

Who benefits from undermining breastfeeding?

Exploring the global commercial milk
formula industry's generation and
distribution of wealth and income



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Published in October 2022.

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This study is part of a wider programme of research on the political economy of commercial milk formula that has been funded by the World Health Organization (WHO) through a grant provided by the Bill and Melinda Gates Foundation (BMGF). The research was conducted entirely independently by the listed authors who are solely responsible for the study and the contents of this report.

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Abstract

The global commercial milk formula (CMF) industry is known to systematically undermine breastfeeding around the world, thereby reinforcing a preventable public health and human rights crisis. The aggressive marketing of CMF products by the industry, for instance, is recognised as one of the key reasons behind the poor global progress in improving breastfeeding rates. The CMF industry is also known to use a range of political strategies to prevent the effective and widespread adoption of regulations by national governments, such as marketing regulations, intended to protect and promote the health of their citizens. One of the key political messaging strategies used by the CMF industry as part of its efforts to avoid or weaken regulation is to portray its importance to economic development and prosperity for national economies, especially those of low- and middle-income countries (LMICs). Such claims, however, have rarely been subjected to critical analysis.

Given these considerations, this report sets out to provide an alternative picture of the global CMF industry's contribution to economic development and prosperity for national economies by critically examining the industry's generation and distribution of wealth and income. To achieve this aim, the report seeks to address three interconnected objectives: i) to analyse trends in the size and concentration of national CMF markets around the world; ii) to analyse the contribution that CMF sales make to the profitability of the global CMF market's most dominant corporations; and iii) to examine how the global CMF industry distributes its wealth and income, focusing on distribution of corporate wealth and income to governments (i.e., taxation) and among market stakeholders (e.g., wealth transfers to shareholders). We adopt a novel approach using multiple methods to address these three objectives, sourcing a diverse range of data from various market research and business databases.

Our analysis shows that the global CMF industry predominately benefits – and to an increasing degree – a small group of shareholders and investors based mostly in high-income countries (HICs). Three interlinked trends and processes underpin this finding. First, many national CMF markets, especially in East Asia, expanded rapidly from 2010 to 2020. Most national CMF markets were found to be highly or very highly concentrated, which means that, in many countries, most of the revenue generated from CMF products flows to only a handful of corporations. Second, the global CMF industry's most dominant players appear to rely on several extractive practices – referring to practices that seek to appropriate wealth rather than create it – to generate and sustain high levels of profits. Such practices include those related to minimising tax payments on their profits, especially to LMIC governments, although the scope for the largest companies to do so appears to have shrunk in recent years. Third, The global CMF industry is becoming increasingly financialised, reflected by a pattern of increasing share ownership by large institutional investors across the industry, as well as by the industry's increasing pursuit of maximising shareholder returns at the expense of other stakeholders. In 2020 (a year affected by the COVID-19 pandemic), the industry transferred an estimated US\$32.7 billion to its shareholders via dividends and share repurchases, an amount nearly double that spent on capital expenditure (US\$17.9 billion), which we treat as a proxy for the long-term interests of workers. As of mid-2021, nearly 97% of the industry's traded share value was held in HICs, whereas less than 1% was held in LMICs, excluding China.

The highly inequitable manner by which the CMF industry generates and distributes wealth and income likely contributes to widening social and economic inequalities. This so-called *maldistribution* of wealth and income strongly undermines the global CMF industry's claims about its role in creating economic value and contributing to sustainable development, especially for LMICs. We therefore strongly recommend that

governments treat such claims made by the industry with strong scepticism, and implement actions to address some of the global CMF industry's negative social and economic impacts. Options include:

- i) **Antitrust policy**, which could be used to protect citizens from the extractive and exploitative practices of powerful CMF manufacturing corporations
- ii) **Progressive tax policy**, which has the potential to partly address the adverse health and equity impacts of the CMF industry, such as by removing certain tax advantages available to powerful CMF manufacturing corporations, as well by raising more of the public finance necessary for the provision of essential goods and services
- iii) Stricter **corporate disclosure laws**, such as mandatory public country-by-country reporting, to ensure greater corporate accountability and transparency, including with respect to flows of profits and taxes
- iv) Reforming **corporate law** so that corporate decision-makers are required to fully consider the interests of all stakeholders in their decision-making, as opposed to prioritising the interests of shareholders

1. Background

Insufficient global progress on increasing rates of breastfeeding is reinforcing a preventable public health and human rights crisis. Breastfeeding is the biological norm for feeding infants and young children [1]. To give infants and young children the best chance to attain optimal health, growth, and development, the World Health Organization (WHO) recommends that infants initiate breastfeeding in the first hour of life, exclusively breastfeed up to the age of six months, and then be provided with safe and nutritionally adequate foods as a complement to breastfeeding up to two years of age or beyond [2].

The global commercial milk formula (CMF) industry's systematic undermining of breastfeeding is well described in the literature [1, 3-5]. In particular, the aggressive marketing of CMF products by the industry is recognised as one of the key reasons behind the poor global progress in improving breastfeeding rates in many contexts around the world [6]. Exposure to such marketing – which often seeks to actively undermine breastfeeding by casting doubt on its superiority, as well as by exploiting the fears and vulnerabilities of mothers – has been linked with reduced breastfeeding initiation, exclusivity, and duration [3, 7-10]. There are circumstances in which CMF feeding is appropriate, such as when breastfeeding or expressing breastmilk is not possible or medically contra-indicated, and breastmilk from a wet-nurse or human milk bank is unavailable. However, the aggressive and pervasive marketing practices of large CMF corporations reflect the creation of demand well beyond the provision of CMF products for such purposes [3].

The ability of large CMF corporations to create and expand markets has proven to be an enormous commercial success for the industry – the global CMF market has increased nearly 36-fold in size in terms of revenue over the past four decades [3]. Yet the rapid expansion of the global CMF market poses problems for public and planetary health on numerous counts. Children who are never or partially breastfed are at an increased risk of acute infectious disease, obesity and type-2 diabetes in later life, and all-cause mortality, compared to children who are exclusively breastfed [11-13]. In addition, the under- or over-dilution and under- or over-feeding of CMF products, the use of contaminated water and equipment, and cases of harmful chemical contamination have all been implicated in infant and child malnutrition and ill-health [11, 14-16]. Children in low- and middle-income countries (LMICs) face much of the burden attributable to these issues. For mothers, it has been estimated that not breastfeeding contributes to nearly 100,000 deaths every year from breast and ovarian cancer, increases the risk of type-2 diabetes, and interferes with birth spacing and family planning [11, 12]. Moreover, the production and consumption of CMF products create considerable ecological harm, including via the emission of vast amounts of greenhouse gases, the excessive use and pollution of freshwater resources, and plastic waste [17, 18].

In response to increasing concerns about the harmful and far-reaching effects of CMF marketing, the International Code of Marketing for Breast-milk Substitutes (The Code), developed under the auspices of WHO and the United Nations Children's Fund (UNICEF), was adopted by the World Health Assembly (WHA) in 1981 [19, 20]. The WHA strongly encourages the integration of The Code, which outlines several provisions related to the regulation of CMF marketing, into domestic law. The Code is a 'living document', updated biannually by the WHA in response to the latest WHO technical guidance and evolving industry practices [3]. Four decades on from its adoption, however, nearly one-third of countries are yet to adopt any of its provisions into national law [20]. Even in the countries where provisions have been adopted, monitoring and enforcement is often insufficient to deter violations by the global CMF industry, which multiple reports continue to demonstrate [5, 21-24].

The global CMF industry's extensive and coordinated use of political strategies to prevent the effective and widespread adoption of The Code, thereby undermining public health efforts to promote and increase rates of breastfeeding around the world, is well documented [3]. The global CMF industry, for instance, is known to employ a large 'global influence network' made up of many trade associations that lobby national governments on the industry's behalf (often covertly) to block or weaken regulation [3]. One of the key political messaging strategies used by these lobbying groups is to portray the importance of the CMF industry

to economic development and prosperity for national economies, especially those of LMICs [3, 25]. As an illustrative example, the CMF industry has repeatedly emphasised the jobs and investments it provides in the Philippines, one of the largest national CMF markets in the world, to argue against the implementation of certain public health regulations [25]. Companies also frequently make claims in their public relations materials concerning their contributions to sustainable development through various social and environmental initiatives [26, 27]. However, with some exceptions [28], these industry and corporate claims framed around economic importance and contributions to sustainable development have rarely been subjected to critical analysis.

Given these considerations, this report sets out to provide an alternative picture of the global CMF industry's contribution to economic development and prosperity for national economies by critically examining the industry's generation and distribution of wealth and income. To achieve this overall aim, this report seeks to address three interconnected objectives.

First, the report aims to analyse trends in the size and concentration of national CMF markets around the world. Trends in CMF market size can provide insight into where corporate income from CMF sales is generated, and how this has changed over time. Relatedly, market concentration measures the extent to which market shares are concentrated between the industry's firms. Importantly, high market concentration can be understood as both an outcome and driver of market power, which is recognised as an increasingly important source of corporate profits in the global political economy [29-31]. Dominant firms often seek to increase market concentration (e.g., by acquiring rival firms) as part of their efforts to create a market environment conducive to the generation of large and sustained profits, which can be attributed, at least in part, to the structural and relational power that high market concentration confers dominant firms vis-à-vis other market stakeholders [29, 32-38]. For instance, high market concentration can increase the selling power of firms relative to consumers, as well as the buying and bargaining power of firms over their suppliers, distributors, and workers [39]. Market power also has important political implications and, in many contexts, readily translates into considerable political influence [40].

The second objective of this report is to analyse the contribution that CMF sales make to the profitability of the global CMF market's most dominant players, most of which have diverse product portfolios. It has been described that CMF products are generally more profitable than other consumer goods [41].

Third, this report seeks to explore how the global CMF industry distributes its wealth and income, focusing on distribution of corporate income to governments (i.e., taxation), as well as corporate wealth and income distribution among market stakeholders (e.g., wealth transfers to shareholders). It is well recognised that, over recent decades, many corporations around the world have increasingly been able to minimise their tax obligations, while concurrently transferring an increasing proportion of their income to their shareholders at the expense of other market stakeholders (e.g., workers) [42-47]. These phenomena likely contribute to widening social and economic inequalities and thus undermine the creation of economic value and sustainable development.

2. Methods

Given the complex nature of the research objectives, we adopted a streamlined approach using multiple methods to examine the global CMF industry's generation and distribution of wealth and income. To the best of our knowledge, this is the first study to integrate market, firm, and industry-level data to critically examine the global CMF industry. See Appendix A for an extensive description of the methods, including methods, metrics, and data sources used.

3. Results

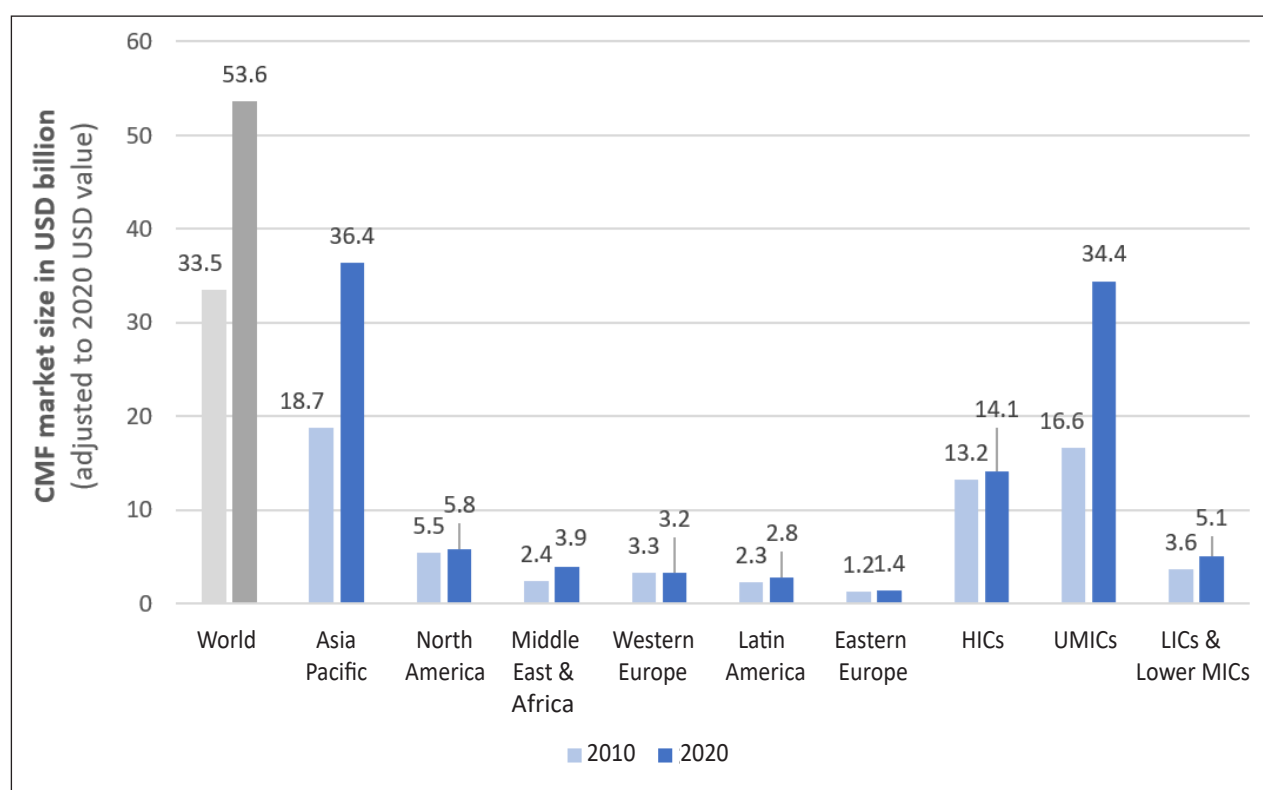
3.1. Market size and concentration

In this section, we describe the size of the global CMF market, including key regional and national CMF markets, as well as their growth from 2010 to 2020. In doing so, we identify the regions and countries wherein the CMF industry is increasingly sourcing its revenue and pursuing growth opportunities. Also in this section, we describe the extent of market concentration across 78 national CMF markets in 2020, as well as how these levels have changed since 2010, to gain insight into the distribution and degree of market power held by the global CMF market leaders. These findings are supported with an analysis of the positioning of the global market leaders in each national market (i.e., whether they hold a top-four position), as well as their geographical spread in terms of sales revenue generated from their products.

The size of the global, regional, and national CMF markets

The global CMF market increased from US\$33.5 billion (constant 2020 USD) in 2010 to US\$53.6 billion¹ in 2020 (Figure 1). Much of the growth occurred in the Asia-Pacific region, which increased nearly two-fold from US\$18.7 billion to US\$36.4 billion over the period. In 2010, CMF sales in Asia Pacific comprised 56% of global sales. By 2020, this proportion increased to 68%. Most of the growth in the global CMF market occurred in upper middle-income countries (UMICs), where sales grew from US\$16.6 billion to US\$34.4 billion.

Figure 1. Market size by region and World Bank income status, 2020 versus 2010

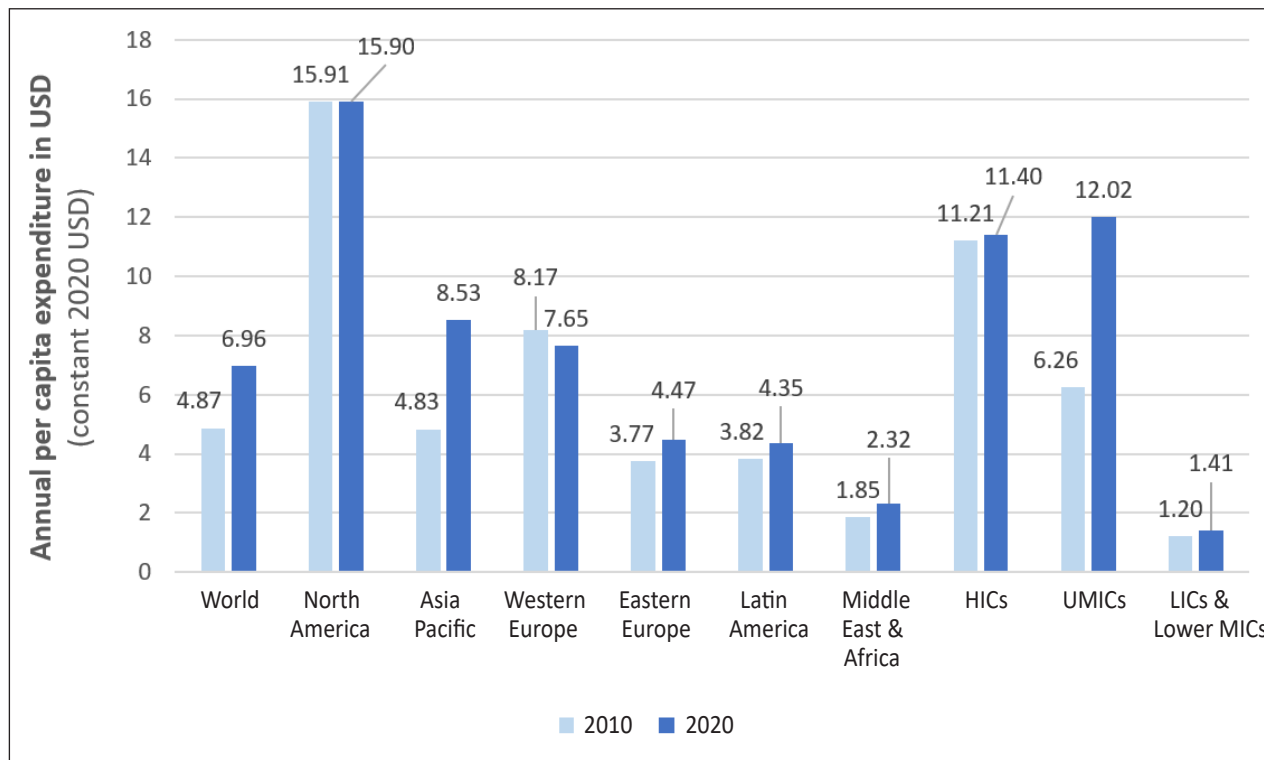


Data source: Euromonitor International (Passport). Prices and exchange rates fixed to 2020 USD. HICs = high-income countries. UMICs = upper middle-income countries. Lower MICs = lower middle-income countries. LICs = low-income countries. Income status based on 2020 World Bank groupings.

¹ Our 2020 estimate is slightly lower than the \$55 billion estimate cited in the 2022 WHO report entitled: 'How the marketing of formula milk influences our decisions on infant feeding', which used 2019 data (<https://www.who.int/publications/i/item/9789240044609>). The difference between 2019 and 2020 CMF sales data is mostly likely due to the effect that the COVID-19 pandemic had on CMF sales during 2020.

Between 2010 and 2020, Asia Pacific experienced the highest proportional growth in annual per capita expenditure on CMF (77%: US\$4.83 to US\$8.53) out of all global regions (constant 2020 prices and fixed exchange rates). Annual per capita expenditure on CMF was highest in North America in both 2010 (US\$15.91) and 2020 (US\$15.90). North America and Western Europe (US\$8.17 to US\$7.65) were the only two regions in which annual per capita expenditure on CMF declined over this period (Figure 2). In terms of income status, growth in annual per capita expenditure on CMF predominately occurred in UMICs.

Figure 2. Market size by annual per capital expenditure (USD) by region and income status, 2020 versus 2010



Data source: Euromonitor International (Passport). Prices and exchange rates fixed to 2020 USD. HICs = high-income countries. UMICs = upper middle-income countries. Lower MICs = lower middle-income countries. LICs = low-income countries. Income status based on 2020 World Bank groupings.

China’s CMF market, which increased in size by nearly 150% from 2010 (US\$10.3 billion) to 2020 (US\$25.5 billion), was by far the largest national CMF market in 2020. In 2020, China’s CMF market represented 48% of the entire global market in terms of revenue. Four of the five largest CMF national markets in 2020 were in the Asia-Pacific region (China, Indonesia, Vietnam, and Philippines). Between 2010 and 2020, annual per capita expenditure on CMF was seen to increase considerably in several of the largest national CMF markets, notably in Australia from US\$7.9 to US\$29.7 per person, in China from US\$7.7 to US\$18.2 per person, and in Saudi Arabia from US\$13.2 to US\$25.8 per person (Figure 3).

Figure 3. Top 10 national CMF markets by size and annual per capita expenditure, 2020 versus 2010

2010				2020			
Rank	Country	Size (USD million)	Per capita expenditure (USD / person)	Rank	Country	Size (USD million)	Per capita expenditure (USD / person)
1	China	10,277.2	7.7	1	China	25,494.1	18.2
2	USA	5,141.0	16.6	2	USA	5,517.9	16.7
3	Indonesia	1,851.3	7.7	3	Indonesia	2,840.9	10.4
4	Vietnam	951.0	10.9	4	Vietnam	1,421.2	14.6
5	Hong Kong	921.2	131.1	5	Thailand	1,033.7	14.8
6	Philippines	777.9	8.3	6	Mexico	1,008.8	7.9
7	France	772.3	12.3	7	Saudi Arabia	846.3	25.8
8	Thailand	769.6	11.5	8	Philippines	832.2	7.6
9	Mexico	757.1	6.6	9	Australia	763.9	29.7
10	Japan	738.5	5.8				
11	UK	539.3	8.6	10	UK	748.0	11.2
19	Saudi Arabia	361.9	13.2	11	France	705.9	10.9
28	Australia	174.4	7.9	13	Japan	569.9	4.7
				19	Hong Kong	376.5	49.9

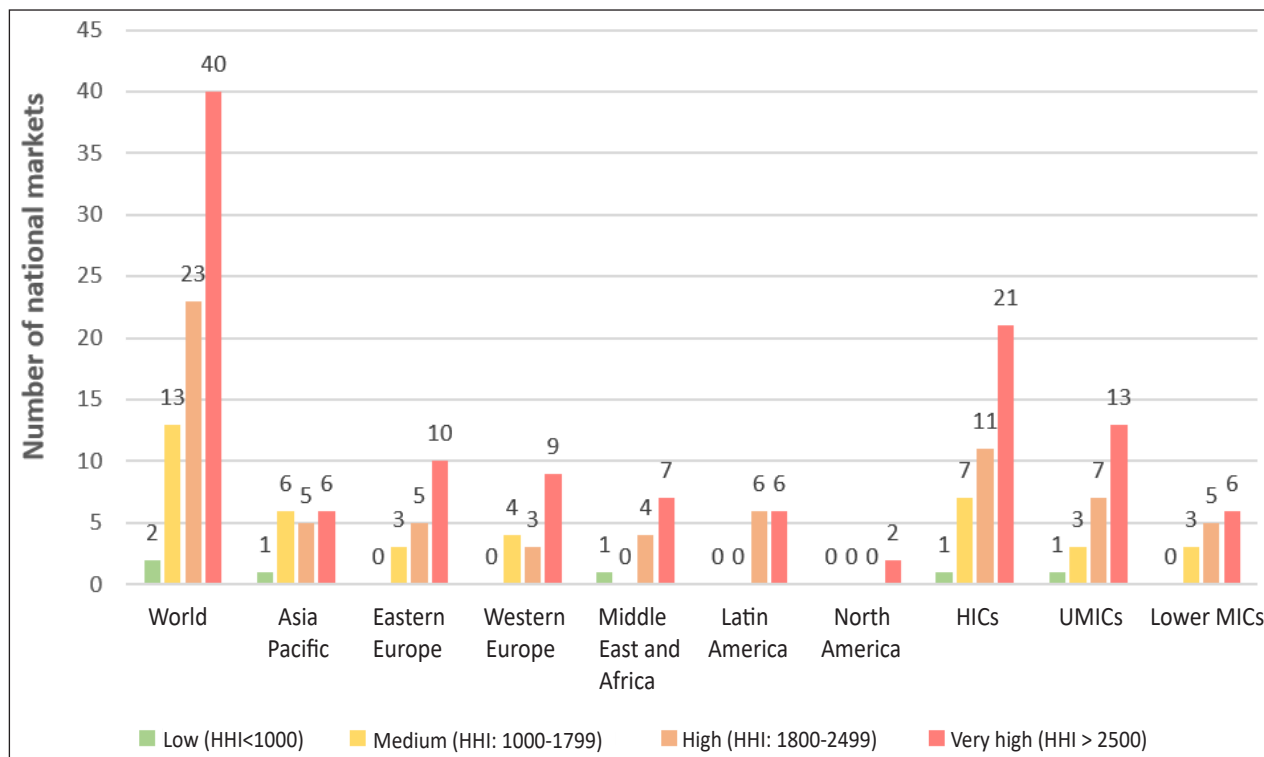
Data source: Euromonitor International (Passport). Prices and exchange rates fixed to 2020 USD.

Market concentration

In 2020, more than 80% (63/78) of national CMF markets were either ‘highly’ concentrated (Herfindahl-Hirschman Index² (HHI) between 1800 and 2499) or ‘very highly’ (HHI > 2500) concentrated, a pattern seen across all regions and income level groups (Figure 4).

² Herfindahl-Hirschman Index (HHI), a commonly used market concentration metric in Industrial Organisation and antitrust scholarship, is found by summing the square of the market share of every firm active in the respective market. We adapted European Central Bank thresholds, as well as current and historical US Department of Justice thresholds, to determine low (<1000), medium (1000-1799), high (1800-2499) and very high (HHI > 2500) levels of concentration. See Appendix A for further details.

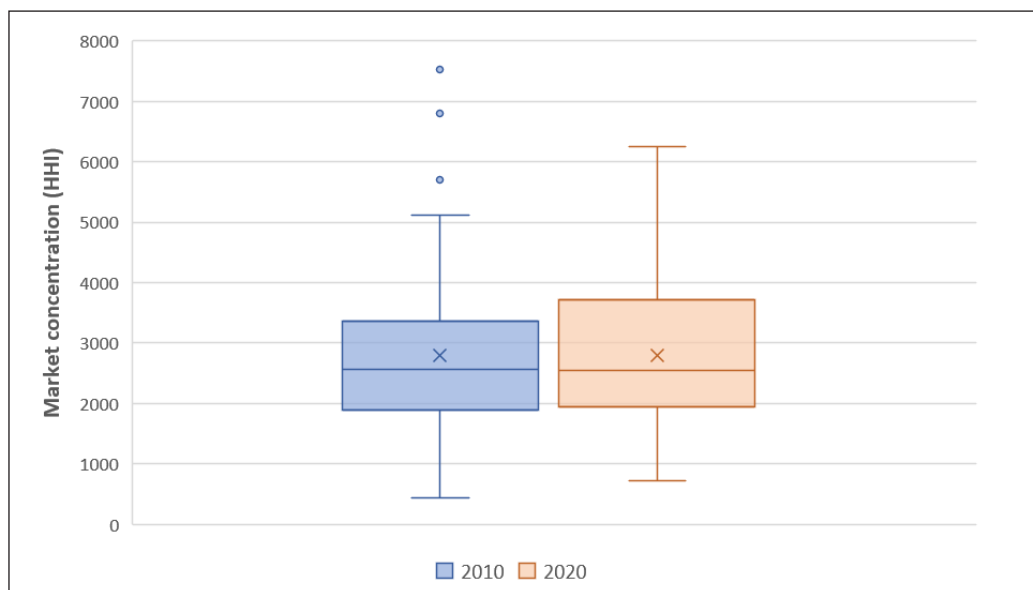
Figure 4. Market concentration (Herfindahl-Hirschman Index) of national CMF markets by region, 2020



Data source: Euromonitor International (Passport). HICs = high-income countries. HHI = Herfindahl-Hirschman Index. Low (HHI < 1000), medium (HHI: 1000-1799), high (HHI: 1800-2499) and very high (HHI > 2500) levels of concentration adapted from European Central Bank thresholds, and current and historical US Department of Justice thresholds [48, 49]. UMICs = upper middle-income countries. Lower MICs = lower middle-income countries. No company share data available for low-income countries. Income status based on 2020 World Bank groupings.

Across the 78 national CMF markets analysed, the median market concentration level in 2020 was relatively similar to the median market concentration level in 2010 (2944 versus 2967, respectively) (Figure 5). Disaggregated by income status, the median market concentration level increased the most in lower MIC contexts over this period, from 1896 to 2230.

Figure 5. A box plot of national CMF market concentration levels, 2020 versus 2010



Data source: Euromonitor International (Passport). Box plot representing the median (middle line through box), mean (the cross, X), 25th percentile (lower line of box), 75th percentile (upper line of box), minimum value (end of lower vertical line), and maximum value (end of higher vertical line). The dots represent outliers. HHI = Herfindahl-Hirschman Index.

From 2010 to 2020, 26 national CMF markets out of the 78 national CMF markets analysed experienced a considerable increase in market concentration (increase in HHI > 250), in comparison to 24 national CMF markets which experienced a considerable decrease in concentration levels (decrease in HHI > 250) (Table 1). Seventy-five per cent (9/12) of national CMF markets in the Middle East and Africa and 44% (8/18) of national CMF markets in Asia Pacific experienced a considerable increase in market concentration, compared to only 17% (2/12) and 28% (5/18), respectively, that experienced a considerable decrease. In terms of income status, 57% (8/14) of national CMF markets in lower MIC contexts and 42% (10/24) of national CMF markets in upper MIC contexts experienced a considerable increase in market concentration, compared to only 21% (3/14) and 25% (6/24), respectively, that experienced a considerable decrease.

Table 1. Number of national CMF markets that experienced a considerable increase, decrease, or neither, in market concentration between 2010 and 2020, by region and income status

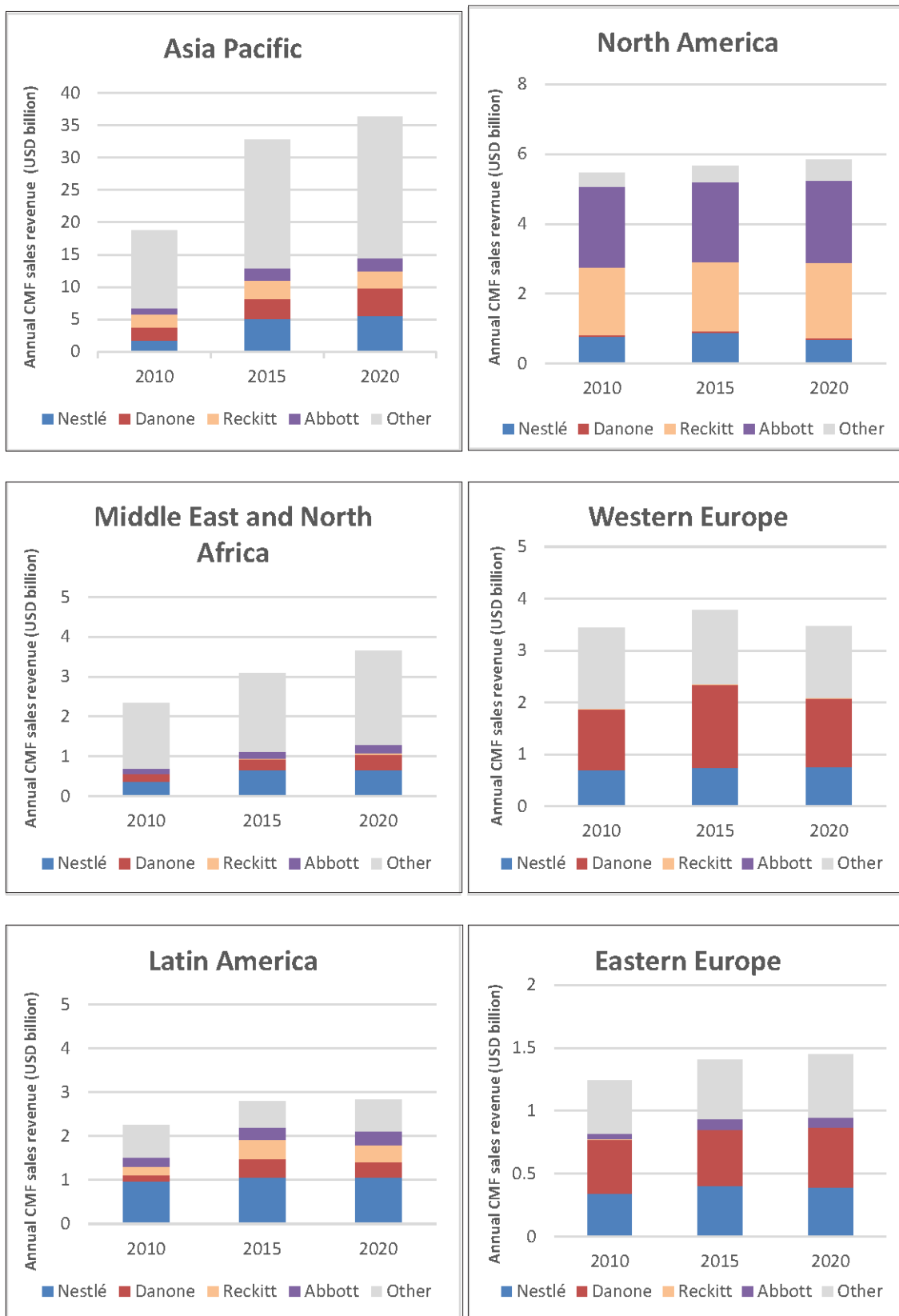
Region and income category	Considerable decrease in HHI	Relatively steady	Considerable increase in HHI	Total
Total	24 (31%)	28 (36%)	26 (33%)	78 (100%)
Asia Pacific	5 (28%)	5 (28%)	8 (44%)	18 (100%)
Eastern Europe	4 (22%)	11 (61%)	3 (17%)	18 (100%)
Western Europe	7 (44%)	8 (50%)	1 (6%)	16 (100%)
Middle East and Africa	2 (17%)	1 (8%)	9 (75%)	12 (100%)
Latin America	6 (50%)	1 (8%)	5 (42%)	12 (100%)
North America	0 (0%)	2 (100%)	0 (0%)	2 (100%)
HICs	15 (38%)	17 (43%)	8 (20%)	40 (100%)
UMICs	6 (25%)	8 (33%)	10 (42%)	24 (100%)
Lower MICs	3 (21%)	3 (21%)	8 (57%)	14 (100%)

Data source: Euromonitor International (Passport). HICs = high-income countries. UMICs = upper middle-income countries. Lower MICs = lower middle-income countries. No company share data available for low-income countries. Income status based on 2020 World Bank groupings. We drew from the European Commission guidelines on horizontal mergers to inform our understanding that changes in HHI of more than 250, in most contexts, can reasonably be understood as considerable [50].

The combined global CMF market share held by the market's four leaders in 2020 (Nestlé, Danone, Reckitt/ Mead Johnson, and Abbott) remained relatively steady over the 10-year period (50.9% in 2010 compared to 49.4% in 2020). Disaggregated by region, we can see that, as of 2020, these four corporations held more than half the CMF market share in North America (89.9% in 2020), Latin America (74.7%), Eastern Europe (65.4%), and Western Europe (60.2%) (Figure 6). Their combined share increased over this period in Asia Pacific from 35.8% to 39.7%, and in the Middle East and North Africa from 29.6% to 35.2%.

The regional CMF market shares held by these four corporations varied considerably. In 2020, Nestlé was the regional CMF market leader in Latin America (37.6%) and the Middle East and Africa (18.2%), and held a regional CMF market share above 10% in all regions. In 2020, Danone was the regional CMF market leader in Western Europe (37.7%) and Eastern Europe (32.7%), but held a minimal share of the North American CMF market (0.9%). Abbott was the regional CMF market leader in North America in 2020 (40.3%), but held only a 0.1% share of the Western European market. In 2020, Reckitt held the second largest share of both the North American (36.9%) and Latin American (15.1%) CMF markets. Reckitt also had minimal presence in Western Europe (0.5%) and was not active in the Eastern European CMF market.

Figure 6. CMF market shares held by Nestlé, Danone, Reckitt, and Abbott by region, 2010 to 2020



Data source: Euromonitor International (Passport). Reckitt data inclusive of Mead Johnson data from 2010 to 2017 (Reckitt acquired Mead Johnson in 2017 to enter the CMF market). Prices and exchange rates fixed to 2020 USD.

In terms of market positioning, at least two of the top four global CMF market leaders held top four market positions in most national CMF markets in 2020. Japan and South Korea were the only national CMF markets in which none of the top four global CMF market leaders held a top four position. In both countries, only domestic firms held top four positions in the CMF market. Nestlé held the most top four positions across the national CMF markets analysed (71/78), followed by Danone (59/78), Abbott (25/78), and then Reckitt (19/78).

3.2. Profitability of CMF for the global CMF market leaders

In this section, we describe how profitable CMF is likely to have been for the industry's four global market leaders – Nestlé, Danone, Abbott, and Mead Johnson (until 2017, when it was acquired by Reckitt) – by examining the contribution of CMF sales to their profits, based on available information. Between 2010 and 2020, Nestlé, Danone, and Abbott made most of their sales from other products than CMF, mainly other consumer goods for Nestle and Danone and medical devices and pharmaceuticals for Abbott. In general, the four leaders of the global CMF market do not publish sufficiently detailed information in their accounts to allow any certainty about the importance of CMF to their global profits. However, they have published enough data to suggest that CMF has been highly profitable, and that it accounted for a significant share of their global profits from 2010 to 2020, though to an extent that varies between companies.

For Abbott, CMF was included within a product category called 'pediatric nutritionals' which accounted for 16% of its global sales revenue over the decade. Abbott has said that the 'principal products' in this category are 'various forms of prepared infant formula and follow-on formula' as well as 'adult and other pediatric nutritional products' and 'nutritional products used in enteral feeding in healthcare institutions'. It appears from this description that a significant part of sales of 'pediatric nutritionals' have been sales of CMF. Not enough data are published to see how profitable this category was. However, there are profit figures for the broader category of 'nutritionals' (which includes products for adults), whose operating profit margins were generally between 7 and 10% higher than the same profit margin for the group's products as a whole in that decade. Nutritionals have become relatively less important for Abbott: they accounted for a third of the group's global sales between 2013 and 2016 but by 2020, this had fallen to 22%.

Nestlé reported 'Nutrition' as a separate product category until 2017, which accounted for between 9 and 12% of the group's global sales. This category included 'performance' and 'weight management' products, as well as 'infant nutrition', and its trading operating profit margins were generally 4 to 7% higher than those of the group as a whole. From 2017 onwards, Nestlé only reported the broader category of 'Nutrition and Health Science' which also had higher profit margins than the group as a whole, but only by 2 to 6%. It is not clear how much of these broader categories are made up of sales of CMF, though Nestlé has described 'infant nutrition' (which includes foods as well as CMF) as 'one of our core businesses' [51].

CMF sales may have been relatively more important for Danone, which reported the results from 'Early Life Nutrition' (previously 'Baby Nutrition') as a separate division until 2017. This division accounted for between 19 and 23% of the group's global sales of all products until 2017, and reported a trading operating profit margin 5 to 8% higher than for the group as a whole. The successor division, 'Specialized Nutrition', which includes child and adult nutrition products, has been even more profitable, reporting operating profit margins since 2017 which have been 7 to 10% higher than the margins of the group as a whole. Figures for the year 2016, when Danone reported both product categories, show that in that year child nutrition products accounted for three-quarters of the sales and profits of the wider 'Specialized Nutrition' business.

For Mead Johnson the relative importance of CMF to its total sales and profits is clearer because the company reported explicitly that 'milk-based powder' was its primary product form and that about 80% of its sales were of Enfamil (a CMF brand) and related brands. Mead Johnson reported profit margins on its sales, before interest costs and tax, of between 21 and 23% between 2011 and 2017. This is comparable to the operating profit margins on the wider product categories that contain CMF which were reported over the decade to 2020 by Abbott (19-24%), Danone (19-25%) and Nestlé (17-23%).

It is unlikely that CMF sales were markedly more profitable for Mead Johnson than for the other three companies. Thus, it is reasonable to assume that CMF has been a highly profitable product for these three companies as well. This is supported by the fact that all three companies reported higher profit margins in the broader product categories that include CMF compared to their profit margins on their sales in general. It also appears very likely that CMF has made an outsized contribution to the global profits of all four.

3.3. Corporate wealth and income distribution: taxation

In this section, we examine whether the global CMF market's four dominant firms might have increased their profits at the global level by minimising their tax obligations in particular countries where they operate, including those countries where they sell CMF, thereby reducing the public revenue generated by the respective governments.

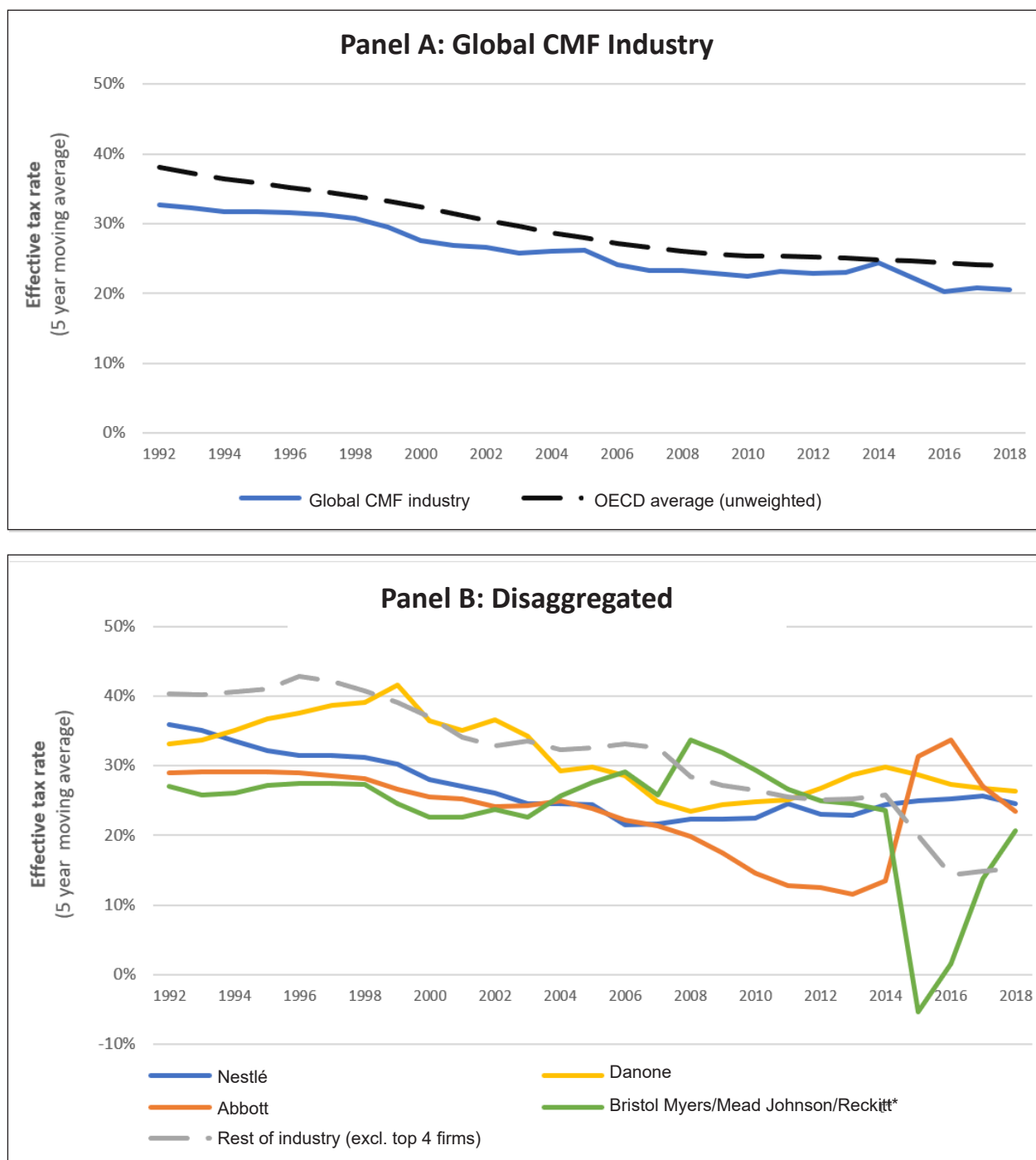
Our findings strongly suggest that low taxation in the past has likely helped the largest corporations in the CMF industry to gain market power and extract more value, relative to their smaller competitors. This no longer appears to be the case, however.

Panel A of Figure 7 demonstrates that the average effective tax rate (ETR) of the CMF industry fell from above 30% in 1992 to just above 20% in 2018 (five-year moving averages).³ This finding is consistent with a broader picture of cuts in headline tax rates on corporate profits in many countries around the world over the same period, which is represented in Panel A by changes in the unweighted average statutory tax rate of member countries of the Organisation for Economic Cooperation and Development (OECD) [52]. Panel B shows that the ETRs of the four CMF market leaders were generally lower than the average ETR of other publicly listed companies in the CMF industry from 1992 until the years around 2012. Since then, the ETRs of the four market leaders have generally risen while the average ETR of other companies in the industry has continued to decline.

The ETRs of three of the four dominant companies have generally been lower than the average of OECD countries' tax rates. Danone is the exception, with a higher ETR than the other three from the early 1990s onwards. Abbott's ETR has consistently been much lower than the OECD average and markedly lower than the statutory tax rate of its home market, the United States, which was 35% during the entire period from 1992 until the Trump administration's tax cuts in 2017 [52].

³ The effective tax rate (ETR) of a company is the rate at which it incurs tax on its annual profits. For a multinational, the ETR is a composite of all the tax obligations it incurs on its profits in different countries, compared to its global pre-tax profits. Over time, the ETR gives a general indication of how highly a company or industry's profit is being taxed, relative to other companies or industries and relative to the official or statutory tax rates on corporate profits which are set out in national laws.

Figure 7. Effective tax rates of the global CMF industry (A) and top four global market leaders and rest of industry aggregate (B), 1990-2020



Data sources: Compustat via Wharton Data Research Services; worldwide tax rates via Tax Foundation [52]. There may be some missing data in the datasheets extracted from Compustat, as well as discrepancies between data sourced from Compustat and data from official company filings and reports. Effective tax rate calculated as total income tax (see below) divided by pre-tax income. Domestic and foreign taxes aggregated.

* Bristol Myers counted from 1990 to 2005; Mead Johnson from 2006 to 2016; Reckitt from 2017 to 2020.

Figure 7 shows that the four market leaders mostly enjoyed lower tax rates than their competitors in the CMF industry until the late 2000s, but this relationship now appears to have reversed. Possible reasons for these low tax rates, and their implications for the market power of the largest companies in the CMF industry, are considered under ‘Discussion’ in section 4.

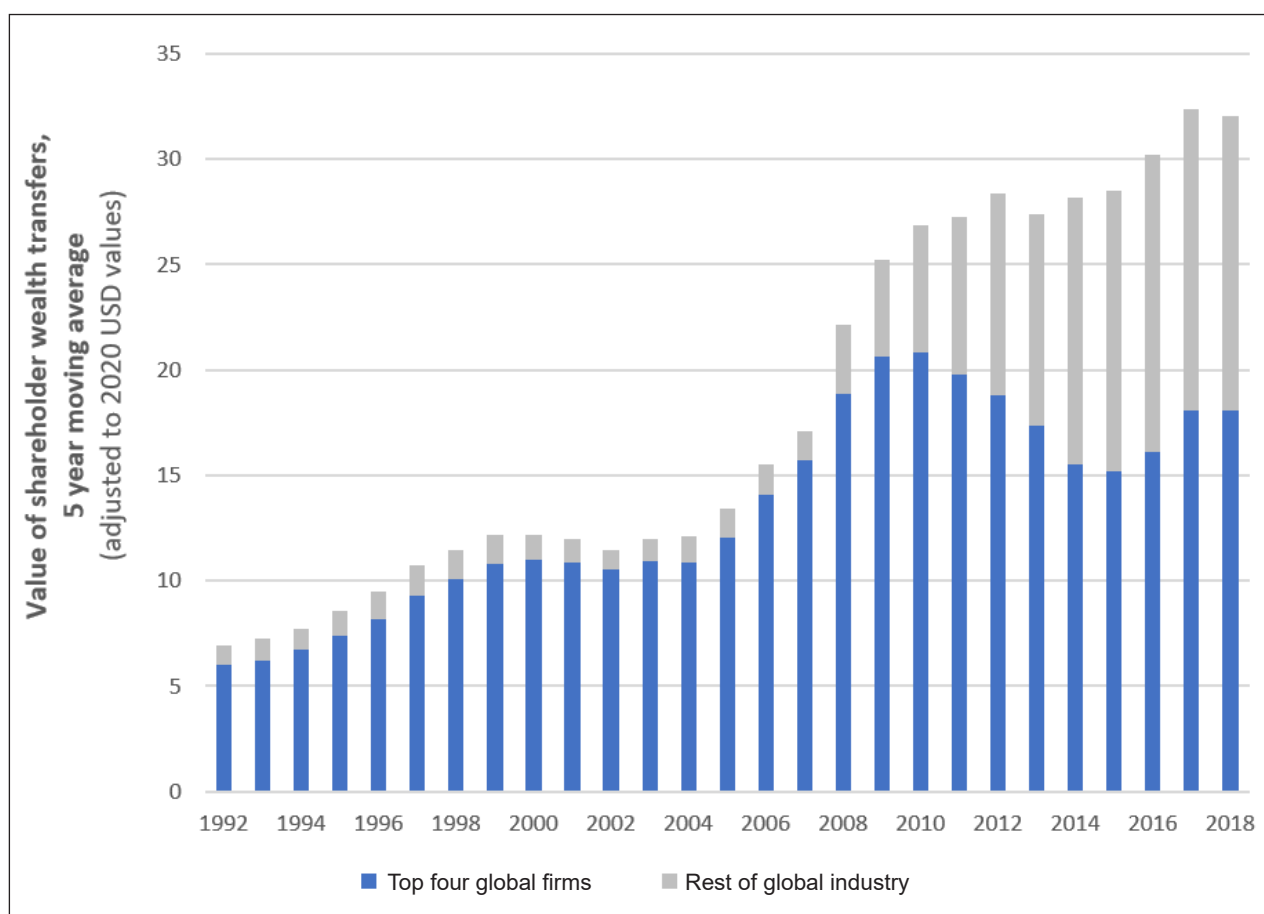
3.4. Corporate wealth and income distribution among market stakeholders

The following section reports findings on how much wealth the global CMF industry transfers to its shareholders, both in absolute terms, as well as relative to other uses of income, such as improved salaries and working conditions, or investments aimed at improving environmental performance. By examining ownership structure and investor location, we also show where this shareholder wealth is concentrated.

Wealth transfers to shareholders and the shareholder power and value ratios

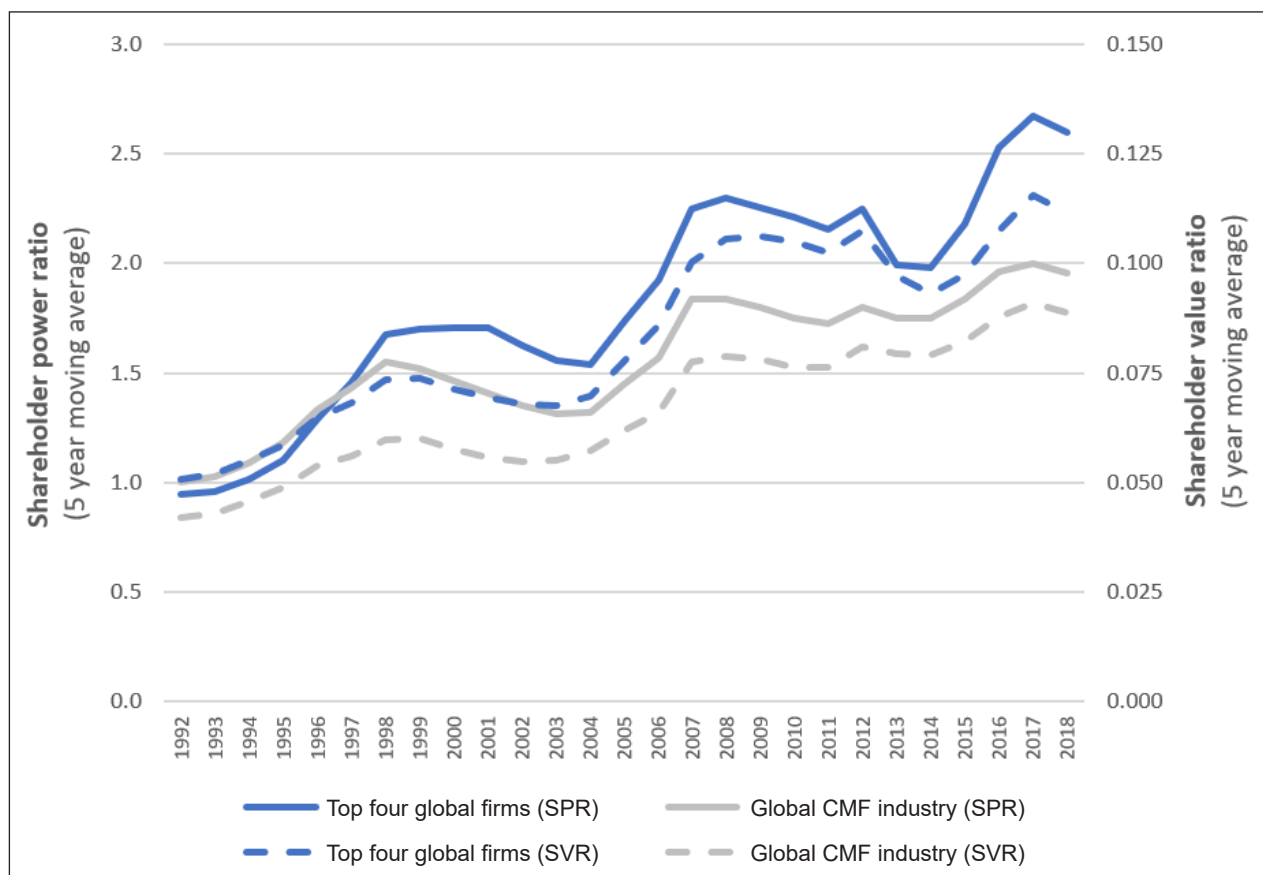
Albeit to a much lesser degree for East Asian firms, the global CMF industry has been transferring an increasing amount of wealth to its shareholders both in absolute terms and relative to other uses of profit (Figures 8 and 9). In 2020, a year in which the financial performance of many publicly listed corporations was affected by the COVID-19 pandemic, publicly listed corporations active in the global CMF industry spent US\$32.7 billion on dividends and share repurchases (both of which are practices that transfer wealth to shareholders). This was an amount nearly double that spent on capital expenditure (US\$17.9 billion), a useful proxy for the long-term interests of workers.

Figure 8. Total estimated value (2020 USD) of wealth transfers to shareholders, 1990 to 2020



Data source: Compustat via Wharton Data Research Services. Values adjusted to 2020 USD. Shareholder wealth transfers equal the sum of dividends and share repurchases. Share repurchase data from Compustat may include data on purchase of preferred stock. There may also be some missing data in the datasheets extracted from Compustat, as well as discrepancies between data sourced from Compustat and data from official company filings and reports.

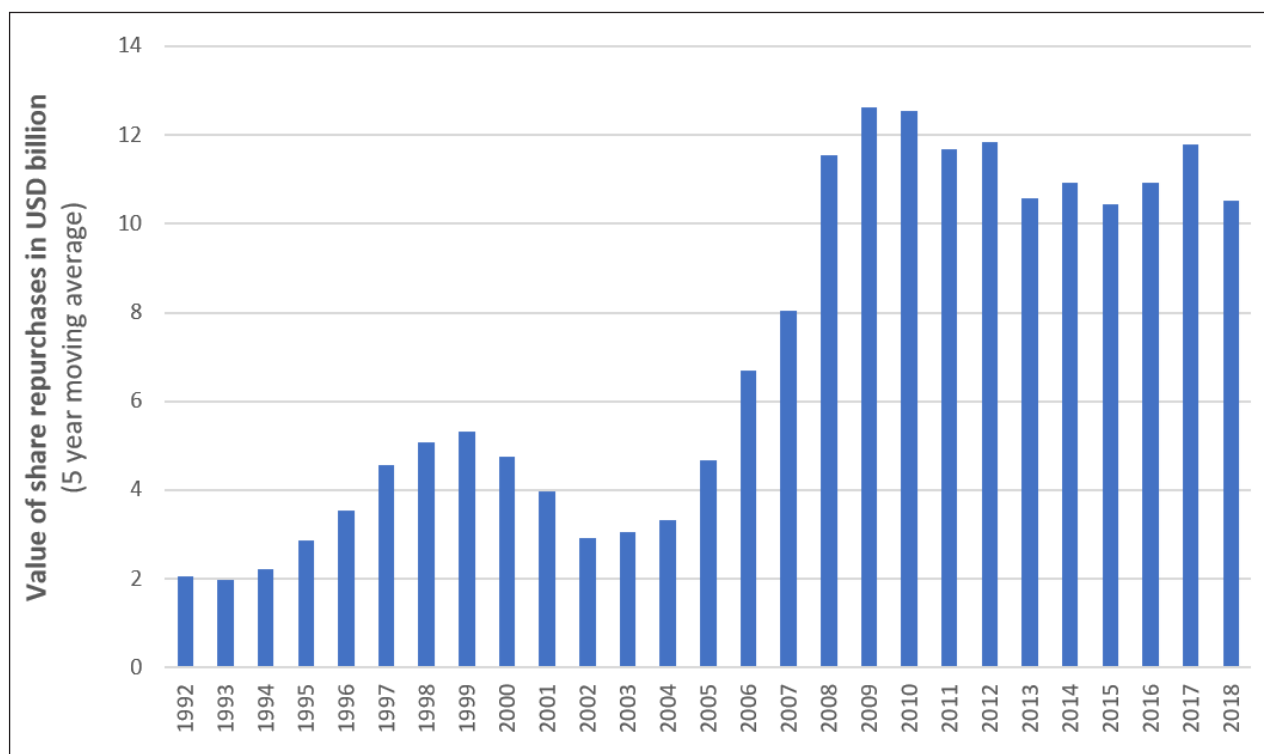
Figure 9. Shareholder power (solid line) and shareholder value (dotted line) ratios, 1990-2020



Data source: Compustat via Wharton Data Research Services. Shareholder power ratio (SPR) = (value of dividends + share repurchases) / value of capital expenditures. Shareholder value ratio (SVR) = (value of dividends + share repurchases) / total revenue. Share repurchase data from Compustat may include data on purchase of preferred stock. There may also be some missing data in the datasheets extracted from Compustat, as well as discrepancies between data sourced from Compustat and data from official company filings and reports.

A marked increase in the total estimated value of share repurchases made by the global CMF industry was seen to occur in the mid-2000s (Figure 10). This increase was led by Nestlé, which started its first formal share repurchase ‘program’ in 2005 [53]. The total estimated value (2020 USD) of share repurchases made by the industry between 2010 and 2020 was US\$131.9 billion.

Figure 10. Total estimated value (2020 USD) of share repurchases made by the global CMF industry, 1990-2020



Data source: Compustat via Wharton Data Research Services. Values adjusted to 2020 USD. Share repurchase data from Compustat may include data on purchase of preferred stock. There may also be some missing data in the datasheets extracted from Compustat, as well as discrepancies between data sourced from Compustat and data from official company filings and reports.

*Bristol Myers counted from 1990 to 2005; Mead Johnson from 2006 to 2016; Reckitt from 2017 to 2020.

Ownership structure and investor location

As of mid-2021, the world’s 10 largest institutional investors by assets under management held an estimated US\$176 billion worth of shares across the global CMF industry, approximately US\$116 billion of which was held by BlackRock and Vanguard (Table 2). Adjusted to 2020 USD, the total value of shares held by the world’s 10 largest institutional investors in the global CMF industry increased nearly two-and-a-half-fold from 2010 to mid-2021. This sharp increase in value was due to both an increase in the number of shares held by these 10 investors in the industry, including as a result of an increase in the number of publicly listed firms active in the industry, as well as an increase in the average share price across the industry.

Table 2. Estimated share value (2020 USD) held by top 10 largest institutional investors across the CMF industry, mid-2021 versus 2010

	Estimated total value of shares (USD billion) held by the world's 10 largest institutional investors*	
	2010	Mid-2021**
Global CMF industry	71	176
Top four global CMF firms	42	109
East Asian CMF firms	3	9

Data sources: Eikon and Orbis. All values adjusted to 2020 USD and rounded to the nearest billion. East Asian firms = those based in China, Japan, the Republic of Korea, and Vietnam.

*The 10 institutional investors, including their subsidiaries when identified, were the world's largest in terms of assets under management as of March 2021. These were: BlackRock, Vanguard Group, UBS Group, Fidelity, State Street, Allianz (including PIMCO), JP Morgan, Goldman Sachs, Bank of New York Mellon, and Morgan Stanley. See Appendix A for further details.

**Share ownership data based on the most recent investor filings as of end of June 2021; share price data based on share price at close of 30 June 2021.

As of mid-2021, nearly 97% of traded share value was held by investors and shareholders based in high-income countries (Table 3). In contrast, the percentage of traded share value held in low- and middle-income countries, excluding China, was less than 1%.

Table 3. Percentage of total value of traded shares held according to investor location, as of mid-2021

	Percentage of traded shares held, by investor location						
	HICs			UMICs		Lower MICs	LICs
	USA	Western Europe	Total	China	Total	Total	Total
Global CMF industry	61.2%	24.6%	96.7%	2.4%	2.7%	0.5%	0%
Top four global CMF firms	62.8%	32.1%	99.7%	0.01%	0.3%	0.003%	0%
East Asian CMF firms	11.4%	13.7%	76.8%	19.0%	19.3%	4.1%	0%

Data source: Eikon. Data based on the most recent investor filings as of end of June 2021. East Asian firms = those based in China, Japan, the Republic of Korea, and Vietnam. Values adjusted to 2020 USD and rounded to the nearest billion.

4. Discussion

Our findings show that, in economic terms, a select group of shareholders and investors based predominately in HICs are the major beneficiaries, and are increasingly benefitting, from the global CMF market's rapid growth. Meanwhile, there is substantial evidence that the financial success of this group comes at a great cost to society and the environment [1, 3, 4, 11, 12, 18, 54]. The findings from this study, interpreted alongside evidence from the literature, suggest that this trend can at least partly be explained by three interlinked factors and processes:

- i) the rapid expansion and high market concentration seen in many national CMF markets (with market growth and concentration mostly increasing in lower MICs and UMICs);
- ii) the extractive nature of the global CMF industry, including with respect to value extraction from consumers, the creation of considerable negative externalities, and, in some cases, low taxation; and
- iii) the increasing financialisation of the global CMF industry, characterised by growing share ownership by large institutional investors and the industry's prioritisation of shareholder interests over other stakeholders, including workers, consumers, and local communities.

We discuss these points in further detail in the following sections. These underlying factors and processes are not unique to the global CMF industry and have been noted in other health-harming commodity industries, including carbonated soft drinks and other ultra-processed foods [46, 47]. However, understanding their role in determining how the CMF industry impacts on health and equity is an important component in assessing common industry claims that the industry creates economic value for national economies [55], including in low- and middle-income contexts [25]. In contrast, the study suggests that the ways in which the global CMF industry generates and distributes wealth and income likely contributes to widening social and economic inequalities, thereby impeding sustainable economic development.

4.1. *The global CMF market: a patchwork of expanding, concentrated national markets*

Our study reports high levels of market growth from 2010 to 2020. Most of this growth occurred in Asia Pacific, which was also the region in which annual per capital expenditure on CMF products was found to increase the most in both relative and absolute terms. In terms of income status, most growth in terms of absolute revenue and annual per capita expenditure occurred in upper MICs.

The large and increasing revenues generated from CMF sales revenue around the world appear to be concentrating around a limited number of firms. The global CMF market's top four leaders have managed to maintain a combined global market share of around 50% between 2010 and 2020. Data from Euromonitor International's Passport show that the combined share of the next two market leaders, China Feihe and Royal Friesland, increased from 4.1% to 10.8% over the same period [56]. In 2020, more than 80% of the national CMF markets analysed were at least highly concentrated. In general, increasing levels of concentration were seen across the national CMF markets in both lower and upper MIC contexts, which is where most of the global growth by sales revenue has taken place over the past decade. A notable exception was the Chinese CMF market – the largest CMF national market by far – which was seen to have a low level of market concentration. It is important to note, however, that there exist considerable variations across CMF markets in China at the provincial level. As a case in point, in 2020, China Feihe held a market share of approximately 60% in Heilongjiang, a province in China with a population above 30 million people [57]. The Heilongjiang CMF market would thus have a HHI of at least 3600, making it very highly concentrated.

The rapid growth and extensive concentration of national CMF markets has important economic and political implications for public health. High market concentration likely confers large CMF manufacturing corporations with structural and relational power over workers, suppliers, distributors, and consumers, thereby allowing these corporations to drive down business costs and to aggressively market cheap-to-produce products with high profit margins [10, 54, 55]. This argument is supported by evidence showing that multinational CMF manufacturing corporations generate by far the largest profits out of all companies active across the global CMF value chain [10]. The ability of large CMF corporations to generate vast amounts of profits likely serves as an important explanation as to how these corporations are able to allocate substantial money and resources to practices, such as sophisticated marketing practices, designed to increase consumer demand for their branded products on a large scale [58].

High market concentration also serves as an important source and explanation of the extensive political influence of dominant CMF corporations, an issue well described in the public health literature [3]. Large corporations in large and highly concentrated markets, for instance, are often able to allocate considerable money and resources towards the deployment of political practices (e.g., lobbying, political contributions), as well as coordinate their efforts to shape industry-wide regulatory efforts [39, 59-62]. In some instances, dominant firms in concentrated markets can exert considerable political influence without having to deploy these political activities. For instance, corporate control over significant amounts of capital and labour can sometimes foster government hesitancy to implement certain policies and regulations out of fear of capital flight and reduced employment [63, 64]. In the Philippines, as a case in point, the CMF industry has implicitly referred to their considerable control over capital and labour to threaten 'capital flight' in the face of government plans to impose marketing regulations [25].

4.2. Value extraction in the global CMF industry: brand power and externalisation of costs

The concept of value extraction refers to the creation of wealth that has been appropriated rather than created, and has important distributional impacts [65]. Although we did not comprehensively examine the pathways of value extraction by the CMF industry in our analysis, the broader literature suggests that the global CMF industry's generation of profit depends on at least two pathways of value extraction – brand power and the externalisation of costs. These pathways reflect, as well as reinforce, market growth and high market concentration.

As with many national ultra-processed food markets [66], it is highly plausible that the extensive and globalised brand power of dominant CMF firms, with their sophisticated, pervasive and often manipulative marketing practices [67], plays a key role in extracting value from consumers [36]. Our finding that the branded CMF products of large corporations tend to have high profit margins supports this argument, particularly when understood alongside evidence highlighting the considerable gap between CMF retail sale prices and the actual costs of CMF production [54], as well as the considerable power of the CMF brands owned by dominant CMF manufacturers [68].

Value extracted by CMF corporations from families and households represents money that can no longer be used to purchase essential household items and services. In China, for instance, it can cost up to 40% of the average monthly salary to feed a baby using premium CMF products, or else around 15% of the average monthly salary using cheaper CMF products [69]. As another example, in Indonesia, it can cost a parent on an average salary up to 75% of their monthly income to purchase a specific premium CMF brand [69]. It is worth noting that the potential value extracted from consumers due to brand power is not uniform across geography or income status, as firms tend to use 'market segmentation' and 'product differentiation' techniques to extract maximum profits – for what is effectively a relatively standard product – according to ability and willingness to pay, both between and within national markets [54, 58]. Importantly, our findings show that the average annual per capita expenditure on CMF products in UMICs, which surged considerably over the past decade, is now greater than the average annual per capita expenditure on CMF products in HICs.

Value extraction also occurs through the ability of the global CMF industry to externalise a considerable amount of the health and environmental costs associated with the production and consumption of CMF products, wherein value is effectively extracted from those burdened by such externalities [1, 3, 4, 11, 12, 17, 18, 54, 70]. These externalised costs include those that relate to increased mortality, infections and risk of obesity in later life for children; an increased risk of certain cancers and type-2 diabetes for mothers; higher healthcare costs and economic costs associated with decreased workforce productivity for governments; the environmental harms associated with dairy production, CMF production, and packaging waste; and intergenerational costs associated with all of the above [71-74].

4.3. Low taxation

Low taxation is another well-known pathway of value extraction used by many multinational corporations (MNCs) in different industries, wherein value is extracted at the expense of public revenues of those countries where more tax would otherwise be paid. One important reason as to why low taxation is a cause for public health concern is because a lower effective tax rate means less public revenue for governments, thus reducing the pool of funds for public health, among other public goods and services. Low taxation can also drive market growth and concentration by enabling MNCs to retain more of their earnings, which can then be allocated to practices designed to expand markets and capture and protect market share (e.g., aggressive marketing, mergers and acquisitions, and lobbying).

Our findings suggest that the four global CMF market leaders, all MNCs, have mostly enjoyed lower tax rates than their competitors for long periods over the last three decades. These are not surprising findings; they are consonant with the broad phenomenon of the 'race to the bottom' in the headline corporate tax rates of countries around the world that has been occurring since at least the 1990s [75]. At the same time, there are

notable differences between the four market leaders, with Danone and Nestlé generally having higher ETRs than the other two.

It is often not possible to be sure why a particular corporation has enjoyed a lower tax rate compared to its competitors, or compared to statutory tax rates, because of lack of published data combined with the sheer complexity of tax accounting. But a low ETR can suggest that a company may be benefitting significantly from tax incentives offered by national governments (which have an accompanying public revenue cost) or may be avoiding tax, which is commonly done by exploiting the pricing of internal transactions between subsidiaries in different jurisdictions to shift profits into tax havens. In any case, tax incentives and tax avoidance often occur in combination, because a tax break in one jurisdiction makes it rewarding to shift profits there from other places [76].

It is reasonable to suggest that tax avoidance may have influenced the ETRs of the four global CMF market leaders, albeit to varying degrees, given that all four of them have subsidiaries in tax havens (e.g., Republic of Ireland, the Netherlands, Singapore) and one of them (Nestlé) has its parent company in a tax haven (Switzerland) [77-80]. Most of the value of a CMF product is derived from branding and marketing, and it is well-established that profits from intellectual property, including brands and marketing intangibles, are generally easier to shift into tax havens than profits from more tangible sources [81]. This is because it is harder for national tax authorities to determine how and where the value of an intangible is created (and where the resulting profit should be taxed), compared to a material object.

A closer look at Mead Johnson, during its period as a stand-alone company between 2009 and early 2017, demonstrates the ways in which use of tax havens can reduce a multinational's global ETR. Between 2009 and 2013, Mead Johnson reported that it had secured tax rulings in the Netherlands and Singapore, meaning that it could pay lower tax rates on profits booked in these places [82]. Large amounts of profit were in fact reported in both countries, even though both have relatively small economies and domestic markets for CMF, and indeed the level of profit reported in Singapore markedly increased after the tax ruling was granted [83]. This strongly suggests that profit was being shifted to these two countries from other countries with higher tax rates, resulting in Mead Johnson paying less tax overall than it otherwise would have done. This effect appears to have been quite large. Mead Johnson reported in 2016 that unspecified 'tax rulings and agreements' were reducing its global effective tax rate by 13% [82].

At the same time, the company's gross provision for 'uncertain tax positions' had risen to US\$164 million in 2016 from only US\$13.6 million in 2010 [82, 84]. An uncertain tax position is one where a company thinks that a national tax authority may successfully challenge its interpretation of tax law (including, though not only, in cases where profits are being booked in tax havens). The increase in these provisions implies that in the same period in which Mead Johnson was making extensive use of tax havens to lower its global tax rate, the company also expected that the risk of being challenged by tax authorities had grown. Indeed, in 2018 the European Commission challenged a tax ruling issued to a Mead Johnson subsidiary in the tax haven of Gibraltar, which was reporting hundreds of millions of dollars in income, on the grounds that this tax ruling contravened EU rules on state aid to companies. Mead Johnson challenged the Commission's finding, which was later partially annulled by a court [85].

The example of Mead Johnson, and the presence of tax havens in the global corporate structures of the other three market leaders, indicate that the four market leaders have been in a position to use tax havens to reduce their tax rates. The differences in their global ETRs suggest, however, that the willingness or ability to do so has varied from company to company, as well as over time.

Opportunities to enjoy lower taxation may have become less accessible to the largest companies in the CMF industry in the last decade as governments around the world have become increasingly involved in limiting tax avoidance by large MNCs, as evidenced by the growth of the tax reform process led by the OECD whose proposals are now being implemented by 141 countries and jurisdictions [86].

Nonetheless, it is reasonable to conclude that the ability to secure lower tax rates than their competitors over a long period of worldwide sales growth has likely played a historical role in enabling the biggest companies in the CMF industry to achieve their current dominance of global markets by increasing their profits. This means that funds which would otherwise have flowed to national governments have instead been used by these companies to expand and consolidate their power.

4.4. The financialisation of the global CMF industry

The term financialisation refers to ‘increasing role of financial motives, financial markets, financial actors, and financial institutions’ in society [87]. The increasing financialisation of the global CMF industry is likely an important driver of the industry’s increasing pursuit of maximising returns for its shareholders, reflected in our findings which show that, over the last three decades, an increasing proportion of post-tax income produced by the global CMF industry has been transferred to its shareholders. The study suggests that this financialisation has occurred in at least two ways.

First, there has been a considerable increase in the total value of shares held across publicly listed corporations active in the global CMF industry by the world’s 10 large institutional investors, eight of which are based in the US and two of which are based in Western Europe. Concerns have been raised about how increasing ownership by a small number of large investors across an industry – often termed ‘common ownership’ – drives market concentration, and encourages firms to prioritise the maximisation of shareholder value over other objectives (e.g., long-term investment for the benefit of workers and society in general) [88-90].

Second, our findings show that during the 2000s there was a large surge in the global CMF industry’s use of share repurchases, led by Nestlé, as part of its efforts to transfer increasing amounts of wealth to its shareholders. This trend existed for East Asian firms, but to a much lesser extent. Share repurchases boost share price, as well as manipulate important executive pay-based metrics (e.g., earnings per share) [91]. As such, they epitomise what Mazzucato (2018) refers to as the ‘financialization of the real economy’, wherein shareholders and company executives accumulate and concentrate wealth not through corporate productivity or long-term investment, but through a financial strategy that simply redistributes corporate income at the expense of other avenues, such as long-term investment for the benefit of workers [91, 92].

The study shows how the financialisation of the global CMF industry appears to be contributing to widening cross-border economic inequalities. Indeed, nearly 97% of the global CMF industry’s traded share value is held by shareholders based in HICs; whereas only 2.4% of this traded share value is held by shareholders based in China, and 0.7% of this traded share value is held by shareholders based in all other LMICs. Given that the revenue generation from CMF consumption is heavily skewed towards MICs, especially those in the Asia-Pacific region, the global CMF industry’s increasing pursuit of maximising shareholder value (with the exception of East Asian firms in most cases) is essentially leading to enormous shifts in wealth from MICs to HICs. It must be noted, though, that institutional investors, which hold a considerable proportion of the total value of traded shares, are not the ultimate owners of the assets they manage. However, evidence suggests that financial assets, including those under management, are disproportionately owned by the upper-income class [93-96]. In the US, for instance, the top 1% of the population by wealth control about 38% of the value of financial accounts holding stocks; the top 10% control 84% of this value [96].

4.5. Limitations of the study

There are several limitations and caveats in our study to consider. First, the report only focused on publicly listed corporations active in the CMF industry. Although the Code covers other companies that may be benefitting from undermining breastfeeding (e.g., manufacturers of feeding bottles and teats), it was beyond the scope of this report to analyse companies outside of the CMF industry.

Second, conclusions about the top four leaders of the global CMF market between 2010 and 2020 should be read bearing in mind that Reckitt only became one of the top four in 2017 after acquiring Mead Johnson. We

argue that this does not invalidate the conclusions drawn, but it does make the ‘top four’ category slightly more plastic.

Third, it is important to note that most firms in the CMF industry operate across numerous product markets, and, for some firms, CMF is a significant but still relatively small part of their global business. Thus, analyses of and discussions related to the distribution of corporate income, including taxation, by the global CMF industry are not only specific to income generated in the global CMF market but to income from all sources. The consolidated accounts of MNCs do not generally disclose the profits from each product or service (Mead Johnson was a rare exception between 2011 and 2017, because it specialised in selling a narrow range of child nutrition products). We have therefore assumed that the global tax rate on CMF profits is the same as for other products, although there may be cases where this was not so (e.g., in cases where CMF or another product was manufactured in a special economic zone with a lower tax rate). Similarly, it is not possible to say exactly how much of the total value of certain practices (e.g., share repurchases) made by the industry in any given year stemmed from CMF sales revenue.

Fourth, a complication with analysing the effective tax rates of MNCs is that the ETR of a given company can change markedly from one year to the next, for example because of the tax effects of an asset sale or settlement of a dispute with a national tax authority. We have used five-year moving averages to capture longer-term trends, while noting that the results may be skewed by large deviations. We have used ETRs which are derived from companies’ profit and loss accounts and reflect the amount of tax that a company has incurred on its profits in a given year, which is not necessarily the amount that it is obliged to pay in that year. Furthermore, we have used the unweighted average of OECD countries’ national tax rates as a benchmark for comparing the ETRs of the biggest companies in the CMF industry with those of the industry as a whole, because these national tax rates are determined by public policy in each country and therefore indicate how much tax corporations might normally be expected to pay on their profits. OECD data have been used because they are available over a long period. We recognise, however, that China and several other important CMF market countries are not part of the OECD. We also note that the OECD average rate may be lowered by the inclusion of small OECD countries which are tax havens, but which are not major markets for CMF. This could have the effect of making it appear that the gap between the headline tax rates of major OECD countries and the tax rates actually paid by the largest CMF producers is smaller than it actually is.

Fifth, it was beyond the scope of this project to verify the data extracted from Compustat North America and Global databases, which were used for firm and industry-level analysis. As such, there may have been instances of missing data, as well as discrepancies between the extracted data and data from official company filings and reports, especially for companies listed on stock exchanges outside of North America.

Sixth, we did not include indicators such as employment figures, wage dispersion, and working conditions in our analysis, mainly due to limited data. In the context of this study, we felt that employment data could only be interpreted alongside data on wages and working conditions, both of which require contextual analysis that was beyond the scope of this study. High employment numbers in the context of high wages and good working conditions, for instance, could represent the pursuit of stakeholder value, whereas high employment numbers in the context of low wages and poor working conditions might instead represent value extraction from workers. Instead, we used capital expenditure as a proxy for the long-term interests of workers [44], although it is important to note that we were unable to explore the nature of this capital expenditure (i.e., where it was allocated and for what purposes).

Lastly, our analysis, which was largely descriptive, should be seen as a point of departure, rather than a conclusive study, in assessing the distributive impacts of the global CMF industry. Future work could aim to build upon this work. For instance, in-country studies could help to examine in greater detail the health and equity impacts of the CMF industry’s generation and distribution of wealth and income within a defined context. Future work could also aim to examine the ways in which other related industries that may be benefitting from undermining breastfeeding generate and distribute wealth and income.

5. Conclusions and recommendations for policy

The global CMF industry's enormous and growing commercial success appears to be mostly benefitting only a small and select group of people, mostly based in HICs. Contrary to industry claims about its role in creating economic value and contributing to sustainable development, the ways in which the industry generates and distributes wealth and income are likely contributing to widening health, social and economic inequalities.

Several government interventions have the potential to reduce the health and social burdens created and perpetuated by the global CMF industry. These include the complete adoption, implementation, and enforcement of the Code; the universal protection and promotion of parental rights; and the widespread support and promotion of breastfeeding [3, 97]. Informed by our findings, we describe below a series of complementary interventions that have the potential to address the global CMF industry's negative social and economic impacts.

1. **Antitrust (competition) policy** has the potential to address the harms associated with high market concentration of national CMF markets. In the context of CMF, this is particularly relevant for LMICs, as it has been described that robust antitrust policy can play a key role in partly undoing or preventing the harms that result from the extractive and exploitative practices of foreign MNCs [98]. In this respect, the recent decision made by South Africa's competition commission to block a merger proposal by a foreign private equity firm on public interest grounds could serve as a useful blueprint for antitrust regulation, especially in LMIC contexts in which foreign CMF corporations might seek to use cross-border mergers and acquisitions in the future to expand their global market influence. Although South Africa's competition commission considered that the transaction would not substantially lessen competition, it was blocked on the grounds that it would have adversely impacted on the welfare of the country's 'Historically Disadvantaged Persons' [99].
2. **Progressive tax policy** has a fundamental role to play in addressing the adverse health and equity impacts of the CMF industry, including by removing tax advantages which are available to the largest companies and by raising more of the public finance necessary for the provision of essential goods and services. Reforms of national tax policy could include raising statutory corporate tax rates, scaling back tax exemptions, and strengthening tax collection and enforcement [100, 101]. This would increase tax revenues from corporate profits in general, including those from CMF. Similarly, in many contexts, reforms to both tax and industrial policies are required to ensure a more appropriate distribution of subsidies [100, 102]. For instance, reducing (or even eliminating) the subsidisation of the production and processing of milk products could help achieve several social and environmental policy objectives.

International tax reforms could include the implementation of a global minimum tax rate for corporate profits set at a sufficiently high level to deter tax avoidance. They could also include treating MNCs for tax purposes as single global entities, rather than as collections of separate entities trading with each other as at present, then apportioning the rights to tax profit to different countries based on the corporation's assets, employment, and sales in each country. This would remove the incentive to shift profits into tax havens by manipulating internal transactions within MNCs. These measures would be likely to reduce tax avoidance in general, including on the profits from CMF. Campaigners for tax justice argue that global tax reforms overseen by the OECD are biased in the interests in OECD countries and that moving the negotiation of these reforms to the United Nations would ensure better outcomes for non-OECD countries which, as this paper has shown, have been the major growth areas for CMF sales in recent years [103].

Progressive tax policy could also serve to address some of the harms related to the use of corporations by shareholders and company executives as a means of maximising wealth. This could include strengthening capital gains taxes and implementing robust financial transaction taxes [100, 104].

3. Stricter **corporate disclosure laws** are clearly needed to ensure greater corporate accountability and transparency with respect to flows of profits and taxes. A pertinent proposal in this regard is mandatory public country-by-country reporting (pCBCR), which would require MNCs to annually disclose their turnover, profits, tax payments, and other key financial data for each jurisdiction where they operate [105]. This reform – which has been adopted voluntarily by a few MNCs and imposed on banks in the European Union by law [106, 107] – would make it easier to identify cases where an MNC is using low-tax jurisdictions to book profits which are evidently created somewhere else. In the case of the CMF industry, this would have the benefit of showing whether the profits and tax payments being reported in major market countries are commensurate with the volume of sales to customers (and, conversely, showing where large amounts of profit are being booked in tax havens).

Public CBCR would have a further benefit for analysis, beyond taxation, of making clearer what MNCs are contributing to the economies and societies of the countries in which they operate. Indeed, this was the original and broader conception by civil society campaigners of pCBCR, which is now commonly portrayed more narrowly as a tax reform.

4. Reforming **corporate law**, in a consistent manner across jurisdictions, to require that corporate decision-makers fully consider the interests of all stakeholders, as opposed to prioritising the interests of shareholders, could have considerable public health potential [59, 108-110]. Corporate law that effectively mandates the pursuit of stakeholder value would *ipso facto* consider the *rights* of all stakeholders, and, as such, would align with the *extraterritorial* obligations of states to protect the human rights of ‘*third-country*’ stakeholders against corporate violations [111, 112]. With respect to the CMF industry, progressive corporate law, in principle, could regulate both the corporate maldistribution of economic benefits (e.g., by limiting share buybacks) and harms (e.g., by prohibiting corporate violations of The Code).
5. As a final and overarching recommendation, we encourage all governments to treat the global CMF industry’s claims framed around economic value and importance with strong scepticism. Indeed, this report raises major questions for national planning and centralised government agencies, whom we call on to scrutinise the role of the global CMF industry in sustainable development, and to act accordingly.

Appendix A. Methods

Overview of methods

Given the complex nature of the research objectives, a streamlined approach using multiple methods to interrogate the global CMF industry's generation and distribution of wealth and income was adopted. This included the use of quantitative techniques to analyse a diverse range of metrics requiring the collection of existing company, market, and equity ownership data, as well as the use of document analysis techniques to examine primary data sources, including annual company financial statements. We summarise the dimensions, metrics, methods, and data type in Table 4, and discuss these in further detail below. All values were adjusted to 2020 US dollars (USD) using either an adjustment function in the respective database, or else a combination of nominal exchange rate data from the US Federal Reserve and the World Bank's gross domestic product (GDP) deflator dataset [113, 114].

Table 4. Dimensions, metrics, methods, and types of data used in this study

Dimension	Methods and data type	Metrics (where relevant)
Market size and concentration	Descriptive quantitative analysis of market data	Size of national CMF market in terms of revenue and annual per capita expenditure Herfindahl-Hirschman Index (sum of the market shares of all active firms in a market which have been squared) Combined market shares held by the global CMF market's top four leaders, and their market positioning
Profitability of CMF for the top four global market leaders	Document analysis of primary data sources (e.g., company annual reports)	
Corporate wealth and income	Quantitative analysis of company fundamental data (income tax paid, pre-tax income)	Corporate and aggregate industry effective tax rates (income tax paid / pre-tax income)
Distribution: taxation	Document analysis of primary data sources (e.g., company annual reports)	
Corporate wealth and income distribution among market stakeholders	Quantitative analysis of company fundamental data (dividends, share repurchases, total revenues, and capital expenditures)	Value of wealth transfers to shareholders Shareholder power ratios [(dividends + share repurchases)/capital expenditure] Shareholder value ratios [(dividends + share repurchases)/ total revenue]
	Descriptive analysis of company equity ownership data	Ownership structure Location of traded shares by value

Definitions and selection criteria

CMF market definition

We used Euromonitor International's classification of the milk formula product market, which is within the baby food product category, to define the product boundaries for our market level analysis [56]. Euromonitor International considers the milk formula product market to consist of: standard milk formula (marketed for ages 0-6 months), follow-on milk formula (7-12 months), growing-up milk formula (13-36 months), and special baby milk formula marketed for certain ailments or medical conditions (also known as therapeutic milks). As of 2020, Euromonitor International's Passport database had national market size data for 208 countries and territories, and national market share data for 78 countries.

Global CMF market leaders, 2020

In 2020, the global CMF market leaders were Nestlé (17.1%), Danone (13.5%), Reckitt (9.8%), and Abbott Laboratories (9%). Combined, these four firms – all multinational corporations (MNCs) – held a 49.4% share of the global CMF market. Nestlé and Danone are primarily active in the food manufacturing sector. Reckitt is primarily active in the household product sector. Abbott Laboratories is primarily active in the medical devices and pharmaceutical sector.

Global CMF industry selection

All corporations listed on major global stock exchanges whose CMF products generated more than US\$30 million in sales revenue (approximately 0.1% global market share) were included in industry-level analysis (See Table 5). According to Passport, the 26 corporations included in our study accounted for nearly 90% of 2020 global CMF retail sales. For trend analysis using industry data, we only included corporations that were active in the CMF industry at that point in time. For instance, Reckitt Benckiser data were only included from 2017; Mead Johnson Nutrition (spun off from Bristol-Myers and then acquired by Reckitt) data between 2006 and 2016; and Bristol-Myers data between 1990 and 2005.

CMF manufacturing companies not listed on a stock exchange were excluded from our analysis on wealth and income distribution due to a lack of available data. Three of the excluded firms had a 2020 global CMF market share of greater than 1%: Dutch firm Royal FrieslandCampina (3.8%), Chinese firm Shijiazhuang Junlebao Milk Co. (3.3%), and Chinese firm Wondersun (1.1%).

Market size and concentration analysis

Market size

National CMF market size in terms of sales revenue and annual per capital expenditure were determined and, in some cases, aggregated at the regional and World Bank income status levels [115]. Market size data were sourced from Passport and the period of analysis was determined by available data.

Market concentration

We calculated market concentration at the national level using the Herfindahl-Hirschman Index (HHI), a commonly used market concentration metric in Industrial Organisation and antitrust scholarship, which is found by summing the square of the market share of every firm active in the respective market [116]. We adapted European Central Bank thresholds, as well as current and historical US Department of Justice thresholds, to determine low (<1000), medium (1000-1799), high (1800-2499) and very high (HHI > 2500) levels of concentration [48, 49]. We also looked at changes in market concentration levels from 2010 to 2020, and drew from the European Commission guidelines on horizontal mergers to inform our understanding that changes in HHI of more than 250, in most contexts, can reasonably be considered a concern from a market

power perspective [50]. Data were sourced from Passport and the period of analysis was determined by available data.

Table 5. Overview of Included publicly listed companies

Company name	Country of incorporation	Global CMF market share (%), 2020
Nestle SA/AG	Switzerland	17.1
Danone	France	13.5
Reckitt Benckiser	UK	9.8
Abbott Laboratories	USA	9.0
China Feihe Ltd	Cayman Islands	7.0
Ausnutria Dairy Co	Cayman Islands	3.0
Inner Mongolia Yili Ind Co	China	2.9
Health & Happiness (H&H) Int	Cayman Islands	1.8
China Mengniu Dairy Co	Cayman Islands	1.2
A2 Milk Company	New Zealand	1.2
Morinaga Milk Industry Corp	Japan	1.1
Beingmate Co Ltd	China	0.9
Vietnam Dairy Product Co	Vietnam	0.7
Meiji Holdings Co Ltd	Japan	0.6
Beijing Sanyuan Foods Co	China	0.3
Megmilk Snow Brand Co	Japan	0.2
Maeil Holdings	Korea	0.2
Asahi Group Holdings	Japan	0.2
Namyang Dairy Products	Korea	0.1
Ezaki Glico Co	Japan	0.1
Hain Celestial Group	USA	0.1
Fonterra Co-operative Group	New Zealand	0.1
Bright Dairy & Food Co	China	0.1
Savencia	France	0.1
PepsiCo Inc	USA	0.1
Kraft Heinz Co	USA	0.1

Data sources: Compustat (via Wharton Research Data Services), Euromonitor International's Passport, and Orbis. Industry disaggregated into East Asian firms (shaded), and rest of industry (non-shaded).

Market shares and positioning of the global CMF market's top four leaders

We looked at the shares held by the global CMF market's four leaders, in terms of sales revenue, disaggregated by world region. The number of national markets in which one or more of the global market leaders held a top four market position was also examined. Data were sourced from Passport.

Profitability of CMF for the top four global CMF market leaders

We used document analysis of primary data sources to examine the contribution of CMF sales to the profits of the global market leaders. Specifically, we examined the annual reports and financial statements of Abbott, Nestlé, and Danone from 2011 to 2020, and Mead Johnson for the period between 2011 and 2017 (the year it was taken over by Reckitt). These documents are publicly accessible via each company's website, or, in

the case of Mead Johnson, from the United States Securities and Exchange Commission’s website [117]. We did not consider Reckitt because it only started selling CMF after acquiring Mead Johnson, and we felt that the period following this acquisition was too short to draw any meaningful conclusions. Abbott, Nestlé, and Danone did not report specific figures for CMF sales, but only for broader product categories that include CMF. However, we used figures for these broader product categories to make inferences about CMF profits.

Corporate wealth and income distribution: taxation

We analysed the effective tax rates (ETRs) – total income tax (foreign and domestic) divided by total pre-tax income (foreign and domestic) – of the global market leaders and of the aggregate of the rest of the global industry. The comparison was of ETRs on total income, and not just income derived from CMF sales. CMF industry data were compared to the aggregate corporate income tax rates set by OECD countries (there are important caveats to this approach which are considered under ‘Limitations of the study’, section 4.5). The period of analysis was from 1990 to 2020. Data were sourced from Compustat and Tax Foundation [52].

Corporate wealth and income distribution among market stakeholders

Wealth transfers to shareholders

We calculated the total estimated value of wealth transfers to shareholders via dividends and share repurchases. Share repurchases refer to when a corporation buys back its own shares. This practice has been described as an important means of redistributing wealth to shareholders by raising share prices, as well as to company executives (who are also very often shareholders) by manipulating firm performance metrics typically linked to executive pay compensation [92, 95]. Data were sourced from Compustat.

Shareholder power and value ratios

We calculated trends in shareholder power and shareholder value ratios to broadly explore how the CMF industry distributes wealth and income among its different stakeholders, including shareholders, consumers, employees, and society in general. These ratios provide an indication of the proportion of corporate income transferred to shareholders (via dividends and share repurchases) relative to other stakeholders [44]. The shareholder power ratio is determined by combining the value of dividends and share repurchases and dividing this by capital expenditure, with capital expenditure serving as a proxy for the interests of ordinary workers (by acting as a gauge for the relative commitment of firms to create jobs, innovate, and advance productivity through long-term investment) [44]. The shareholder value ratio considers the total combined value of dividends and share repurchases relative to firm revenue [44]. Both ratios were analysed at the top four firm and rest of global industry levels. The period of analysis was from 1990 to 2020. Data were sourced from Compustat.

Ownership structure and investor location

The ownership structures and investor locations of publicly listed CMF manufacturing corporations were also analysed. This involved analysing the percentage and value of shares held by the world’s 10 largest institutional investors, by assets under management, as of March 2021 [118]. These were: BlackRock, Vanguard Group, UBS Group, Fidelity, State Street, Allianz (including PIMCO), JP Morgan, Goldman Sachs, Bank of New York Mellon, and Morgan Stanley. Investor location data were aggregated by World Bank country income status. The periods of analysis were determined by available data, which were sourced from Orbis and Eikon databases [119, 120].

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