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IMPACT FOCUS NOTE

Tobacco

Smoke and Mirrors

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Following our previous work analyzing the negative health impacts of cigarettes, we round out our argument for the negative impacts of tobacco products with two arguments. First, we discuss the rapidly growing category of smoke-free products: electronic cigarettes, heated tobacco units, and oral tobacco. Second, we discuss the mirage that tobacco companies create through claims of ESG excellence.

Smoke free products are marketed as lower risk than combustible cigarettes and as a way to quit smoking. Claims of reduced risk are correct insofar as carcinogen concentration, but clinical evidence that this reduced concentration improves health outcomes is lacking. Further, tobacco is still at the core of the product offering, thus the addictive qualities of nicotine remain, and nicotine addictions may be easier to develop with these more pleasant and flavorful methods of consumption.

We have a high level of conviction that these products create poor outcomes for human health and for the planet, yet tobacco companies often receive high operational ESG ratings. We use this example to highlight the difference between our impact thesis, based on the positive or negative impact generated by a company's product or service, and ESG, based on the operational actions of a company that are more easily greenwashed.

About Smoke-Free Tobacco Products

There are three main types of smoke-free tobacco products: electronic cigarettes, heated tobacco units, and oral tobacco. Electronic cigarettes, or e-cigs, (also known as e-vapes, vapes, and generally as Electronic Nicotine Delivery Systems or ENDS) have made headlines in the United States over the past few years for an array of health complications, especially in adolescents. E-cigs consist of a heating source and a consumable insert, which contains an e-liquid typically derived from the tobacco plant. The most well-known example of this type of product is JUUL. A survey study of US adults found that 2020 e-cig current use prevalence was at 5.1%, a slight decrease from 5.5% in 2018. This decrease was most prominent amongst adults aged 18 to 20. Daily e-cig use prevalence was at 2.3% in 2020, up from 2.1% in 2018.

Heated tobacco units, or HTUs, (also known as Heat Not Burns or HNBs, Heated Tobacco Sticks or HTSs) consist of a tobacco heating source (often re-chargeable) and a consumable insert of tobacco leaves. The tobacco insert is heated, but at a lower temperature than a traditional cigarette, which creates an aerosol the user inhales. These devices are much less common in the United States compared to the rest of the world. Only 2.4% of all US adults surveyed had ever used a HTU, compared to 6.5% of EU survey participants. This is mainly because key player Philip Morris has not yet entered the US with its IQOS product (I Quit Ordinary Smoking), though the company plans to enter the United States market with IQOS 3.0 in 2024. IQOS has been the topic of academic debate over concerns that IQOS is not in fact proven to reduce risk of health complications (more on this later) and whether or not IQOS is truly a smoke free product. One academic paper explains the smoke-free fallacy. Harmful components of cigarette smoke are a result of pyrolysis (incomplete combustion) and thermogenic degradation (degradation of the cigarette through heat). Complete combustion occurs at temperatures above 1,300 degrees Celsius, but pyrolysis and thermogenic degradation can occur at lower temperatures, such as those of traditional cigarettes (roughly 800 degrees Celsius) and HTUs (350 degrees Celsius). The paper goes on to show elements from pyrolysis and thermogenic degradation are present in the IQOS device vapor: thus, "there can be smoke without fire."

Oral tobacco, also known as chewing tobacco, comes in the form of both loose leaves and shaped capsules or bundles. It can be sweetened with different flavors and is usually placed inside the mouth to be chewed. Another variant of oral tobacco is the nicotine pouch, also known as snus, which contains a spitless, moist powder. The CDC found that oral tobacco was currently used by 2.3% of US adults in 2020, with a higher prevalence in men (4.5%) than women (0.3%).

Electronic Cigarettes and the Environment

E-cigarettes are particularly concerning for the environment. Due to the recent rise in e-cigs, the negative impacts of manufacturing e-cig products are still being fully understood. However, the end of life impacts of e-cig pods and batteries is clear. When surveyed, 51% of young e-cigarette users said they dispose of used pods in the regular trash, 17% put them in the regular recycling, and 10% admitted to littering the pods. Littering is certainly the worst end of life outcome: E-cig pods are ultimately single use plastic, made worse by the added nicotine salts, heavy metals, lead, and mercury, which make their way into soil and waterways. The more e-liquid that remains in the pod, the worse the environmental impact. Disposing of used pods in the regular trash or recycling may seem like the way to go, and JUUL even recommends on its website that pods can be disposed of as regular trash. However, given the mix of heavy metals and residual nicotine, these pods actually qualify as both e-waste and biohazard waste. The same survey of youth e-cig users found that 43% of users disposed of empty batteries or other components in the regular trash and 16% dispose of these parts in regular recycling. E-cig batteries are lithium-ion batteries, which have been known to explode in garbage trucks and landfills when damaged or overheated. Ultimately, the manufactures of these products do not provide clear, proper disposal instructions for consumers or any sort of a recycling program: 46.9% of users reported receiving no disposal instructions from the manufacturer. The proper way to dispose of pods and batteries, separately, will vary by the policies and practices of local waste departments. This can still present challenges, so in 2019, the US DEA started to accept used e-cig pods during annual National Prescription Take Back Day programming.

Reduced Risk Claims

The health risks of cigarettes are well established and publicized, and marketing for electronic cigarettes and HTUs often centers on claims of reduced health risk compared to combustible cigarettes. The outlier is oral tobacco, which contains many cancer causing chemicals and has been linked to cancers of the mouth, tongue, cheek, gum, esophagus and pancreas. Oral tobacco can also cause other mouth and gum diseases such as leukoplakia, white/grey patches inside of the mouth which can lead to cancer, and tooth decay. Additionally, oral tobacco use increases chances of dying from heart disease and stroke. Based on clinical evidence, in 2009 the FDA implemented regulations that require oral tobacco packages and advertisements to have clear labeling of these negative health effects, and that oral tobacco is not a safe alternative to cigarettes and is addictive. The FDA strictly prohibits companies from making reduced risk claims on oral tobacco products without explicit FDA approval. Although not explicitly marketed individually in this way, oral tobacco products are still included in many tobacco companies' smoke-free, potential reduced harm, product portfolios.

Though HTU and e-cig vapor contains lower levels of some chemicals than their combustible cigarette counterparts, there is still minimal research which supports claims that these products are "reduced risk" alternatives. The contents of e-cig vapor in particular are of great concern and include: nicotine, volatile organic compounds, heavy metals (nickel, tin, and lead), ultrafine particles, cancer-causing chemicals, and flavorings (which have been linked to serious lung disease). A 2021 study by researchers from the University of Hong Kong and Columbia Mailman School of Public Health used a survey method to assess and compare the respiratory impacts on youth who consumed HTUs, e-cigs, and cigarettes in Hong Kong. The study ultimately found similar respiratory symptom burden prevalence in current cigarette, current

HTU, and current e-cig users (31.2%, 33.5%, and 29.3%, respectively). And, when former cigarette users switched to an HTU device, they still experienced a higher risk of respiratory symptoms, suggesting that this proposed switch did not result in a clinical improvement of health outcomes. The study closes with key remarks that because HTUs (and e-cigs) are less harsh than traditional cigarettes, they can actually be more appealing to initiate using to youth consumers. Another study by researchers at UCSF called into question reduced risk claims around IQOS specifically, highlighting that although IQOS resulted in reduced emissions of known cigarette toxins, IQOS resulted in significantly higher emissions concentrations of many other chemicals compared to cigarettes. The impact of these compounds in terms of toxicity and clinical harm are unknown, and further clinical trials of IQOS will be necessary to prove any clinical benefit compared to conventional cigarettes.

Cigarettes and the Environment

Cigarette waste is literally everywhere: 4.5 trillion cigarette filters (also known as cigarette butts or ends) are littered in parks, oceans and beaches, rivers, sidewalks, and more every year. These filters contain microplastics and make up the second largest source of plastic pollution on the planet, and the WHO emphasizes that there is no evidence to support that filters provide any health benefit. These filters actually make it easier to smoke, while product marketing misleads consumers into thinking they are consuming a safer option. Worse, the chemicals in the filter leach into water and soil when littered, harming wildlife and contaminating water supplies.

Tobacco smoke contains all three major GHGs and produces more particulate matter than diesel engine exhaust.

It takes 1 tree to make enough paper for 15 packs of cigarettes.

Smoking Cessation Claims

E-cigs are also marketed as a smoking cessation assistance device, meant to replace cigarettes with a less harmful alternative along the way to quitting smoking altogether. Contrary to this claim, according to the CDC, vapes are not scientifically proven to assist with smoking cessation, and youth who vape may be more likely to smoke cigarettes in the future. A 2020 study found that approximately 39% of US adult e-cig users were still current smokers, and approximately 38% were former smokers. The study remains inconclusive as to whether or not vaping actually helps quit smoking, or just serves as a substitute for access to addictive nicotine. A little over 23% of e-cig users in the study reported never smoking cigarettes, and the majority of these users were under the age of 24, supporting concerns that e-cigs have resulted in the initiation of tobacco product use in younger populations. Although HTUs are also designed to support smoking cessation, an EU survey found that 2.1% of current HTU users were not previously smokers. Alarmingly, and following the same trend as e-cigs, HTU ever-use and daily-use were both the most prevalent in the 15–24-year-old population. Oral tobacco products are also positioned as an avenue to quit smoking cigarettes, but the Mayo Clinic emphasizes that no smokeless tobacco product has actually been proven to assist with smoking cessation. All oral tobacco products contain nicotine, and users ultimately get the same amount of nicotine as regular cigarette smokers.

Negative Impacts on Underage Users

In this section, we explore the heightened risk that smokeless tobacco products present to under-21-year-old users because of their ease of use and appeal. For example, newer oral tobacco products that do not require the user to spit appeal to youth users because they can be used without detection in places where smoking and/or vaping is prohibited. The biggest concern is the underage use of vaping devices, which has catastrophically risen in the United States in recent years. Most disappointing is that progress made

over the past 20 years in reducing youth tobacco use has been erased by e-cig use, which has driven an increase in total tobacco product use amongst high school and middle school students. In fact, e-cigarettes passed cigarettes as the most commonly used youth tobacco product in 2014. In 2011, the National Youth Tobacco Survey found that 0.6% of middle school and 1.5% of high school students used electronic cigarettes. By 2019, these figures rose to 10.5% of middle school and 27.5% of high school students using e-cigarettes, with JUUL as the most popular brand. Although cigarette use amongst adolescents continued to decline during this period, e-cigarette use rose at "alarming levels" according to the FDA. Vaping devices deliver a potent punch of nicotine in a sweet-tasting vapor, initially available in flavors such as bubblegum, mint, candies, and fruits. These flavors were one of the key contributors to massive underage use: 84.9% of youth who used e-cigs reported using flavored varieties. This led the FDA to prioritize enforcement of all flavored e-cig cartridges, aside from tobacco and menthol flavors, in 2020. The National Youth Tobacco Survey's methodology changed during the pandemic to an online format, and this combined with the societal changes of the pandemic make comparisons with prior years difficult. With that said, after the 2020 flavor ban, the 2022 survey showed that 3.3% of middle school and 14.1% of high school students were current e-cig users. The most common devices were disposables, and JUUL was not even in the top four most common brands.

Underage use is not just driven by tasty pod flavors, but also by the marketing practices of tobacco companies. In 2021, 76% of US students reported exposure to tobacco product marketing through traditional media, and 74% reported exposure to social media-based advertisements. More than 80% of underage smokers choose from the three brands with the top advertising spend. In addition to the intriguing flavors mentioned above, the most commonly cited reasons for trying vape products include curiosity, perception as a lower risk alternative, and the avoidance of indoor smoking restrictions. And, youth use of vape products is easier than conventional cigarettes as it frequently goes undetected by parents and others because of the discreet nature of the devices (especially JUUL).

Lastly, and most importantly, e-cigs contain nicotine, which can cause the same addiction as in adults, but also comes with health complications specific to youth users. According to the CDC, nicotine is not only addictive, but also especially harmful for adolescents, as it can harm the formation of synapses, or neural connections, which support pivotal brain functions such as learning, attention, mood, and impulse control in the developing brain. The CDC also highlights that adolescent e-cig and cigarette use has also been associated with depression and future addictive behaviors. Other chemicals present in e-cigs are known to have adverse health effects and the clinical outcomes are not completely understood for adults, let alone adolescents.

E-cigs have been proven to be mislabeled, for example, claiming to be nicotine free when the liquid does in fact contain nicotine. JUUL is particularly of concern due to its highly potent formula of nicotine: one JUUL pod contains as much nicotine as 20 traditional cigarettes, and is delivered in a patented nicotine salt formulation, which allows for higher levels of nicotine to be inhaled more easily, resulting in less irritation than traditional, free-base nicotine. This compound, later trademarked JUULSALTS, is the reason for JUUL's immense popularity, especially with adolescent, never cigarette smokers given the ease of use. David Kessler, a pediatrician and former FDA commissioner, said, "Addiction is central to the business model. With their nicotine salts, JUUL has found the Holy Grail." JUUL vapor is so smooth that two-thirds of users aged 15 to 24 don't realize that JUUL always contains nicotine. In younger people, 5 mg of nicotine per day is enough to establish an addiction: that is roughly one quarter of a typical e-cig pod. The US Surgeon General's fact sheet for youth tobacco use prevention highlights that almost 90% of smokers start by age 18, and 99% start by age 26. Escalation from occasional to daily smoking almost always will take place before turning 26. 75% of teen smokers will end up smoking through adulthood because they

develop a nicotine addiction and do so more easily than adults, and the younger the user starts the more likely they will be addicted long term.

Product Impact vs ESG

The tobacco industry ultimately serves as a strong example of the distinction between an impact thesis and an ESG thesis. We believe this to be an important distinction: though we consider ESG factors and recognize their relevance in many investors' approaches to responsible investing, our impact thesis is centered on the product or service's impact and the decision whether or not to invest is binary based on that outcome.

To this point, we have demonstrated that the impacts of tobacco companies' products are negative on human health, with a high amount of conviction based on the evidence provided by public health organizations and peer reviewed literature. We have also highlighted some of the negative environmental impacts of tobacco products, which supplement the negative health impacts.

ESG ratings are traditionally focused on how a company operates, and not the product or service it is offering. The methodology of this scoring varies, but analyses typically compare a set of metrics to performance by industry peers. Thus, for an industry like tobacco, companies can still procure "higher" ESG scores by simply beating their peers on a comparative basis.

Further, we believe that ESG scoring is more vulnerable to greenwashing efforts than product/service impact analysis. Tobacco companies make claims of reduced risk products, as discussed in this note, but the evidence is clear that this is simply misleading marketing. When it comes to the environmental impact of tobacco companies' *operations*, however, the truth is not as easy to see. For example, a company may make what seem like impressive CO2 emissions reduction targets, but the reality is that the absolute emissions from tobacco manufacturing are still enormous: shutting down the entire tobacco industry would have the same GHG impact as taking 16M cars off of the road every year. However, the commitment to disclose and decline emissions alone is often the basis for an ESG rating component. The tobacco industry is notorious for greenwashing its negative impact on the environment: the WHO has highlighted that these companies intentionally publicize and self-report social responsibility investments and initiatives that focus on reducing manufacturing carbon footprint and shifting responsibility for waste cleanup to communities, while hiding the reality of the magnitude and scope of their negative impact.

Even with all of this considered, tobacco companies generally earn ESG ratings ranging from average to ahead of the pack. Comparatively, by our impact metric methodology, tobacco companies are responsible for some of the highest consumer death tolls in our impact universe.

We emphasize that there is a high value in using properly constructed ESG analyses as a risk mitigation tool, a management quality assessment framework, and a values-based investment screen. However, it is our belief that the true positive or negative nature of a company comes most empirically and powerfully from the product or service's impact on people and the planet. Since this product or service is directly tied to the company's revenue, our approach also has the potential to be a better long run indicator of company growth and performance.

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