary, we have made the following adjustments to our DCF valuation for JBS.

On a fundamental basis, we arrive at a target price of R\$49 per share with a target valuation of 10.1x 2022e P/E, implying 34% upside potential to the current share price of R\$36.

We make the following three adjustments to this target price, based on ESG considerations:

- a. We apply a theoretical 13% discount to reflect the impact of public issues;
- b. We offset this with an 8% premium based on the company's ESG practices, which should help to prevent public issues from persisting in the future; and
- c. We add a further 16% discount to account for public issues over the last three months that are not reflected in the current valuation.

The overall adjustment for ESG considerations is a 21% discount, which leaves 6% upside potential to the current share price.

Our investment recommendation on a fundamental basis is a Buy rating with a target price of R\$49 and 34% upside potential to the current share price of R\$36.

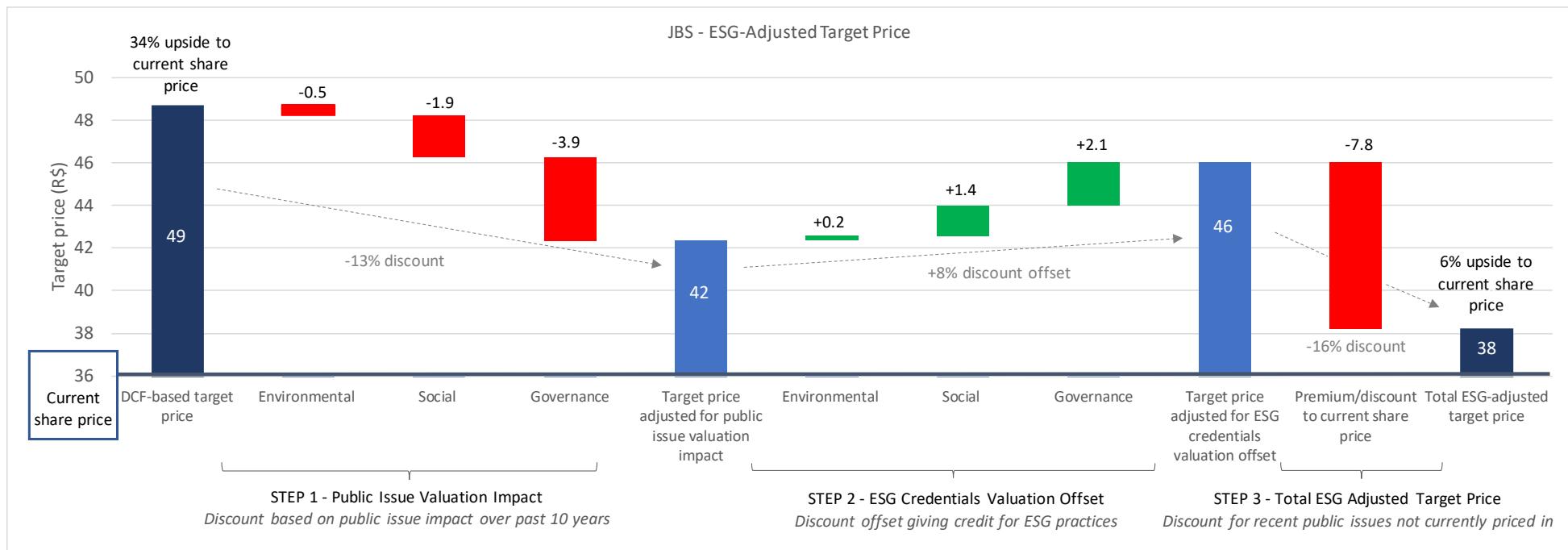
After adjusting for ESG, the upside is significantly reduced to 6% (R\$38 adjusted target price).

Figure 22 offers a summary of our ESG-adjusted target valuation.

Pages 39-41 offer further details on the ESG scoring mentioned above.

The final section of this report includes our fundamental research report on JBS, into which we have integrated our ESG valuation adjustment (pages 42-56). This offers an example of how the above analysis can easily be integrated into an internally or externally produced fundamental research report at asset management firms.

Figure 22 – JBS ESG adjusted target price vs. R\$36 current share price



Source: Denny Ellison & TDi Sustainability

Figure 23 – JBS ESG credential valuation offset

Measurement Category	Key Indicator	Environmental Metrics																	
		GHG Emissions / Climate Action	Notes / additional indicators	Score	Biodiversity	Notes / additional indicators	Score	Deforestation	Notes / additional indicators	Score	Energy	Notes / additional indicators	Score	Water	Notes / additional indicators	Score	General	Score	
Commitment	Public Policy Statement or Formal Position				Commitment to zero impact on areas of high biodiversity / conservation value	No commitment	0	Company policy for achieving deforestation-free operations and supply chain (or similar)	Company pledged to "eliminate illegal Amazon deforestation from its supply chain including suppliers of its suppliers"	0.5	Commitment to reduce energy intensity of business operations	Company committed to reducing energy intensity	0.5	Commitment to reduce water use intensity of business operations and across supply chain	Company pledged to reduce water usage in its own operations	0.5			Environmental Commitment Overall Score
								Company policy exclude the use of products originating from intact forest landscapes, high conservation value areas, primary forests or tropical natural rainforests			Commitment to increase the energy efficiency of business operations	Company committed to increasing energy efficiency	0.5	Commitment to mitigate and minimise water pollution caused by business operations					
	Targets	Company sets target to reduce or eliminate net GHG emissions	Commitment to net-zero global emissions by 2040; Reduction in scope 1/2 /3 GHG emission intensity	1	No operations on or near areas of high biodiversity conservation value	No operations in habitat of animals on IUCN Red List	0	Deforestation free supply chain	Net zero deforestation by 2035	1	Energy efficiency targets e.g. reduced total electricity consumption; energy per unit of production e.g. kWh per ton		1	Specific targets for water intensity use reduction or reduction in volume of water intake per unit of production (m3 / ton) of output	Company reduced water usage in line with targets HOWEVER usage increased during COVID-19 pandemic	0.5			
	Average Score			1			0		0.75			0.667			0.5		0	49%	
Disclosure (Transparency)	Reporting	Company discloses GHG footprint via Carbon Disclosure Project or Task-Force on Climate-Related Financial Disclosures	Received an "A-" score in 2020	1				CDP reporting on deforestation, or analogous reporting framework	Received "B" score from CDP in 2020	1							Publicly reports progress against environmental milestones	0.5	Environmental Disclosure Overall Score
	Reporting Standards	Company discloses against GRI standard 305 for emissions, or similar			Company discloses against GRI standard 304 for biodiversity, or similar						Company discloses against GRI standard 302 for energy, or similar	Reports against GRI 302	1	Company discloses against GRI standard 303 for water and effluents, or similar	Reports against GRI 303	1			
	Average Score			1			0		1			1			1		0.5	75%	
	Performance	Company's GHG emission performance over multiple years			Adopted sustainable production and sourcing practices that improve soil health and increase/preserve biodiversity e.g. excludes use of products originating from high conservation areas		0	Company demonstrates that it is achieving deforestation-free operations and supply chains e.g. excludes use of products originating from intact forest landscapes or tropical natural rainforests		0	Business operations powered by renewable energy sources	Improvements in energy intensity / efficiency of business operations						Environmental Implementation Overall Score	
	Verification	Third-party audits	Third party audit carried out by Brazil GHG Protocol Program in 2019	1															
	Average Score			1			0		0			0			0		0	0	17%

Measurement Category	Key Indicator	Social Metrics												Score	Social Commitment Overall Score	
		Community	Notes/additional indicators	Score	Gender	Notes / additional indicators	Score	Human Rights	Notes/additional indicators	Score	Labour Rights	Notes/additional indicators	Score	OHS		
Commitment	Public Policy Statement or Formal Position	Commitment to respecting human rights of communities affected by its activities		1	Commitment to equal participation of men and women in its workforce	Commits to seek equal participation in workforce	1	Commitment to respect human rights	Alignment with UN Global Compact principle 1	1	Commitment to respect the fundamental rights of workers	Can include workers' right to collective bargaining and action	0.5	Commitment to eliminate / reduce work-related injuries / illness/ fatalities	1	Social Commitment Overall Score
		Commitment to engage with communities in order to secure the free, prior and informed consent of communities affected by business operations		0				Commitment to ensure the company is not complicit in human rights abuses	Alignment with UN Global Compact principle 2	0.5						
								Commitment to carry out human rights impact assessments		0						
								Commitment to not tolerating threats, intimidation, physical or legal attacks against human rights defenders								
	Targets	Bi-annual consultation with communities affected by business operations		0	Near-equal male / female employment ratio	>20% of senior management positions occupied by women	1	Commitment to the Voluntary Principles on Security and Human Rights			Child / forced labour free		1	Zero OHS serious injury / fatality rates by target year	1	
Average Score		0.333				1		0.5		0.75		1		81%		
Disclosure (Transparency)	Reporting				Annual reports state changes in male/female employment ratio	2020 Annual Report showed less women in leadership positions than previous year. Annual Report stated that company hired external consultancy to address gender issues	0.5								Social Disclosure Overall Score	
	Reporting Standards							Company discloses against GRI standard 412 for human rights assessments, or similar		1	Company discloses against GRI standard 402 for labour / management relations, or similar		1	Company discloses against GRI standard 403 for OHS, or similar		
	Average Score	0				0.5		1		1		1		1	88%	
Implementation	Personnel				Workforce gender balance	29% of leadership positions are held by women	0.5	Reporting company's human rights obligations to workforce		0.5	Representation of employees by collective organisation	Company allows workers to unionise	0.5	Company dedicates resources to improving staff OHS readiness	1	Social Implementation Overall Score
	Performance	Proof of events / meetings held with community representatives	Proof can be signed agreements, meeting minutes or photos	0		Women in leadership positions fell from 3.9% in 2019 to 2.7% in 2020	0	Legal action against company based on alleged human rights infringements						Decrease in occupational injury / fatality rate	1	
	Verification	Suppliers committing to treat affected communities fairly		0				Evidence of company monitoring its implementation of human rights policy commitments, with follow-up corrective changes to policies or processes						Food safety	1	
	Business Relationships							Company communicates its human rights policy commitments in its business relationships and contracts	Company has a policy in place but no indication of how it communicates to stakeholders and business relationships	0.5						
	Average Score	0				0.25		0.5		0.5		1		56%		

Measurement Category	Key Indicator	Governance Metrics															Score	
		Animal Welfare	Notes / additional indicators	Score	Board	Score	Corruption	Score	Stakeholder Engagement	Score	Supply Chain	Score	Sustainability	Score	General	Notes / additional indicators		
Commitment	Public Policy Statement or Formal Position	Commitment to meet NAMI Animal Standards in slaughterhouses	Company implements NAMI Animal Standards. Also mention SDG 15: Life on Land and their policy supporting the 5 freedoms (natural behaviour, prevent injury & disease, from discomfort, from hunger & disease and from fear & distress)	1	The company's public policy commitments are approved at board level	1	Combat all forms of corruption, including extortion and bribery	0.5			Company has a supplier (environmental) code of conduct	0.5	Commitment to sustainable production and procurement	0.5	Publicly available policy related to good governance		0	Governance Commitment Overall Score
											Company policy excludes the use of products originating from intact forest landscapes, high conservation value areas, primary forests or tropical natural rainforests	0			Company has a clear governance structure		0	
											Company supply chain monitoring system	1						
	Targets		Company goal is to achieve score of 90% or higher in animal welfare assessments	0					Regular consultation with non-business partner stakeholders	0.5								
	Average Score			0.5		1		0.5		0.5		0.5		0.5			0	42%
Disclosure (Transparency)	Reporting						Compensation as penalty for 2017 allegations were disclosed in full	1	Publily available results from consultation	0	Publily available supplier code of conduct	0.5	JBS published a bespoke sustainability report in 2020	1				Governance Disclosure Overall Score
	Reporting Standards						Company discloses against GRI standard 205 for anti-corruption, or similar	0			Company discloses against GRI standard 204 for procurement practices, or similar	1			Company discloses against GRI standard 102 for general disclosures, or similar		1	
	Average Score			0		0		0.5		0		0.75		1			1	54%
Implementation	Personnel														Company has clear governance structure with regards to ESG performance		0	Governance Implementation Overall Score
	Performance	Animal Welfare Index performance above certain threshold	Proportion of slaughterhouses meeting animal welfare standards; proportion of animals transported on routes less than a certain duration				At least one board member given responsibility for maintaining good governance practices / fulfilling ESG commitments (e.g. tasked with implementing internal policies; signature of board member on policy document)	1										
	Verification	Performance on Animal Welfare Index	Scored 99.4% on Animal Welfare Index for beef	1			10 billion Reais payout as penalty for admittance to bribery by head of parent company is a very significant penalty and will set precedent which deters future corruption	1	Partakes in multiple multi-stakeholder initiatives with non-business entities. Includes: Global Roundtable on Sustainable Beef, which includes civil society organisation Solidaridad; Food Network for Ethical Trade, of which a JBS subsidiary is member of technical board. As of 2020, JBS is undertaking a Corporate Materiality Analysis which aims to identify material issues and its level of sustainability as perceived by stakeholders such as NGOs, communities, academia and government	1	Company has monitoring systems for (environmental) supply risk mitigation. Despite this, a ransomware attack was observed in 2021, which delayed production	0.5				Company carries out assessments with regards to its ESG governance	Higher score awarded for independent, 3rd party assessments as opposed to self-assessments	0
	Average Score			1		1		1		1		0.5						58%

Source: Denny Ellison & TDi Sustainability

JBS

Fundamental Research Report with
ESG Valuation Adjustment

JBS S.A. Continuing Public Issue Risks Offset Positive Fundamentals

Priced as of 01/10/2021

BUY RECOMMENDATION

Ticker:	Strong FY20 results. Against a challenging backdrop, FY20 results were impressive across each of the group's divisions, where both price and volume appreciation were enhanced by salient acquisitions and investments to improve efficiencies and broaden value-added product ranges.
JBSS3	
Price (R\$):	Positive demand outlook. Looking forward, the market dynamics of each of the group's divisions are supportive of further growth, particularly in the US where demand is recovering on the domestic side, and are especially strong for exports.
36.34	
Market cap (R\$m):	Shareholder friendliness. Management has committed to pay out 58% of 2020 profits to shareholders as dividends in 2021. This could be the first step in a more shareholder-friendly stance in advance of a US listing, which is openly planned.
91,255	
No. of shares (m):	Fundamental TP offers 34% upside potential. Under conservative assumptions and applying a discount rate in excess of 10%, we value the shares at R\$48.7 on a discounted cashflow basis. Our sum-of-the-parts work corroborates this with a value of R\$51.3 per share. This indicates the shares are currently undervalued by 34%.
2,511	
Avg. volume (m shares):	ESG valuation analysis
13.75	The Public Issue Index reveals a high magnitude of governance public issue in 2017 and environmental and social issues in 2020/21.
P/E (x):	Based on our Public Issue Risk Profile analysis, we apply a 13% discount to our fundamental target price to reflect potential ongoing risks from public issues. This is offset by an 8% premium, effectively giving management credit from recent ESG initiatives to limit future public issues. The analysis of recent public issues suggests that the shares are overvalued by 16%
21.0	
EV/EBITDA (x):	
4.9	
Net gearing (%):	Our total ESG valuation adjustment is a 21% discount to our fundamental target valuation, leaving 6% upside potential to the current share price.
111	

Company description	Key financials	2018	2019	2020	2021e	2022e	2023e	2024e	2025e
		R\$m							
JBS is a leader in the animal protein industry, where it enjoys economies of scale and well-established export markets for a diversified range of meat-related products.	Revenue	181,680	204,524	270,204	329,056	343,877	359,490	375,948	393,306
	EBITDA	14,850	19,881	29,555	32,895	35,269	37,134	38,750	40,441
	Net profit	25	6,068	4,599	10,327	12,197	14,038	15,740	17,027
	Net debt	47,218	45,006	48,328	43,849	34,853	26,965	20,213	14,104
	EV	143,995	141,848	144,814	136,031	127,035	119,147	112,395	106,286
	EPS R\$	0.0	2.3	1.7	4.1	4.8	5.5	6.2	6.7
	BVPS R\$	10.5	12.2	16.4	25.7	33.8	41.6	49.3	56.9
	PE x	nm	16.0	21.0	8.9	7.6	6.6	5.9	5.4
	P/BV x	3.5	3.0	2.2	1.4	1.1	0.9	0.7	0.6
	EV/EBITDA x	9.7	7.1	4.9	4.1	3.6	3.2	2.9	2.6
	Net gearing %	169%	139%	111%	67%	41%	26%	16%	10%

Source: Denny Ellison analyst estimates

Company Overview

The roots of JBS stem from 1953 when José Batista Sobrinho (JBS) began processing five head of livestock per day at a small plant in Anápolis in central Brazil. Since then, JBS has methodically increased its processing capacity, initially through playing a key role in the consolidation of the Brazilian beef industry and, subsequently, via international acquisitions. Table 1 sets out some key events in the company's evolution.

JBS is currently the world's largest protein producer and second-largest food company. It produces beef, lamb, pork and chicken as well as a wide range of convenience foods and value-added products derived from animal protein. It also sells a variety of derivative products including leather, hygiene/cleaning products, collagen and biofuel.

Table 1: Some key events in the evolution of JBS

Year	Key event
1953	JBS founded in Anápolis, Goiás, West Central Brazil
1968	first meatpacking plant acquisition
1970	second abattoir incorporated, increasing capacity to 500 head per day
1970 - 2001	expansion via acquisition and capacity increases, reaching 5800 head per day
2001 - 2006	expansion to 21 plants in Brazil, 5 in Argentina, capacity 19.900 head per day
2005	first international acquisition, Swift Armour in Argentina
2007	IPO of shares, acquisitions of beef producers in USA and Australia, entry into pork market
2009	entry into chicken market with purchase of controlling stake in Pilgrim's Pride Corp. in USA
2010	further expansion in Australia, USA and Europe, additional equity offering
2013 - 2020	further expansion and diversification of production platform and product portfolio
2013	acquisition of Seara Brazil, becomes largest poultry processor in the world, 12mn birds daily
2015	acquisition of Moy Park, a leading European food and poultry producer
2017	senior management embroiled in corruption scandal, leading to a plea bargain
2019	acquisition of Tulip in UK, a leading pork and prepared foods supplier
2020	acquisition of Empire Packing Company, including 5 US production plants

Source: JBS

Operational and geographic exposures

The JBS group is divided into five operating divisions:

- JBS Brazil (15.9% of gross revenue in 2020), which oversees beef production in Brazil as well as leather and related businesses;
- Seara (10.2% of gross revenue in 2020), which is Brazil's second-largest producer and exporter of chicken and pork along with a wide variety of derivative and value-added products;
- JBS USA Beef (42.7% of gross revenue in 2020), which is the largest beef company in the world in terms of production/distribution and produces beef, lamb and prepared foods with distribution facilities in the US, Canada and Australia;
- JBS USA Pork (12.3% of gross revenue in 2020), the world's second-largest pork producer, producing fresh, pre-packaged pork and derivative products;

- Pilgrim's Pride Corporation (23.7% of gross revenue in 2020), which is a publicly traded company in the US, producing fresh chicken and a wide variety of derivative and value-added products. JBS owns 80.5% of PPC;
- Intercompany eliminations and other revenues make the difference between the above divisions and 100%.

The US Beef division is significantly the most important in terms of its contribution to the group's operating profitability, accounting for 62% of group operating profit in 2020. The remaining divisions contribute between 10% and 20% to group operating profit.

JBS has a presence in over 20 countries globally via more than 450 facilities and offices. The bulk of group revenue (c.79%) is derived from the US (47%), Asia (17%) and Brazil (15%). Notably, Asia (China, Japan, South Korea and Taiwan) accounted for 53.4% of total group exports (US\$13.6bn) in 2020.

Ownership and management

The controlling group of JBS is J&F Investimentos SA and Formosa, with a 44.25% stake. J&F Investimentos was founded in 1953 and is owned by the Batista family. BNDES (Brazilian National Bank for Economic and Social Development) is the second-largest shareholder, with a stake of 23.16%. The remaining 32.59% of JBS shares represent a free float of minority shareholders.

The shares are currently traded in Brazil. However, the company plans to seek a listing in the US in the near future, which makes sense given its operational and capital structure (the bulk of the company's debt is denominated in US\$). It is likely, in our view, that BNDES will seek to reduce its current stake, either following or as part of the US listing.

JBS's management has a long track record of acquiring companies within the protein supply and distribution industries and successfully integrating them into the group, which has accounted for the bulk of its operational growth. JBS is led by Gilberto Tomazoni (CEO), who had 30 years of experience in the food industry before joining JBS in 2013 as the Global President of the poultry business. He was appointed CEO of JBS in 2018 after leading the establishment of Seara Alimentos and serving as the company's Global COO.

In 2017, JBS took a significant blow to its reputation when its parent company (J&F Investimentos SA) was accused of bribing a significant number of politicians in order to advance the company's business interests and secure low-cost financing from state-run banks. This scandal rocked the whole of Brazil and even led to the indictment of President Temer.

Ultimately, J&F Investimentos SA accepted a plea bargain agreement and paid a R\$10.3bn fine. The scandal, however, continued to plague the company, which only last year pled guilty to US foreign bribery charges regarding the same event and paid a further fine of US\$128.25m.

Since the scandal in 2017, JBS has taken important steps to improve its corporate governance, including the establishment of seven ethics committees in each business unit in Brazil to oversee a new compliance programme; becoming a signatory of the Business Pact for Integrity and Against Corruption; and appointing a Global Compliance Director, establishing direct reporting to the JBS Board of Directors.

Global protein market

Global consumption of meat is stable and growing, despite increasing consumer interest in plant-based proteins. In 2020, approximately 315m tonnes of meat was produced and consumed according to the OECD, which forecasts per capita meat consumption to increase at a compound annual rate of 0.6% between 2020 and 2026 (Chart 1). Forecast growth rates do, however, vary significantly across regions. Chart 2 depicts projected per capita consumption growth rates by region between 2016-18 and 2028e.

Chart 1: Global projected per capita meat consumption 2020–26e

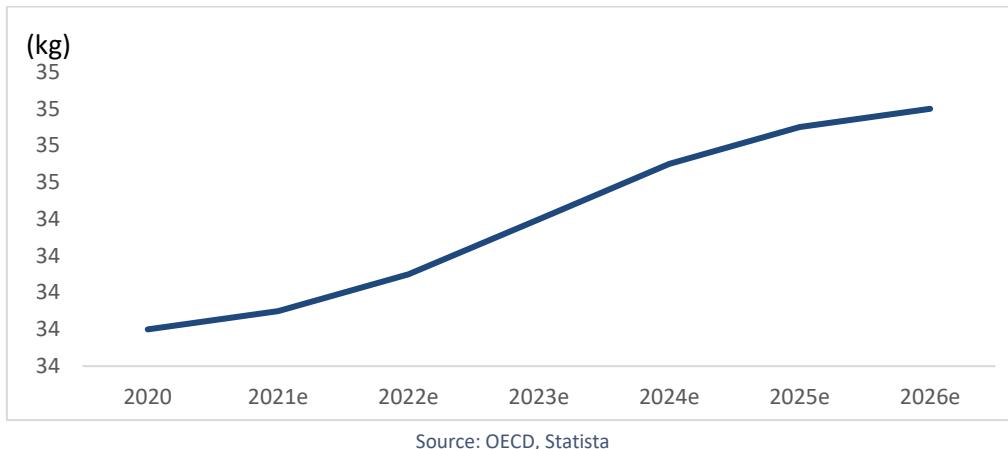
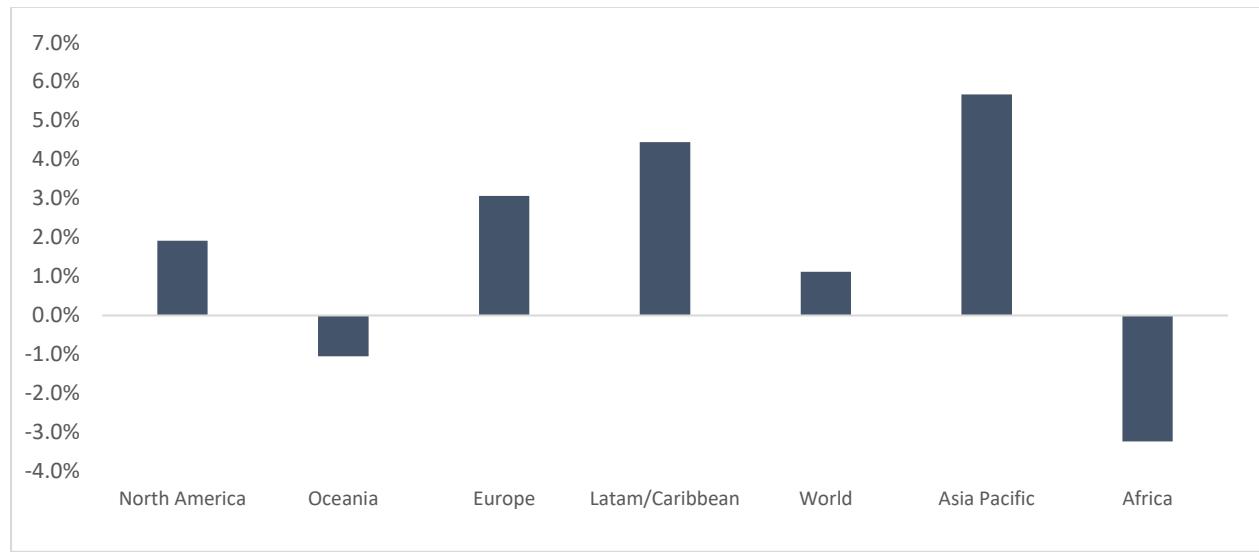


Chart 2: Projected per capita meat consumption growth by region between 2016-18 and 2028e



While the market dynamics of different meats vary, a key driver of consumption is net disposable income and hence economic growth and fiscal stimuli. In general, beef consumption is more sensitive to changes in disposable income given its higher relative price, followed by pork and then chicken. Also, a key period for demand is what is known as the BBQ season, running from May to September in the US.

Meat production is capital intensive, though levels of automation within production facilities vary depending on meat produced. Chicken processing facilities are generally more automated and therefore less likely to be adversely affected by disruptions in the labour market (read pandemic) than those of beef and pork.

Beef

While global beef consumption is reasonably stable and increasing, the supply side is subject to a variety of factors that can affect the overall market price. Cattle rearing differs from country to country, with ideal conditions being a temperate climate and large grassy plains. It is chiefly for this reason that the US and Brazil are the two largest beef producing countries.

There are, however, notable differences between these two markets in terms of herding. In Brazil, cattle herds are mainly free ranging rather than feedlot (i.e., feeding mostly on grass rather than being fed grain) and the lifespan of a heifer from birth through pregnancy, weaning and slaughtering, is around five years.

In the US, this cycle is shorter, at approximately 3.5 years, partly due to different cattle breeds, which mature more quickly, but also due to animal management, with a shorter fattening stage where the animal is mostly “finished” with feedlots prior to slaughter. US cattle prices are more subject to volatility due to changes in the price of grain.

The US beef market is currently experiencing an excess of cattle (a backlog of approximately 1m head) due to factory closures in April last year. This has had an impact on cattle prices which, despite increasing seasonally now, are still below the five-year average. In comparison, beef prices are now high due to this supply disruption and in comparison to the five-year average.

The global market has also been affected by the situation in Australia. Due to the drought between 2017 and 2019, a large portion of the Australian herd was culled. Although weather conditions and hence pastures have improved since, allowing ranchers to start retaining heifers, the Australian herd is not expected to return to normal levels until mid-2022.

Both of these factors have given rise to relatively high beef prices and a deficit in exports from Australia, which typically serves the Asian markets, has driven up exports from the US and Brazil to fill the gap. This beneficial pricing environment for JBS is expected to continue over the next 12 months.

JBS exports are also supported by increasing demand from Asia, where beef consumption per capita is expected to increase by 5.7% compounded annually between now and 2026 (OECD). Much of this is driven by evolving Chinese consumers who are buying more beef from the US. The key here, at a company level, is to certify facilities for their product to be exported to China. This has been an area of focus for JBS as well as improving the group’s product mix by building out a range of value-added products for both the domestic and export markets.

Pork

As with other meat proteins, global pork consumption per capita is stable and increasing. The OECD forecasts a compound annual growth rate of 2.7% in global per capita consumption between now and 2026. The main pork producers are China and the EU, while the biggest exporters are the EU and US.

Historically, pork production was severely affected by Porcine Epidemic Diarrhoea (PED), which in 2013 impacted hog herds in the US, China and South Korea, among others, reducing hog availability and thus pork supply at a time when consumption of pork was increasing.

The inevitable price increases as a result of PED meant that industry margins started to pick up, which incentivised more producers to enter the market. Production accelerated between 2015 and 2019 when margins started to stabilise at the 7-9% level.

In 2019, there was an outbreak of African Swine Flu (ASF) in China (the largest consumer of pork), which prompted it to import more, particularly from the US, and in turn pushed industry margins up again to where they are now, at 9-11%.

Importantly, both PED and ASF are not short-term issues and outbreaks can occur anywhere and alter the dynamics of both domestic and export markets in any given country. Another key determinant of the pork market is the supply of feedstock for hog herds (generally corn and soybean), the price of which directly impacts production margins. As with its beef division, JBS is keen to expand its production of value-added pork products, as evidenced by the recent opening of a bacon/charcuterie facility in the US.

Chicken

The OECD forecasts the global consumption of poultry to increase by 1.1% on an annual compound basis between 2020 and 2026. The main poultry producers and exporters are Brazil and the US, which together account for 34% of production and 62% of exports, according to the USDA. China and the US are the largest consumers of poultry (around 20m tonnes and 19m tonnes per annum, respectively).

Global poultry production stood at 137m tonnes in 2020, according to the OECD. Notably, the bulk of this is to serve domestic markets as the global export market for poultry stands at 12m tonnes. The poultry market is closely linked to that of grain and soy feedstock, and prices in these markets can have a notable effect on the margins of poultry producers.

Over the last year, the chicken market has been more affected by the pandemic than have other protein markets. This is due to chicken's relatively higher exposure to the food service sector. Notably, though, JBS (read: Pilgrim's Pride Corporation) has lower exposure to the food service sector than its closest peers in this market, Tyson and Sanderson.

With grain and corn prices currently increasing, operating margins in the chicken production industry have been challenged, although this has been partly mitigated by an increase in the price of chicken meat. The current outlook is for a recovery in food service demand as vaccinations take effect and the pandemic recedes. This should lead to an improved financial performance from this industry in 2021 relative to 2020, as prices remain firm.

As well as building out its value-added product range in this division, JBS is looking to increase operational efficiencies in its recently acquired operations in Europe via investments in automation, a focus on higher yields and thus improved mitigation of input costs.

Financials and forecasts

2020 review, 2021 outlook

JBS's 2020 financial results were strong. Each division experienced double-digit top-line growth, with price and volume increases boosting margins across the board. Group net revenue increased by 32% to R\$270.2bn, while the increase in COGS was more muted at 30%, leading to gross margin expansion of over 100bps.

JBS Brazil

Net revenue increased by 30% at JBS Brazil in 2020, whilst EBITDA registered R\$3.1bn, an increase of 76%, with the EBITDA margin expanding from 5.4% to 7.4% over the period. This is an exceptional result considering the lacklustre Brazilian economy, which impacts beef consumption, and is no doubt boosted by the division's export performance and focus on value-added products/services, as well as extracting further operational efficiencies from its existing plants.

Exports are currently pushing cattle prices up in Brazil because the reference market for prices is São Paolo, where beef from around 70-80% of the cattle processed is for export.

A further one-off challenge for domestic sales of beef is the halving of the government's 'corona vouchers'. These were part of a government initiative to boost disposable income during the pandemic. JBS will be seeking to mitigate these challenges via a focus on their 'Swift', 'Maturatta' and '1953 Friboi' ranges of value-added and premium products. However, the group recognises that 2021 is likely to be weaker than 2020 operationally, although margins should continue to hit the typical 5-7% range.

We expect similar net revenue growth for JBS Brazil in 2021, with a forecast of 30%, which is likely to be both price and volume driven, given that the export market is expected to remain buoyant, in our view. We also expect margins to weaken (from 5.6% to 3.4% at the operating level), reflecting the challenging domestic environment, but mitigated to some extent by JBS's efforts to adjust its product mix. We believe revenue can increase by 3-4%, with operating margins of 5-7%, on a sustainable basis.

JBS USA Beef

The USA Beef division witnessed an increase of 29% in net sales in 2020 in Brazilian real terms to R\$112.1bn (41% of the group's total). However, this belied a significant depreciation in the Brazilian currency which lost 24% of its value against the US\$ over the period.

Excluding the currency effect, net revenue declined by 2% under US GAAP accounting. Under both measures, however, EBITDA increased strongly (by 61% in R\$ and 23% in US\$), with the EBITDA margin expanding by over 200bps.

Typical margins for the USA Beef division are between 6% and 8%, and we would expect this range to be sustainable over the long term. The jump in 2020 was largely caused by the market conditions associated with the pandemic, including government initiatives to support disposable income. However, the beef market is also buoyant in the US and, with increased demand both domestically and internationally, margins are expected to remain stable or increase in 2021.

We forecast net revenue to increase by 20% in R\$ terms at the USA Beef division in 2021, via a combination of solid demand and the higher-than-average pricing environment. Production volume is also unlikely to be hit as severely as in 2020, and any increase will be absorbed by the recovering consumer as the pandemic eases. On a sustainable long-term basis, we believe average revenue growth of 4% is achievable.

We have forecast a stable EBITDA margin for 2021, though this might prove conservative given strong export demand for premium beef products, the company's focus on improving its product mix and the integration and repurposing of plant acquisitions recently made in the US. Looking further out, this division is also likely to benefit from the current retention of Australian heifers in mid-2022.

JBS USA Pork

The USA Pork division posted 2020 net revenue growth of 37% in R\$ terms. In US\$ terms, thanks to the 24% depreciation of the Brazilian currency, net revenue increased by 5%. EBITDA increased by 30% to R\$3.4bn and margins remained reasonably stable in both real and dollar terms. Of particular note were export volumes, which increased significantly and, according to USDA data, China has become the main export market for US pork. For the JBS USA Pork division, China represented 32% of total divisional export volumes, boosted by the outbreak of ASF three years ago, which hampered domestic production, and despite tariffs imposed by China on US exports. However, China's hog herd rose by 31% in 2020 as the industry recovered and in December the Ministry of Agriculture stated that the virus was under control and herds would be fully recovered by 1H21. Despite this, reports of ASF outbreaks have increased over the past several months across at least five distinct provinces.

We expect the current market dynamics for USA Pork to remain intact this year, with recovering demand and low inventory levels supporting the price environment. Given recent news out of China regarding ASF, it is also likely that demand for exports remains firm. However, in 1H21, margins have come under pressure from increased input (hog) prices and labour shortages have impacted production and deboning capacity.

As a result, although we forecast a 20% increase in net revenue in 2021, we expect margins to be weaker at the full-year stage compared to 2020. Some of this margin effect could be mitigated by the recovering US consumer and recent investments in broadening the value-added product mix (new pre-cooked bacon plant to start operating in Missouri in mid-2021), but we prefer to remain conservative in this respect. Typical EBITDA margins for this division range between 8% and 12% and this should be sustainable over the long term, in our view, as well as revenue growth in the region of 4% to 5%.

Seara

Seara's net revenue increased by 31% in 2020 to R\$26.7bn, through a combination of higher prices and some volume increase too, while the divisional gross margin increased by 20bps. At the EBITDA level, Seara posted even more significant growth of 88% to R\$4.2bn, with its EBITDA margin expanding from 11.1% to 15.8%.

Along with the improved top-line growth, increased operating efficiencies and an improved mix of markets, channels and products were the key drivers of this performance. It is also worth noting that the final quarter results were boosted by the integration of the Bunge margarine acquisition, which concluded in November.

Notably, Seara's revenue split is 50% domestic, 50% export, and, of the domestic revenue, around 70% is derived from value-added products, 20% poultry and 10% fresh pork. This differs for the export side, with 70% of exports being fresh chicken, 25% fresh pork and 5% value-added products.

Needless to say, export revenue was boosted by the depreciation of the real, despite the current oversupply of poultry in the global marketplace. On the domestic side, with 70% of revenue derived from value-added products, disposable income levels are an important factor. This makes the division's results even more impressive given the challenging economic environment.

EBITDA margins are typically 10-12% at Seara (16% in 2020) and are currently challenged by input costs. In our view, this range is sustainable over the long term. JBS expects 2021 to be another good year in terms of results, though not as good as 2020. However, it is still investing in operational efficiencies, innovation (of product range) and the modernisation of facilities, which should mitigate margin pressure to some extent.

We forecast net revenue growth similar to 2020 for the Seara division in 2021 and expect margins to decline. The division should benefit from a full year of the Bunge acquisition, which, together with a recovering economic situation, should be supportive of domestic revenue. On the other hand, it is unlikely that export revenue will experience another fillip from currency devaluation to the same extent as in 2020. Also, production costs, particularly for animal feed, are currently very challenging and will suppress margins over the full year, in our view.

JBS USA Chicken

R\$ net revenue at PPC increased by 38% in 2020 or 6% in US\$ terms as a result of currency devaluation. At the EBITDA level, however, there was a decline in profitability in US\$ terms of 19% (an increase of 12% in R\$). The divisional EBITDA margin declined by over 200bps to 9.6% (R\$ terms), closer to the lower end of the typical 8-12% range for the poultry production business.

The USA chicken business was negatively affected on the demand side by the devastation the pandemic caused to the food service sector, as well as increasing grain and corn prices, to which the business is sensitive. Fortunately, chicken prices are inflating too, which balances out some of the margin pressure from input costs.

Expectations for the US chicken business rest in part on a recovery in the food service sector as vaccination rates increase and the pandemic recedes. JBS anticipates an improvement in results compared to 2020 for this reason, as well as a firmer pricing environment, and hopes to positively improve margins via further focus on its value-added range, as in the other protein businesses.

We forecast a lower net revenue growth number in 2021 of 18% for the chicken division, but expect the EBITDA margin to advance slightly, chiefly via active efforts by JBS to balance out rising input costs with investments in automation, operational efficiencies and higher yielding products. The typical EBITDA margin of this division is similar to that of pork, 8-12% and this level is sustainable over the long term, in our view.

Profit and loss

JBS 2020 profit and loss account bears two distinct features. On the one hand, the operating performance across all divisions was strong, particularly given the often-severe changes to individual market dynamics brought about by the pandemic. Group operating profit increased by 52%. On the other hand, below the operating level, profitability took a huge hit from a net financial expense which was over twice that registered in 2019, an increase that was due entirely to the depreciation of the Brazilian real over the year. Group pre-tax profit increased by 10%.

Given that real depreciation to the same extent as in 2021 is unlikely, we expect group net revenue growth to reflect current protein market dynamics more closely in 2021 and forecast growth of 21.8%. This is positive, with recovering/stable demand and fewer supply shocks. We do, however, expect margin pressure at the gross and operating levels, thanks mainly to challenging input costs and labour shortages. We thus forecast a gross margin of 13% in 2021 (16.7% in 2020).

At the operating profit level, we forecast growth of 8%, despite a margin contraction of 80+bp. We also expect the net financial expenses to return to levels similar to those experienced prior to last year, between R\$5bn and R\$7bn. This clearly provides a strong boost to bottom-line profitability.

Applying the Brazilian corporate tax rate of 34% to our pre-tax forecast and deducting minority interests at the same rate registered in 2020 leaves a group net profit forecast for 2021 of R\$10,327m, over twice the level reported in 2020, chiefly due to the removal of the expense related to currency depreciation.

Balance sheet

JBS's balance sheet at the end of 2020 registered R\$43.5bn of equity and R\$48.3bn of net debt (including supply-chain finance), leaving net gearing at 111%. The bulk of the group's debt (90%) is long term and cash levels are high – R\$19.6bn at year-end. As a rule of thumb, JBS is comfortable with a net debt level of 2-3x EBITDA. At the end of 2020, net debt/EBITDA stood at 1.64x. 90.5% of group debt is denominated in US\$, which is understandable given the geographic spread of the group's operations, whilst the remainder is R\$ denominated. The group actively hedges exchange rate risks. We expect the net debt/EBIDTA ratio to decline over the forecast period.

In 2017 and 2018, the group focused on reducing leverage, which led to the capex/depreciation measure falling below 1x. Since 2019, investments and acquisitions have accelerated, leading to a capex/depreciation multiple of 1.1x in 2020. In 2021, the group plans to invest between US\$1.5bn and US\$1.7bn in capital expenditure. We expect the capex/depreciation multiple to remain unchanged at 1.1x over the forecast period.

Cashflow

JBS generated a net increase in cash and equivalents in 2020 to the tune of R\$9.6bn. There was a considerable increase in the cost of debt due largely to exchange rate differences, operating investments increased by 39% and the group paid out a meaningful dividend to shareholders. We expect net cash and cash equivalents to increase at a lower rate in 2021 due mainly to a change in working capital (higher inventories and receivables) as well as an increased dividend pay-out.

We have built in a small reduction, approximately 2%, in debt levels, and net debt should decrease by more due to the increase in cash and equivalents that we expect.

Valuation and recommendation

Based on our forecasts for JBS outlined above and detailed in the accompanying spreadsheet, we have completed a discounted cash flow valuation for JBS shares using a weighted-average cost of capital (WACC). Our assumptions for the discount factor are as follows:

- A risk-free rate of 9.1%, which is equivalent to the 10-year Brazilian government bond yield.
- An equity market risk premium of 5.5%
- An equity beta of 0.4x
- A credit risk premium of 5%
- A marginal tax rate of 34%, equivalent to the Brazilian corporate tax rate
- A target debt/debt + equity ratio of 20%

These assumptions generate a WACC of 10.8%.

Regarding the group's operations, we forecast operating profit to increase at a compound annual rate of 3% for the forecast period and over the longer term. We expect depreciation and amortisation as a percentage of sales to remain constant at 3% over the forecast period. We expect capex/depreciation to remain stable at 1.1x over the forecast period. These assumptions generate a compound annual growth rate in free cashflow of 2.0% between 2020 and 2029e.

The results of this valuation are set out in Table 2 below and indicate a fair value for the shares of R\$48.7, 34% higher than the current share price.

Table 2: DCF valuation summary R\$M

PV of visible period	91,725
PV of terminal value	82,177
Enterprise Value	173,902
Net Debt	-48,328
Minority interests	-3,425
JV and associates	171
Equity value	122,320
Number of shares 000	2,511,136
Implied Equity value per share (R\$)	48.7

Source: Denny Ellison analyst estimates

In addition to the above valuation, we have put together a sum-of-the-parts (SOTP) valuation, a summary of which is set out in Table 3 below. We have applied an EV/EBITDA multiple to each of the group's divisions, with the exception of PPC (JBS USA Chicken), for which we have taken the current market capitalisation of PPC and applied the JBS ownership percentage. The multiples we have applied to each division are all at a 20% discount to the equivalent multiple of their closest quoted peers. The result of this analysis gives a fair value of R\$51.3 for JBS shares, 41% higher than where they currently trade.

Table 3: SOTP valuation summary

R\$M	EBITDA 2020	EV/EBITDA multiple	EV	
Brazil	3,082	4.2	12,992	20% discount to Minerva multiple, which is a purer play on Brazilian protein
Seara	4,224	5.1	21,446	20% discount to BRF, closest peer
Beef USA	12,902	6.8	88,160	20% discount to Tyson, closest peer
Pork USA	3,388	6.8	23,151	20% discount to Tyson, closest peer
Chicken USA			31,437	80.54% of market value of Pilgrim's Pride (ticker PPC) which is quoted in US
Total			177,187	
Less net debt 2020		-	48,328	
Valuation			128,859	
Per share			51.3	
PPC current market cap. US\$ m	7,136			
US\$/BR\$ x rate	5.5			
PPC current market cap R\$M	39,033			

Source: Denny Ellison analyst estimates

ESG valuation analysis

The largest public issue risk comes from governance issues given the large 2017 scandal.

We apply a 13% discount to our target valuation based on past public issues.

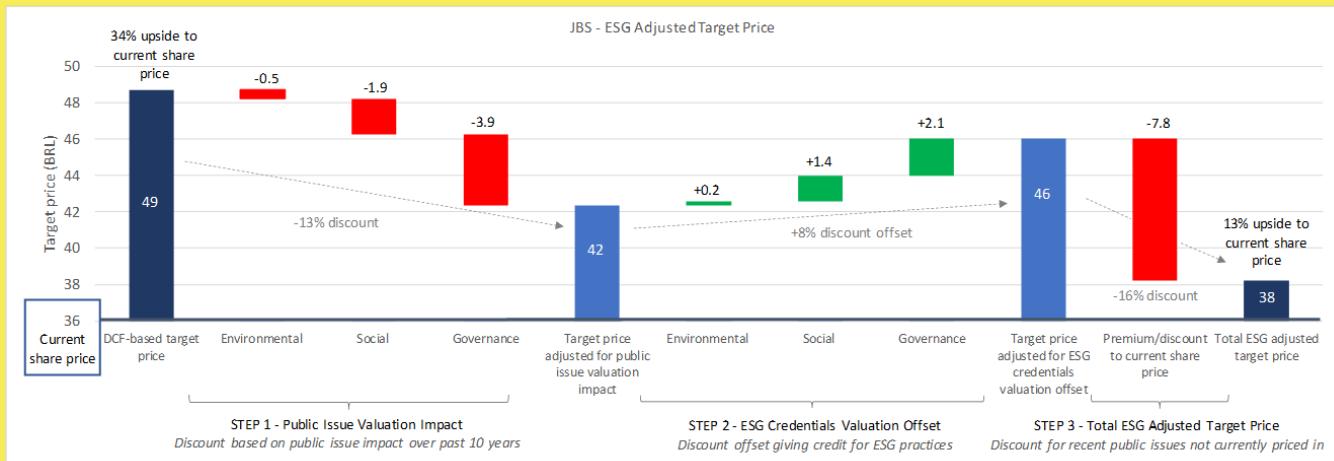
We recognise that the company has implemented strict governance measures to prevent such events happening again. We therefore apply an 8% offset to the valuation discount.

The shares have performed well over the last three months and the recent public issues do not seem to have hindered the performance.

We therefore apply a further 16% discount to our target valuation, leading to an overall ESG adjusted discount of 21% to our fundamental target valuation.

Our ESG adjusted target price is R\$38, leaving 6% upside potential to the current share price.

Chart 3: ESG-adjusted target valuation



Risks

Risks to our assessment of the valuation of the JBS share price include:

- A weaker-than-expected recovery in consumption levels following the pandemic across the range of proteins.
- A weaker-than-expected economic recovery in the US (the single largest source of group net revenue).
- Deterioration in the competitive environment, requiring lowering prices to maintain market share.
- Increases in cattle and grain prices.
- Less impact from ASF and PED than expected in the pork market.

- A significant acceleration in changing consumer habits regarding animal versus plant protein.
- The resumption of trade tensions between the US and China.
- Brazilian real appreciation against the US\$ in particular. The group's results have been susceptible to currency fluctuations, particularly at the net interest line, as evidenced by a R\$7.8bn (38% of group operating profit) exchange-rate variation charge. This is less of a concern going forward due to the removal of intercompany loans between cross-border subsidiaries.
- The sale of the BNDES stake.
- Further corporate governance issues.

ESG-related risks

The main ESG-related risks are already reflected in our ESG-adjusted target valuation.

These relate to ongoing ESG public issues, offset to some extent by the company's recent ESG initiatives.

However, should another governance scandal of the same magnitude as the one in 2017 recur, the shares will likely derate strongly. Given the company's internal policies and measures, we think there is a relatively low chance of this happening again.

Given the company's low score in environmental issues, especially around deforestation, increasing public issues in that field add further downside risks.

4. Appendices and Disclosure

A. JBS Main Competitors – Public Issue Index

Minerva

Summary of public issues

Minerva S.A. is a Brazil-based company specializing in the commercial production and sale of beef. Its operations are located in Brazil, Paraguay, Uruguay, Colombia and Argentina.

Our analysis of public issues relating to Minerva found that animal cruelty was the most widely reported on by different online sources, including international media outlets and local Brazilian media outlets. We provide a summary of other key issues below:

1. Nada Ship scandal: In January 2018, the Nada ship, which was carrying more than 25,000 cattle, was inspected by a veterinarian appointed by a Brazilian court expert who found that the conditions were inadequate for the animals. The court granted an injunction to interrupt the boarding of the animals and the Nada ship was prevented from continuing its voyage. This decision was reversed by a higher court, which authorised the continuation of the trip, alleging economic losses to national livestock and logistical difficulties in disembarking the animals. An inspection was carried out and found the absence of proper documentation to ensure compliance with animal rights transport. Issues included cattle covered in their own manure, less than a metre of space allocated to each animal, and dead animals and excrement thrown into the sea. The event triggered several protests regarding the conditions in which the animals were held.

2. Haidar ship: In 2015, a Lebanese ship transporting Minerva's live cattle from Brazil to Venezuela sank in Barcarena, Pará. It contained over 5,000 cattle, many of which died and subsequently polluted the surrounding waters, triggering complaints from the indigenous and local community. Carcasses were found all along the coast and the ship was left stranded, which left the carcasses to rot. Minerva was held responsible for the event and paid several heavy fines.

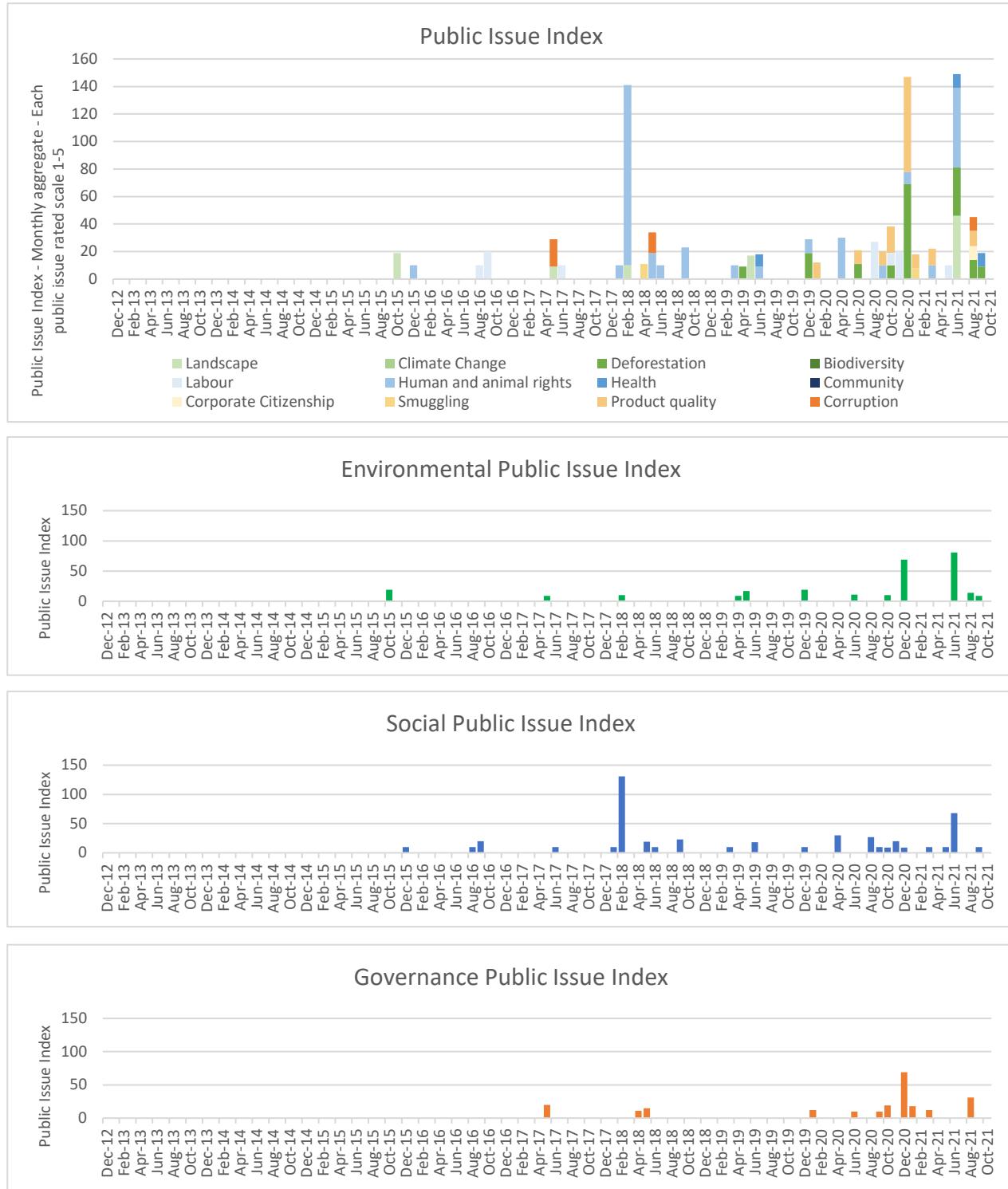
3. Misrepresentation and deforestation associations with the supply chain: There are multiple instances suggesting the practice of what is more commonly known as "cattle laundering". This practice begins with raising animals in plots of land where legal restrictions apply, such as indigenous demarcations or land reform areas. The cattle are then transported and mixed into legally operating properties and subsequently added to the supply chain. There has been evidence of a correlation between this practice and issues such as deforestation, poor working conditions and violation of indigenous people's rights.

4. BBFAW (Business Benchmark on Farm Animal Welfare) certificate puts Minerva at the bottom of its list: In 2020, Minerva was ranked at the bottom of the list in a benchmarking of 23 companies operating in 150 countries regarding their animal welfare policies.

5. Working conditions: In 2020, Brazilian non-profit Repórter Brasil published its findings of investigations it carried out into the working conditions in slaughterhouses and cattle farms linked to Minerva's supply chain. Workers have reportedly been working in "slave-like" conditions since 1995.

Public Issue Index

Figure 24 – Minerva Public Issue Index (PII[©])



Marfrig

Summary of public issues

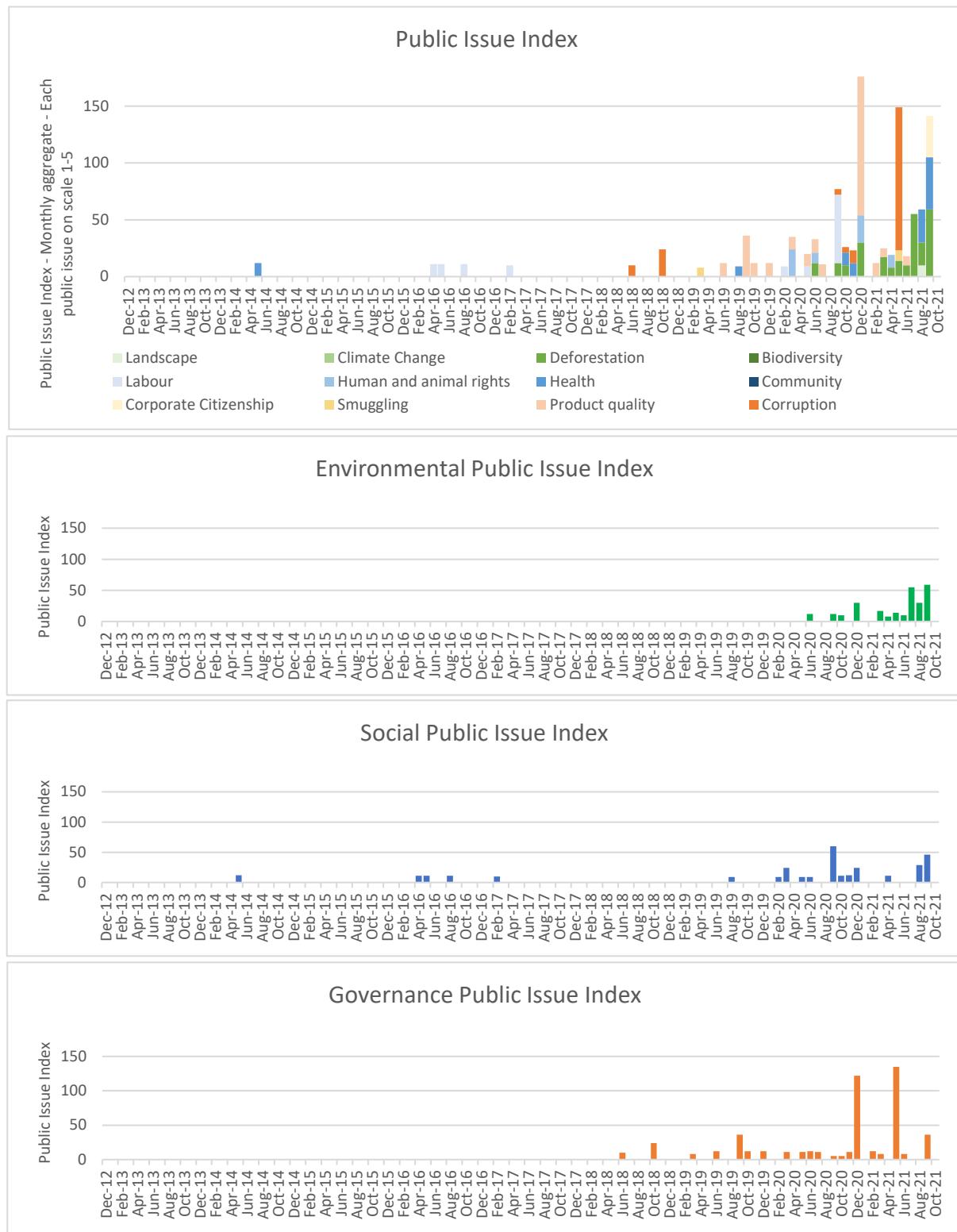
Marfrig is a Brazil-based beef producer, processor and distributor. Its product portfolio comprises beef, lamb processed foods such as canned food, and leather. Its operations are located in Brazil, Argentina, Chile, USA and Uruguay.

Our analysis of public issues related to Marfrig found that its misrepresentation of the origin of cattle, contributions to deforestation and corruption were the most widely reported on by non-profit organizations and international media outlets. We provide a summary of the key issues below:

- 1. Insider trading allegations:** The founder and chairman of the board of directors of slaughterhouse Marfrig was accused by the Brazilian Securities and Exchange Commission (CVM) in 2021 of having benefited from privileged information to take advantage of negotiations which amounted to insider trading. The executive operated in the financial markets while still negotiating the purchase of National Beef with Leucadia (now Jefferies Group). He actively participated in negotiations for the purchase of the company, including face-to-face meetings with representatives of the company, Leucadia, between June 23, 2017, and March 16, 2018.
- 2. Working conditions:** There were numerous reports between 2012 and 2020 indicating a lack of proper workforce training and inadequate safety measures, often resulting in deaths.
- 3. Misrepresentation and deforestation associations with the supply chain:** There are numerous reports between 2019 and 2021 suggesting the practice of what is more commonly known as "cattle laundering". This practice begins with raising animals in legally restricted plots of land, such as indigenous demarcations or land reform areas. The cattle are then transported and mixed into legally operating properties and subsequently added to the supply chain. In Marfrig's case, there has been evidence of a correlation between this practice and issues such as deforestation, poor working conditions and violation of indigenous people's rights.
- 4. Supply chain association with criminal responsible for the murder of nine rural workers:** In 2020, Marfrig and JBS were accused of buying cattle from a criminal accused of torturing and murdering nine rural workers in a previous event; cattle were allegedly also raised and subsequently laundered from an illegally occupied area of an agrarian reform settlement in Rondônia.
- 5. Slavery working conditions in the supply chain:** A cattle supplier within the supply chain of Marfrig and JBS is on a "blacklist" of slavery-like working conditions. In 2019 it was reported that both companies operated their services even after suppliers were put on the list.
- 6. Two occurrences of major fraud:** In 2018, Marfrig and a Brazilian congressman were found guilty of payment fraud towards public workers in Tangará da Serra, who worked with the company's Federal Inspection Service. Marfrig was subsequently prohibited from contracting with the government or receiving tax benefits for three years. A Marfrig executive was accused of fraud.

Public Issue Index

Figure 25 – Marfrig Public Issue Index (PII[©])



B. Denny Ellison

Founded in 2010 and based in London, Denny Ellison provides bespoke, independent equity research on companies, sectors and themes. The company delivers reports, presentations and other equity research-related products to asset managers.

The company is well positioned to help asset managers fill any existing (or emerging) coverage gaps in either its external sell side or internal research resources.

Denny Ellison covers global equities across a wide range of sectors. We have completed bespoke reports on more than 30 different industries across several geographies.

The team comprises highly experienced, independent equity research analysts, each with 15 years' experience on average, who have worked at leading international financial institutions, on both the sell side and the buy side, covering a wide range of sectors including: consumer, retail, luxury goods, industrials, energy, TMT, financials, utilities, construction and pharma.

The company operates as a third-party, buy-side research provider with most of its clients, with whom it forms close relationships and gains insight into the client's research process. With a stable and growing team of analysts, it has positioned itself as a valuable and trustworthy extension of buy-side, in-house research teams.

For more information, please visit www.dennyellison.com and training.dennyellison.com.

Eveline Varin, CEO, Denny Ellison Enterprises Limited: Eveline worked at Morgan Stanley as a sell-side equity research analyst covering the consumer sector for several years. Before that, she was an analyst at Dresdner Kleinwort Wasserstein, covering the general retail sector. Eveline holds a master's degree in international management from ESCP-EAP, European School of Management and conducted her French 'classes préparatoires aux grandes écoles' at Lycée privé Ste Genevieve.

David Wilson, Analyst, Denny Ellison Enterprises Limited: David has over 14 years of research experience. He was responsible for European utilities coverage at Standard & Poor's where he also covered sectors including construction, property, hotels & leisure, banks and motorways. He covered European large-cap growth stocks at the US long-only fund management company, W.P. Stewart, and held a number of research roles at Robert Fleming & Co. David also set up an equity research department for Drewry, a leading information provider in the shipping industry. He has a Diploma in European Business Administration from Regent's University London.

C. TDi Sustainability

The company is a sustainability advisory firm whose aim is to create an environmentally, economically and socially responsible system of connected enterprises that benefits communities and businesses worldwide.

Our experience is both broad – covering multiple material supply chains, geographies, jurisdictions, and industry initiatives – and deep – our team's cross-disciplinary qualifications cover technical, environmental, social and governance issues – and each member has 10 to 25 years' practical experience of in-the-field implementation. We are corporate sustainability strategists. TDi Sustainability has completed more than twenty-five mandates to build responsible supply chains for downstream companies in multiple sectors, covering agricultural products, raw materials, textiles, minerals, fragrances and plastics. We are experienced in developing longstanding, strategic interventions and value chains and partnerships between commercial businesses and civil society for mutual benefit.

We are risk management specialists with a strong track record of enabling investors and corporates to meet the compliance requirements of voluntary sustainability standards and expectations of external stakeholders. TDi Sustainability is 'hands on'; we actively work in the field of site-level audits in numerous countries from Brazil to the Republic of the Congo, Mexico to Mauritania and the Democratic Republic of the Congo (DRC) to the Dominican Republic. TDi is trusted as we have 'suits in the boardroom and boots in the mud'.

Combining strategic thinking and business acumen with real-world experience, TDi Sustainability offers clients a uniquely insightful, accurate and nuanced understanding of both the challenges and opportunities facing responsible investing and sourcing. TDi is well known for its applied relevant research into raw material value chains and current databases: we gather, collate, analyse and present data on the sources, production and sustainability aspects of commodity supply chains. An important contribution in this area was our assessment of 50 minerals presented in the *Material Change* report. TDi has completed similar analytical exercises for six different industry associations and a number of private companies. We were contracted by the OECD to compile and analyse information on the risks associated with sourcing from over 200 countries and 40 different minerals and metals.

TDi Sustainability has developed TDi Search360°, a data scraping and issue analysis tool that is used to help downstream companies be alert to and judge the significance of allegations in their supply chain. These projects have enabled the development of a deep database on allegations and risk indicators of countries, regions, individual companies and mines in the country where many materials and minerals originate. Some of this work will be incorporated into an online portal – Material Insights – being developed by TDi. We are also retained by clients to develop practical LCA (Life Cycle Analysis) tools with which to analyse and build sustainable supply chains, right up to the producer. For example, we are completing a multi-year project to measure the biodiversity, water use and GHG impact of leather used in the auto industry – right up to ranches in Brazil and Argentina.

Lastly, TDi prides itself on keeping abreast of changing political and technical landscapes, and our research into emerging sustainability trends in business enables us to remain fresh and (to) create innovative approaches to our work projects when needed. For example, we are partnering with the World Economic

Forum to bring briefing and white papers on the extraction of commodities from the ocean and a forum to engage in discussion about this new source of nickel, cobalt, manganese and copper.

For more information, please visit www.tdi-sustainability.com.

Assheton Carter, CEO, TDi Sustainability: Pioneering executive, consultant and board advisor on sustainable business and environmental markets, corporate responsibility, non-financial risk, and responsible investment in international and emerging markets. Assheton has a track record of 25 years with a focus on practising business sustainability in the resource sector – mining, oil & gas, forestry and forest-based carbon markets, and tropical agriculture – and international supply chains – food, jewellery, luxury and OEM. Assheton chairs and serves on a number of boards and expert panels for standard-setting organisations, NGOs and private companies. He is an expert on corporate voluntary standard-setting and certification schemes. Previous executive positions include head of risk and performance at Althelia Ecosphere, an impact-investing firm; SVP at PACT, a leading international social development NGO where he oversaw climate change and mineral supply chain programmes, as well as external affairs and communications functions; and Chief Advisor Business Practices at Conservation International, where he led strategy development and execution.

Assheton co-founded Spartacus Capital Mining Fund, an ESG-focused private equity firm (now trading as Tembo Capital). He has developed many significant public-private partnerships between business, environmental and development NGOs, the donor community and government agencies. Assheton has worked with major brands in Europe and the USA, including Disney, United, Marriot, Cartier, Chopard, Kering, Bulgari and Apple, and with natural resource companies in Africa, Asia and Latin America. He has launched and led a number of ‘best practice’ initiatives with extractive industries, and structured innovative ‘green’ supply chains, including the first fully traceable gold and diamond jewellery for the world’s largest retailer, Wal-Mart. He also developed the only tracking system for ‘conflict-free’ metals from the DRC used by electronics manufacturers in Europe and the United States. He has published more than 20 book chapters and articles. His first degree is in international agriculture, with an award-winning thesis written on Fairtrade coffee and the merits of low-input agricultural systems.

Andrew Moore, Analyst, TDi Sustainability: Andrew is a sustainability and international development professional with interdisciplinary skills built on an academic background in both physics and environmental management. His work with TDi Sustainability focuses primarily on material supply chain risk, including research and the development of techniques to help manufacturers and consumer product companies better understand their sourcing risks and how to mitigate them. In parallel, Andrew works with TDi’s sister organisation, The Impact Facility, which takes a developmental approach to improving how artisanal and small-scale gold mining is carried out in East Africa. Not only does this help to reduce the environmental impact of gold mining such as mercury pollution, but it also aims to provide the large numbers of households who depend on it with fair livelihoods.

Jumana Miqdadi, Analyst, TDi Sustainability: Jumana is a sustainability analyst with a background in civil rights law, and regulatory compliance matters. She has an academic background in law, economics and finance. Jumana’s work at TDi Sustainability focuses primarily on material supply chain risk and helping companies with their responsible sourcing and corporate social responsibility policies. She also researches and writes reports on global sustainability trends and how downstream and mining companies can utilise

and develop their own products and services in line with these emerging trends. Jumana is a native Arabic speaker and is currently learning to speak, read and write Mandarin.

Ben Payton, Senior Consultant, TDi Sustainability: Ben joined TDi in April 2021 and is based in London. At TDi Sustainability, Ben focuses on supply chain risk analysis and led the development of TDi Sustainability's *Material Insights* platform. Ben was previously a Senior Research Manager at Exiger, a due diligence consulting firm, where he specialised in managing projects to help clients manage ESG risks in their supply chains. Prior to this, he was Head of Africa Research at Verisk Maplecroft, a firm providing advice to international clients on political and ESG risks. As part of this role, Ben managed multiple projects for clients in the extractives sector to help them assess operational and reputational risks as part of country-entry processes. Ben has regularly presented at international conferences and events, and his analysis has appeared in publications such as the Financial Times, Reuters and Bloomberg. Ben has a BA in Modern History and Politics from the University of Southampton and an MA in African History from the School of Oriental and African Studies, University of London.

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E. Disclosure

Authors' Certification

The authors hereby certify that the views expressed in this document accurately reflect their personal views about the securities mentioned herein.

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Contact us

info@dennyellison.com

www.dennyellison.com

Phone: +44 (0) 20 7183 7645

Denny Ellison Enterprises Limited

118 Pall Mall, London, SW1Y 5ED, United Kingdom

Company number: 07289870

VAT number: 998 1349 61

Registered in England and Wales