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Meso-institutions shaping arenas for policymaking: an exploratory study on front-of-package food labelling in Brazil, Chile, and Mexico

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Front-of-package food labelling (FOPL) is a mechanism to inform consumers on food nutrients content and risks for health. Each country, within its own institutional framework, defines methods and protocols to formulate rules capable of influencing organizations and the behavior of agents. The paper aims at evaluating the role of some meso-institutions in shaping arenas for policymaking on FOPL based on an exploratory study in Brazil, Chile, and Mexico. A documental analysis and literature review were employed, followed by in-depth interviews. The relevant aspects of FOPL assessed were thresholds for sugar, fats, and sodium; marketing restrictions, and timeframe given for compliance with the new rules. The contribution of this article is to illuminate the way in which meso-institutions operate in a specific context, namely the development of food labelling standards. The focus is to find the rules that allowed the participation of stakeholders in the process of defining normative acts intended to regulate food labelling. The discussion of mandatory FOPL can be interpreted as a struggle to define proper rights for the food industry and the consumer. Meso-institutions, as translators of general normative principles in specific contexts, can encourage or restrict stakeholder participation in policymaking. Besides political arena, the participation can be done in other arenas, such as legislature, regulatory agencies, scientific community, media and public opinion. Institutions that encourage stakeholder participation increase the probability of obtaining widely accepted specific rules.

KEYWORDS

institutions, food labelling, meso-institutions, policymaking, front-of package labelling

1 Introduction

Obesity associated metabolic diseases are a public health problem (Guthrie et al., 1995; Becker et al., 2015). In Latin America and the Caribbean, obesity affects one in four adults, representing 24.2% of the population of the region, a greater rate than the global average of 13.1% (FAO et al., 2021). Overweight and obesity are the unintended consequences of changing patterns of food production and consumption of processed food in developing

countries. Consumers are incapable of measuring the food nutrition attributes by themselves: unless they are explicitly signaled on the label, the nutrition information is incomplete and costly for consumers' food choices. As a consequence, overweight and obesity cause economic, social, and health impact in countries through reduced productivity and increased medical care and treatment costs (FAO et al., 2021).

Markets do not spontaneously resolve or even mitigate these undesirable effects, making it necessary to create institutions. In the presence of market failures, the adoption of appropriate institutions can lead to superior results. Institutions define the rights of economic agents to perform certain actions (Coase, 1959) and are enforced by law and, in some circumstances, by society's shared norms, values, and beliefs (Ménard and Shirley, 2014). Formal and informal rules complement each other and shape how society evolves.

Under high transaction costs, such as the significant food product attribute measurement cost, institutions are quite important defining formal rules to minimize the asymmetry of information among the supply chain agents, and to reduce the search and measurement cost on nutritional information by consumers. Thus, institutions can influence the consumers' choices and behavior toward a healthier diet.

This is the case of front-of-package food labelling (FOPL), a food policy stressed in 2019 by World Health Organization (WHO) as a powerful mechanism to inform consumers on food nutrients content and risks for health (Wyrwa and Barska, 2017; World Health Organization, 2019).

Food labelling influences on consumer choice is a long-standing hot topic in the literature (Nestle and Ludwig, 2010; Temple, 2020). The use of FOPL is to categorize the food according to its nutritional composition, using criteria defined by each country (Egnell et al., 2018; Talati et al., 2019). In most cases, exceeding the nutritional thresholds for sugar, sodium, and fat, which are defined by the critical nutritional profiles, is not recommended for promoting a healthy and nutritious diet (Wartella et al., 2010; European Commission, 2020). Following WHO guidelines (World Health Organization, 2023), many policymakers worldwide are proposing new, more up-to-date, and simpler approaches to labelling (Vapnek and Spreij, 2005; Croker et al., 2020). As a result, in the last few years, there were major transformations of food labels worldwide and an increase in the number of food labelling schemes (Gracia and de-Magistris, 2016).

FOPL is the implementation of warnings on the front panel of food labels that contain excessive amounts of added sugar, fat – saturated and trans, sodium, among other critical nutrients. FOPL immediately provides nutritional information displayed on food packaging in order to enable consumers to make better choices, and it is a strategy against obesity (Becker et al., 2015). FOPL requires less effort from consumers to identify key nutritional facts of the product (Roberto et al., 2021). Also, it is more effective in drawing the consumer's attention and is more inclusive, since even people with lower educational levels can easily read it (Wartella et al., 2010; Lundeborg et al., 2018).

Conversely, defining nutritional profiles, critical nutrients, thresholds, and categories covered by the regulation is a long and complex process. It involves several stakeholders (World Health Organization, 2019), at the same time requiring devices and mechanisms at intermediate level to positively influence the organizations and consumer behavior. In Europe, for example, the Claims Regulation estimated that the nutritional profiles for the region

should be defined by 2009, however, the attempt at unification was unsuccessful, due to controversial, divergent, and polarized views on the topic (European Commission, 2020).

This happens because formal rules, such as FOPL, are not spontaneously implemented, managed, enforced, and complied with by stakeholders (World Health Organization, 2019). The same goes for the process of creating the specific mandatory rules. Societies establish constitutional frameworks that regulate the creation of new rules (laws) established at macro level.

General principles, such as the rule of law and participatory democracy, demand interpretation, translation into legislative practices, monitoring, and adaptation to specific situations. These functions are performed by meso-institutions.

The aim of this article is to illuminate the way in which meso-institutions operate in a specific context, namely the development of food labelling standards. The focus is to find the rules that allowed the participation of stakeholders in the process of defining normative acts intended to regulate food labelling.

Regulation of stakeholder participation defines the arenas in which different voices, representing different interests, emerge. In addition to official public consultations, the debate echoes in the media, and professional and industry associations. If successful, the result of the participatory process are standards that obtain wide acceptance from stakeholders.

To this end, the paper investigates the institutions shaping arenas for policymaking on the nutritional front-of-package labelling in three Latin American countries – Brazil, Chile and Mexico –, through a comparative analysis considering the devices and mechanisms for the thresholds on food nutrients, marketing restrictions, and timeframe for compliance with the rules. Special attention was dedicated to the phase of definition of specific rules (or translating the general rule into specific regulations), since the institutional environment for FOPL is recent and the implementation process is in course.

In terms of knowledge advance, this paper offers a contribution in the understanding of the complex institutional mechanisms supporting the establishment of thresholds of food nutritional elements and signals for food label, an important subject considering public health and human wellbeing, by using the novel analytical framework of meso-institutions.

2 Institutions and roles

According to North's (1991) current classic definition, "institutions are the humanly devised constraints that structure political, economic and social interaction." Such restrictions encompass informal rules, such as sanctions, taboos, traditions and codes of conduct, as well as formal norms, including constitutions, laws and property rights. Along with the constraints usually considered in economic choice theory, institutions shape the set of feasible choices for economic agents and provide incentives, and eventually disincentives, for engaging in certain economic activities (Coase, 1992). Institutions, depending on their nature, can either foster or deter innovation and entrepreneurship.

"Institutions matter" became a catchphrase of the New Institutional Economy. Economic development would happen in all societies that adopted the right western type of institutions (rule of law, property rights, constitutional democracy, and efficient markets,

among others). North (1991) stated that “third World countries are poor because the institutional constraints define a set of payoffs to political and economic activity that do not encourage productive activity.”

However, many developing economies that have promoted modernizing institutional changes have not achieved expected growth (e.g., Sachs, 2003). Good institutions are not enough. Similar institutions can result in substantially different results. One of the roots of the failure are the fact that broader institutions do not impose themselves, depending on ancillary rules that translate general institutions into specific contexts as well as agencies to monitor and enforce compliance.

Institutions are not singular commandments, but structured sets of rules that operate at different levels. At the macro level, institutions are the general rules that govern life in society. They define the general outline of the architecture that will guide the actions of micro-institutions. At the micro level, they are the specific rules of each organization, as well as the heuristics adopted in the decision-making process. The micro-institutions have the function of operationalizing the supply of products and services, guided by transaction costs. Meso-institutions connect these two levels, translating general norms into the specific contexts in which agents make their choices, monitoring their behavior and implementing incentives.

The success of institutional change depends on the articulation of macro and micro levels, promoted by meso-institutions. The meso-institutions, with the function of implementing the macro-institutions, define the governance designs (Ménard et al., 2018).

North (1993) compared institutions to the rules of the game, while organizations were the players. In our view, it is legitimate to extend the metaphor by including the referee and his assistants, who constitute a unique organization whose objective is to enforce the rules in each circumstance in which the game takes place. Under the three-tier classification of institutions adopted here, referees and assistants are meso-institution issuers. Organizations, “groups of individuals bound together by some common purpose to achieve certain objectives” (North, 1990), produce, among other things, institutions, whether formal or informal, to maintain some stability over time. Even simple aspects of everyday life, such as choosing food, involve institutions and organizations that regulate interactions between different actors.

A general institutional framework comprises three layers of analysis (Ostrom, 2005; Ménard et al., 2018): macro-institutions, where the general rules are defined and the rights established; meso-institutions, where the specific rules (embedded in the general rules) are delineated; and micro-institutions, at which transactions actually take place (the organizational level), where the food consumers and industry take action. Meso-institutions are an intermediate level of institutions where mechanisms (procedures) and devices (entities) are created in order to interpret and translate general rules at macro-level into specific rules, allocate rights, enforce and monitor them. Meso-institutions work as a “bridge” between general rules at macro-level and the agents operating within these rules at micro-level (Figure 1). Governing all these activities/functions are individuals, decision-makers, who act nuanced by their motivations (pro-social versus self-interest).

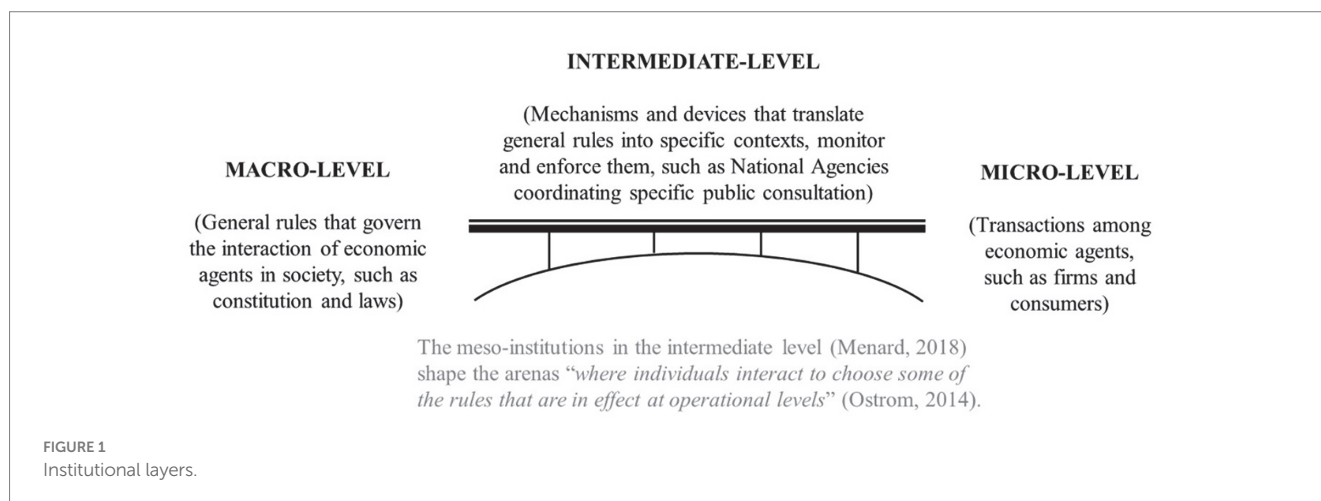
Meso-institution is a novel and valuable concept for investigating public policies (Ménard et al., 2018; Vinholis et al., 2021). The transmission mechanisms at intermediate level and how they operate and translate the rules at macro-level into micro-performance and wellbeing are still underexplored (Ménard, 2014).

The literature on food labelling has been devoted to discussions about the role of public or private institutions in reducing the asymmetry of information around food composition (Golan et al., 2001), public health instrument (Jones et al., 2019), the form and the terms of FOPL regulation, and the governance for the development and enforcement (Jones et al., 2019). However, little attention has been paid to the role of intermediary institutions in the development of FOPL regulation, on how they act and coordinate the process of development of FOPL regulation.

This article addresses the following research question: What is the role of meso-institutions in the development of FOPL regulation? More specifically, what are the mechanisms and devices used in FOPL regulation? Deeper knowledge on the role of meso-institutions in the specification of FOPL contributes to the success of the law fighting obesity established at the macro-level.

The effectiveness of the macro-institutions depends on the implementation of good meso-institutions (Ménard et al., 2020). FOPL policy requires devices and mechanisms at intermediate level to positively influence the organizations and consumer behavior.

Part of the growing literature on FOPL focuses on consumers and stakeholder’s reactions to recently issued rules in various countries



(Koenigstorfer and Groeppel-Klein, 2010; Andrews et al., 2011; Scrinis and Parker, 2016; Acton et al., 2018; Elshiewy and Boztug, 2018; Cole et al., 2019; Andrews et al., 2021; Baccelloni et al., 2021; Guan et al., 2021; Mazzonetto et al., 2021; Andreeva et al., 2022; Ares et al., 2023; Srour et al., 2023).

A set of studies explores the effects of imposing standards on employment (Paraje et al., 2021; Díaz et al., 2023), as well as on the competitiveness of the local food industry (Campbell, 2022; Crosbie et al., 2022). There is not yet abundant literature on the socio-political processes that lead to widely acceptable norms concerning FOPL. Pereira et al. (2022) describes the evolution of labelling rules and the manifestations of the food industry, consumer associations in Brazil, as well as the positions of public agents. However, the mechanisms that allowed the negotiation of conflicting positions have not attracted as much attention.

Several countries value stakeholder participation in public policy formulation (with the aim of gaining legitimacy and effectiveness in implementation) and a healthier diet for their populations, reducing the health risks. In order to achieve these broad (macro) objectives, it is necessary to define rules for participation in the formulation of the policy (which are the legitimate voices in the interlocution, what are the mechanisms of articulation and forums for debate, who does and how the mediation between interlocutors is carried out), as well as rules to influence the behavior of agents in agrifood chains, in order to produce healthier food (manufacturing practices, labelling, consumer education).

This research sought to present cases in which the implementation of FOPL, as an instrument of the healthy eating policy, was preceded

by regulated stakeholder participation processes and produced sets of well-defined FOPL rules.

3 Materials and methods

Chile, Mexico, and Brazil were selected due to their high obesity rates (Ferreira et al., 2021) and the different stages of implementing FOPL at which they are.

Between 2000 and 2016, Brazil saw a 52.4% increase in obesity, with 22.1% of adults considered obese. In Mexico, growth was 38.9% and in Chile, 35.9%, taking obesity rates to 28.9 and 28.0%, respectively (FAO et al., 2021).

Chile was the first country in Latin America to apply FOPL in 2016, which makes its regulation a model for other countries, including Mexico and Brazil. Mexico approved new labelling regulations in October 2019 and started the first phase of its implementation in October 2020. Brazil officially approved new labelling regulations in October 2020, after more than 6 years of discussion. Each of the three countries adopted the legislation at distinct points in time, with distinct rules and implementation times, resulting in divergent stages of implementation.

The research methodology (Figure 2) focused on analysis of public documents, literature review, and in depth-interviews.

The analysis of public documents covers decrees from the three nations in this study (Anvisa, 2020a,b,c; Chile, 2015; Mexico, 2020), along with public policies published by international organizations (World Health Organization, 2015, 2019, 2023; El Poder del

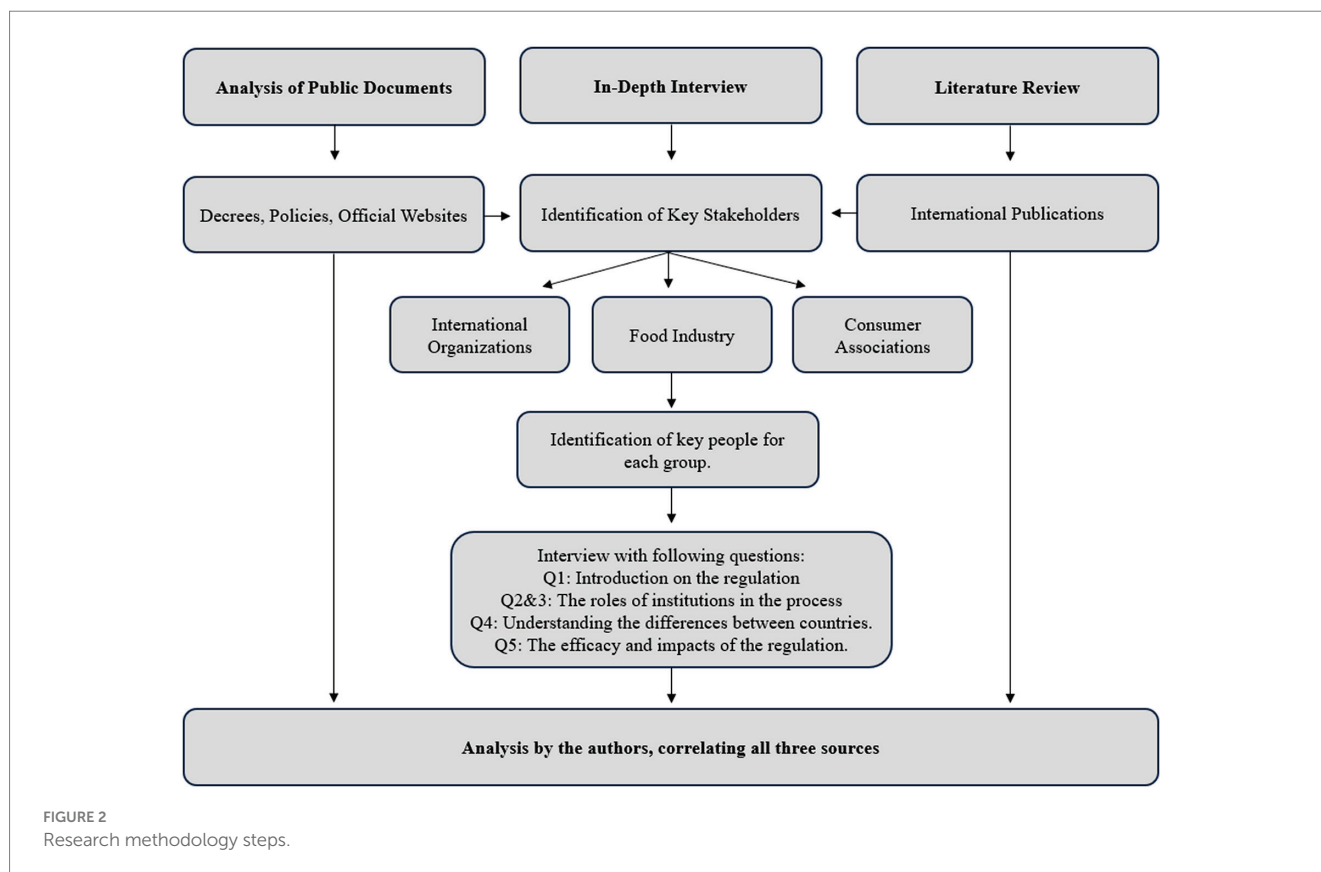


FIGURE 2
Research methodology steps.

Consumidor, 2020; European Commission, 2020; FAO et al., 2021; Public Eye, 2022), and official websites.

The methodology employed to compile the review of scientific literature on meso-institutions, policymaking and FOPL involved a two-step search mainly on Web of Science, Scopus and Google Academic, using the following keywords: (i) meso-institution; (ii) front-of-pack labelling; food; beverages. In both cases, we restrict the search to the economics and business research area. The screening of identified articles was carried out with a focus on original research articles and systematic reviews that addressed the meso-institutions' involvement in policy development, process implementation of FOPL, as well the effects and implications of FOPL interventions on consumer behavior, food choices and health outcomes.

In-depth interviews (Malhotra and Kahle, 1994) guided by a questionnaire were conducted with people based in Brazil, Chile, Mexico, Italy and Switzerland. In order to obtain a qualitative understanding of the social choice process related to FOPL, nine semi-structured interviews were carried out, divided into three groups based on institution segments: international organizations, industry, and consumer associations. The institutions were chosen deliberately given their importance in the process, identified by their advocacy in the media and discussion forums. In addition, the selection of the interviewees was a carefully structured process, focused on the leadership position of the organization, and considering their significant influence on the definition of intermediate-level rules in the context of FOPL. The recruitment stopped when the main organizations were included and a clear picture of the relationships between relevant actors have emerged.

The integral and high level roles assumed by the selected participants in shaping the FOPL rule setting process highlight the logic behind the interviewees for this study (Table 1).

Interviews were recorded and transcribed by one of the authors to ensure that accuracy and veracity of the original discussions were maintained. Subsequently, the transcript was shared between the authors for comprehensive analysis and coding, with a focus on evaluating the key findings as delineated by the parameters of the study. Using a qualitative content analysis approach, the interview data was examined until saturation was reached, ensuring a full exploration, and understanding of the subject under discussion.

The interview questions were structured to obtain technical information and the interviewees' perceptions on the subject. A total of 5 questions were asked, as described below.

1. Generical question for introduction on the topic: In your opinion, what is the main purpose of frontal nutritional labelling in processed foods?
2. Descriptive question on the role of the interviewee institution on the topic: How do you describe the main role of "your organization" in the decision-making process of the frontal nutritional warnings?
3. Descriptive question of the role of other institutions on the topic: How do you describe the role of other parties involved, such as governments, industry, consumers in the decision-making process?
4. Deepening question on the differences found between countries: What challenges are created by the fact that restriction levels vary considerably among countries and how can this issue best be addressed in designing guidelines?
5. Focus question on assessing how the regulations have effectively addressed the root issues that originated the regulation: To what degree do you feel frontal labelling is an effective tool to reduce obesity and its associated metabolic diseases of people in poverty, given the fact that these people most often do not have the knowledge to evaluate a label or the financial freedom to choose the food? What other measures could be taken to make the regulation more efficient and inclusive?

The comparative analysis focuses on how the broader concepts of nutrition information are translated into operational and transitional rules, and how the behavior of the agents will be monitored. With the purpose of identifying how the participation of stakeholders is translated into specific rules and how it is controlled by the regulatory agency in each country, the procedures for calling and admitting interested third parties were reviewed. Variables that express each country's interpretation of what constitutes healthy food, such as warning signs as well as tolerable limits for salt and sugar, were included in the comparative analysis.

TABLE 1 List of interviewee details according to main stakeholders, institution, position, and location.

Stakeholder	Institution	Position / Expertise	Location: City/Country
International Organization	SID (Society for International Development)	Senior official representative	Rome / Italy
	WHO (World Health Organization)	Senior official representative	Geneva / Switzerland
	Università degli Studi Roma Tre	Professor and researcher on food safety with experience at UN	Rome / Italy
Industry	UNICA (Sugarcane Industry Association)	Senior official representative	Brasília / Brazil
	Dairy Industry Company	Official representative	Vitacura / Chile
	Food Labelling Consultant Company	Expert on food labelling	Mexico City / Mexico
Consumer	IDEC (Brazilian Consumer Protection Institute)	Official representative	São Paulo / Brazil
	CONADECUS (National Consumers and Users Corporation)	Official representative	Santiago / Chile
	El Poder del Consumidor	Official representative	Mexico City / Mexico

The transition between the current rules and the new ones also deserves attention, highlighting the implementation deadlines and phasing. The incentives for the food industry to adhere to the new rules and the regulatory agencies' control mechanisms and stakeholder participation were included in the analysis, as well as the reactions of key stakeholders to the end result of the rule-making process.

4 Results

What's inside the front-of-package food labelling process in Brazil, Chile, and Mexico.

4.1 Taking a look at the devices

Table 2 presents the institutional environment for FOPL, including macro- and meso-institutions (devices) in Brazil, Chile, and Mexico. The Brazilian Health Surveillance Agency (*Anvisa*, in the Portuguese acronym), within the scope of the National Health Surveillance Service, was responsible for regulating, implementing, and monitoring the FOPL (*Anvisa*, 2020c). After an extensive report on the subject, *Anvisa* presented a public draft containing the proposed specific rules on FOPL through the public consultation instrument, which aims to receive contributions and interact with the various stakeholders at micro level, before issuing the regulation.

In Chile and Mexico, regulation of the FOPL was stimulated by political projects at the legislative level, as stated by interviewees. In both countries the translation of FOPL general rules into specific rules was coordinated and regulated by public devices (government entities) after the interaction with stakeholders, also through public consultation. The FOPL had the greatest public consultation in both Brazil [23,435 comments (*Ferreira et al.*, 2021)] and Mexico [5,200 comments (*El Poder del Consumidor*, 2020)]. In Chile, stakeholders' submissions were also abundant (*Dorlach and Mertenskötter*, 2020).

In all three countries, the effective participation of entities representing consumers and industry was verified. Interaction with stakeholders is essential to craft realistic and implementable policies (*Ménard et al.*, 2018), as well as to ensure legitimacy to the policymaking process (*FAO et al.*, 2021). However, great consideration should be given to power imbalances amongst stakeholders (*Carey et al.*, 2016; *Jones et al.*, 2019; *Talati et al.*, 2019), often reflected in different agencies and organs of the state apparatus. Policymakers face challenges in choosing between conflicting policy objectives. In the case of FOPL, an example of conflict happens between the need to protect health and the desire to develop the industry and the economy, as well as to promote competitiveness of the domestic food industry in foreign markets (*Mialon et al.*, 2020).

Food policymaking process must take all these interests into account and, where there are conflicts, determine preferences and assess the relationship between costs and benefits (*Vapnek and Spreij*, 2005).

Public agencies in Brazil, Chile, and Mexico (*Anvisa*, *Minsa*, *Cofepris*) mediate the dialogue among stakeholders, but the debate is not regulated by specific rules. While keeping democratic participation, the government should shield itself against potential conflicts of interest, being aware of the massive interference of private and collective lobbies in the process, as detailed during the interviews

with international organizations. Lobbying regulation restricts the influence of private interest on policy outcomes and should ensure a fair governance.

One of the biggest challenges states face in developing multistakeholder' approach to policymaking, as the case of FOPL regulations, is giving the right weight to voices from different sectors, which may have their own interests and heavily influence the process (*McKeon*, 2017).

In Brazil, the coalition *Rede Rotulagem* (Labelling Network, in Portuguese) represents around 1,500 food and beverage companies and advocated for the adoption of the Nutritional Traffic Lights model in FOPL. The network gained strength with the active participation of the food industry in the public consultation process established by *Anvisa*. *Rede Rotulagem* has played a role in the generation of studies, opinion polls, and participation in the public consultations by *Anvisa*. It has also acted influencing society and policymakers, including congressmen. *Rede Rotulagem* has been working extensively on social media to widely communicate the defense of its preferred model.

Inter-organization networks can facilitate the implementation of food labelling policy (*Gracia and de-Magistris*, 2016).

In Mexico, the industry has exerted huge influence in defining the regulation of FOPL. The most striking case was the official letter from a multinational company to its suppliers, requiring assistance to curb the labelling proposal, which according to the company would interfere with international trade treaties and create obstacles to trade (*Public Eye*, 2022). The industry also formed coalitions within industrial chambers in Mexico, which represented not just one brand, but the entire industrial sector, promoting campaigns in communication networks to disseminate its arguments, and financing groups of experts and famous people to spread its point of view.

The industry opposition to the FOPL, in most cases led by transnational food firms, has been reported by other authors, such as *Crosbie et al.* (2022) in Mexico and *Campbell* (2022) in Chile. Although the FOPL has been recognized and stimulated by Public Health entities as a mechanism against obesity associated metabolic diseases, the food industry argues on international trade issues and has treated the FOPL as a technical barrier to trade.

In Chile, the industry was also represented by associations, with particular highlight to *ABChile's* performance. One month before the entry into force of the FOPL, *ABChile* launched a campaign on social media with celebrities, singers, and athletes, promoting digital content against the new labelling law and asking for its reformulation (*Mialon and Naik*, 2023). However, the campaign was withdrawn from social networks due to strong civil society movements, which also occurred on that medium. In this case, the formal organization of consumers and civil society in a collective entity representing them gave voice to an important sentiment of a segment usually scattered and non-coordinated. This movement may change the direction of a policy on food-related issues (*Vapnek and Spreij*, 2005).

Some of these movements of civil society are connected to consumer associations, as it is the case of *CONADECUS*, which represents consumers in Chile and works close to several stakeholders and media. This civil organization, which has high level of representation across many regions of the country, took three particular actions that strengthened the discussion of the legislation before, during, and after its run through Congress. First, it had active participation in the legislative sessions of the Health Commissions of the Senate and the Legislative Chamber, with more than 19

TABLE 2 Devices coordinating the stakeholders' interaction for specific rules at inter-mediate level in Brazil, Chile, and Mexico.

Country / Stakeholder	BRAZIL	CHILE	MEXICO
MACRO-INSTITUTIONS (general rules)			
FOOD & NUTRITION NATIONAL PLANS & HEALTH LAWS	National Food and Nutrition Policy	Food Law	General Health Law
MESO-INSTITUTIONS (devices coordinating stakeholder interaction for specific rules at intermediate level)			
PUBLIC AGENCIES	National Health Surveillance Agency (ANVISA)	Ministry of Health (MINSa)	Federal Committee for Protection against Sanitary Risks (COFEPRIS)
<i>Description</i>	Regulatory agency linked to the Ministry of Health. Its main function is to promote the health of the population, acting in the sanitary control of several products, such as medicines, food, and cosmetics.	Government institution that develops and controls health systems centered on people strengthening the factors that can affect the health and management of the national health network.	Government agency in charge of the national health policy and other aspects of health services, including regulating drugs and medical devices.
<i>Functions on the FOPL implementation process</i>	Establishment of thresholds and marketing restrictions; technical support, implementation and monitoring the process.	Defining the limits of each critical nutrient from scientific research, and disseminating the information.	Homologating criteria between the regulatory authority and the regulated parties, disclosing the standards developed and monitoring the correct implementation of this standard.
<i>Form of interaction with stakeholders on the FOPL implementation process</i>	Public consultation.	Public consultation.	Public consultation.
COLLECTIVE ENTITY REPRESENTING CONSUMERS	IDEC	CONADECUS	<i>El Poder del Consumidor</i>
<i>Description</i>	Brazilian Institute of Consumer Protection is a non-governmental organization, with no government or business ties, which aims to promote education, the defense of consumer rights, and ethics in consumer relations.	The National Consumers and Users Corporation is a civil association with focus on consumer protection.	It is a civil association formed by citizens concerned with defending their rights as consumers established in the laws of Mexico.
<i>Functions on the FOPL implementation process</i>	Promote and protect consumer rights, denouncing practices that violate them. Dialoguing with government; promoting consumer awareness and empowerment on the regulation and their rights; enforcement, since it advises consumers on judicial processes; get survey on consumers' needs and feedback to policymakers. Promote sustainable consumption habits.		
COLLECTIVE ENTITY REPRESENTING INDUSTRY	<i>Rede Rotulagem</i>	ABChile	CONMEXICO
<i>Description</i>	It is a network created as an initiative of the food and beverage production sector to defend a more informative and efficient FOPL. The network comprises 20 entities which represent industrial production of food and non-alcoholic beverages in Brazil.	ABChile is a union entity that brings together producers and importers of food and non-alcoholic drinks in Chilean market.	The Mexican Council of the Consumer Products Industry groups together the leading companies in the markets for food and alcoholic and non-alcoholic beverages
<i>Functions on the FOPL implementation process</i>	Dialogue with industry and government; Advocacy of informational labels rather than warning models. Inform the industry on the regulation; implement the regulation and get feedback to policy makers.		

interventions recorded in the proceedings. Secondly, it was the only consumer association present in the public consultation on ancillary regulations carried out by the Chilean Ministry of Health. Finally, it also promoted technical seminars and alliances with parliamentarians to make political advances to approve the new regulation. Today, CONADECUS has become a vital ad honorem overseer of the law, publishing in 2017 a nutritional surveillance report on its effective compliance, and carrying out permanent health complaints before the formal oversight bodies.

In Brazil, IDEC (Brazilian Institute of Consumer Protection) is an organization for consumer defense and has been active since the beginning of the discussions on FOPL in 2014. IDEC has made technical contributions, working with specialists from Brazilian universities and international institutes, supporting *Anvisa* in the decision-making process. In addition, IDEC coordinated with other actors in society, such as the Brazilian *Aliança para Alimentação Saudável e Adequada* (Alliance for Healthy Eating), an association that worked to make political progress regarding the front-of-package

labelling regulation in Congress. IDEC sought to articulate with *Anvisa*, promoting a debate on labelling both inside and outside the organization, in order to have public participation and a sense of urgency to move forward in this process.

In Mexico, the organization *El Poder del Consumidor* (The Consumer’s Power), which represents consumers in several civil society councils, has actively worked in the process of making this public policy. The institution participated in discussions with the government, always bringing the consumer and public health viewpoints, with much support from universities and civil society. *El Poder del Consumidor* functioned as a counterweight to the industry’s position and played a role in influencing decision-makers, such as congressmen and legislators, informing them about the technical issues of the new labelling. In addition, the institution, together with the Mexican *Alianza por la Salud Alimentaria* (Alliance for Food Health), formed a network of more than 35 organizations that joined this effort. This network organized campaigns showing the positive impacts of FOPL in digital media and on billboards and transportation in major cities in Mexico (*El Poder del Consumidor*, 2020).

The participation of civil society in any country is essential to press for public policies in favor of healthy food. In the case of Brazil, Chile, Mexico, it was done through consumer associations, which worked under the recommendations of international organizations, such as PAHO, WHO, FAO, and UNICEF.

At macro-level, international organizations also play a vital role in the FOPL policymaking process. These organizations have the role of analyzing the evidence around policy measures and providing normative guidance to country governments, particularly around the establishment of certain policy measures, as well as the technical support for its implementation (*World Health Organization*, 2015, 2019, 2023).

At micro-level, based on the interviews with consumer associations, it is possible to affirm that these entities also play functions of monitoring and building capacities on the FOPL, going beyond the participation in the translation of general rules into specific rules. They have acted toward framing producers’ and suppliers’ behavior through devices capable of monitoring their conduct, informing, and empowering consumers about irregularities,

and submitting complaints to proper channels. These civil society organizations are complementary to the public enforcement mechanisms, i.e., the court. It reinforces the importance of an efficient governance structure for providing authority to the responsible agency to monitor and enforce the food labelling policy (*Phulkard et al.*, 2017).

It is expected that specific rules developed with effective contributions of users achieve a higher performance rate than those entirely determined by external authorities (*Carey et al.*, 2016). The intermediate level, or meso-institutions (*Ménard et al.*, 2018), shapes the arenas “where individuals interact to choose some of the rules that are in effect at operational levels” (*Carey et al.*, 2016). *Figure 3* presents the institutional environment for FOPL, including macro- and meso-institutions and expectations at micro-level in Brazil, Chile, and Mexico.

4.2 Exploring the mechanisms: differences in the FOPL regulation

The adaptation of FOPL regulation to the context of each country is observed in the signs used in the labels (*Table 3*). Both Chile and Mexico apply the model of front warning labelling in the form of black octagons, indicating “high in” or “excess in” sugar, saturated fat, sodium, and calories, respectively.

Brazil chose the black magnifying glass. The model was considered the most suitable for the Brazilian population since it has less potential to generate a sense of fear, allowing independent and conscious choices by consumers, and has performance similar to models adopted by other countries in terms of understanding nutritional information (*Anvisa*, 2020c).

The use of icon and color-coding schemes helps consumer comprehension of the meaning of the information presented on the label (*Becker et al.*, 2015).

Regarding the critical nutrients, there are different thresholds for the application of FOPL in each country (*Table 4; Jones et al.*, 2019).

Mexico has the most restrictive thresholds for critical nutrients, especially sodium limit. Mexico is also the only one that establishes the obligation to declare trans-fat on the front-of-package labelling

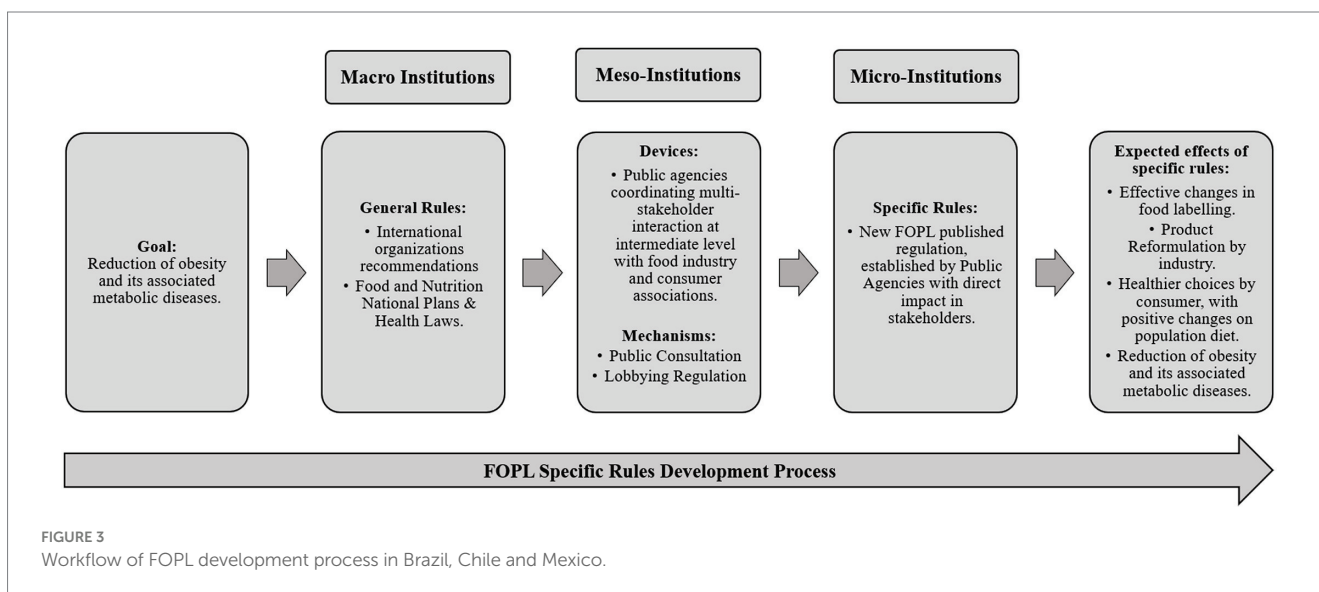





FIGURE 3 Workflow of FOPL development process in Brazil, Chile and Mexico.

TABLE 3 Regulation/Specific rules (mechanisms) on front-of-package labelling policymaking process in Brazil, Chile, and Mexico.

Regulation/Specific rules (Mechanisms)			
AT A GLANCE	BRAZIL	CHILE	MEXICO
Regulation Publication Date	October 8th 2020	June 26th 2015	March 27th 2020
Implementation (Months after publication date)	24	12	6
1st Phase of implementation of regulation			
Starting Date	October 8th 2022	June 27th 2016	October 1st 2020
Length of time (Months)	Definitive	24	36
2nd Phase of implementation of regulation			
Starting Date	Not applicable	June 27th 2018	October 1st 2023
Length of time (Months)	Not applicable	12	24
3rd Phase of implementation of regulation			
Starting Date	Not applicable	June 27th 2019	October 1st 2025
Length of time (Months)	Not applicable	Definitive	Definitive
Total Length (Months)	24	48	66
Signs			

Source: Based on Anvisa (2020c), Chile (2015), and Mexico (2020).

TABLE 4 Thresholds of nutritional front-of-package labelling policymaking process in Brazil, Chile, and Mexico.

AT A GLANCE	BRAZIL	CHILE	MEXICO
Added Sugar thresholds			
Solid food	Greater than or equal to 15 g/100 g	Greater than or equal to 10 g/100 g	≥ 10% of the total energy from free sugars.
Liquid food	Greater than or equal to 7,5 g/100 mL.	Greater than or equal to 5 g/100 mL	
WHO Daily Intake Recommendation <10% of the total energy from free sugars.			
Saturated Fats thresholds			
Solid food	Greater than or equal to 6 g/100 g	Greater than or equal to 4 g/100 g	≥ 10% of the total energy from saturated fat.
Liquid food	Greater than or equal to 3 g/100 mL	Greater than or equal to 3 g/100 mL	Not applicable.
WHO Daily Intake Recommendation <10% of the total energy from saturated fat.			
Trans Fat thresholds			
Solid food	Not applicable.	Not applicable.	≥ 1% of the total energy from trans-fat
Liquid food	Not applicable.	Not applicable.	
WHO Daily Intake Recommendation <1% of the total energy from trans-fat.			
Sodium thresholds			
Solid food	Greater than or equal to 600 mg/100 g	Greater than or equal to 400 mg/100 g	≥ 1 mg/kcal or ≥ 300 mg
Liquid food	Greater than or equal to 300 mg/100 mL	Greater than or equal to 100 mg/100 mL	No Caloric Beverages: ≥ 45 mg
WHO Daily Intake Recommendation <2000 mg/day.			
Calories thresholds			
Solid food	Not applicable	Greater than or equal to 275 kcal/100 g	≥ 275 kcal
Liquid food	Not applicable	Greater than or equal to 70 kcal/100 mL	≥ 70 kcal or ≥ 8 kcal of free sugar
WHO Daily Intake Recommendation not applicable.			
Marketing Restrictions			
Solid and liquid food	Not applicable	Restriction of advertisement for children and sales in schools.	Restriction of advertisement for children.

Source: Based on Anvisa (2020c), Chile (2015), and Mexico (2020).

and follows the maximum daily intake recommended by WHO. On the other hand, Brazil has less restrictive thresholds, higher than the ones from Chile and Mexico. The country requires the use of front-of-package labelling for only three parameters, while Chile requires for four, and Mexico for five. It is worth noting that the choice of a specific maximum or minimum threshold should meet dietary guidelines and the recommendation on the constituents of healthy eating in the context of the country, considering the nutritional objectives for that population.

There is a long way to reduce sodium, sugar, and fat. Chile and Mexico have decided to have phases of implementation of the new regulation with limits that are progressively updated, starting at a considered low ambition, but already with a plan in place to make it stricter, getting closer to the objective. Besides the adaptation to local context, the process of policymaking and choosing the best combination of specific rules always involves experimentation and takes time (Ostrom, 2014).

The period for applying the regulation varies (Table 3). Chile and Mexico defined a gradual implementation of the regulatory limits for including FOPL in three phases. These countries have a more extended period for implementation. Based on the in-depth interviews with the industry sector, the application of a staggered term is advisable to allow the food production sector to make necessary adjustments to the formulation and labelling of its products, as well as to adapt consumer tastes to products with possibly reduced palatability. Chile was the only country to present a gradual reduction for the four nutrients in all three phases. Mexico showed a gradual reduction only for sodium in the second phase. The third phase is limited to extending restrictions to more food categories. On the other hand, Brazil established only one phase for the implementation of FOPL regulation. According to *Anvisa*, that can avoid products with different contents of critical nutrients being simultaneously in the market and makes the implementation easier for the industry. Although Brazil has the shortest implementation time in months, the country has the longest period for the rules enter into force. Therefore, concerning the implementation deadlines, Brazil is the most flexible and Mexico the most restrictive. Conversely, Mexico has the more extended period for full implementation, 66 months, while Chile plans for 48 months and Brazil, 24 months.

Regarding the constraints on food advertisements and marketing (Table 4), the Chilean regulation states that if the packaged food exceeds the limits of a critical nutrient and receives at least one black octagon, that food cannot be advertised to children or sold in schools. This measure aims to promote awareness about healthy eating for children, protecting them from excessive advertising that reinforces poor eating habits directed at them (World Health Organization, 2015, 2019, 2023; Mialon et al., 2020). The additional intervention in Chile regulation is understood as a potential to extend the benefit of FOPL beyond the food selling point (Jones et al., 2019).

In Mexico, the new regulation also prohibits the inclusion on the label of children's characters, animations, cartoons, celebrities, athletes, pets, interactive elements, such as visual-spatial games. As these items are aimed at children, they promote the consumption, purchase, or choice of products with an excess of critical nutrients. In addition, Mexican regulation brings two other warnings for sweeteners and caffeine. When appropriate, the producers should include the phrases "Contains caffeine – avoid for children" or "Contains sweeteners – not recommended for children." In Brazil, FOPL

regulation does not include specific actions to constrain advertising or marketing.

Despite departing from similar goals and tracing relatively similar paths in the policymaking process, the countries have reached different regulation.

The process by which regulatory agencies consider stakeholder statements and arrive at a synthesis of multiple points of view has not been clearly documented in the cases studied. Durán et al. (2022) note in Mexico an asymmetry between the participation of industry organizations and that of other civil society organizations, such as academia and non-governmental organizations. The agencies have poorly documented the manifestations of the latter.

Regulatory agencies have, in theory, autonomy vis-à-vis stakeholders and the government. Their decisions would supposedly be technical, based on scientific evidence. They are not, however, immune from pressure from public opinion, nor from government bodies, which often have conflicting views and objectives. Pereira et al. (2022) reports, in the Brazilian case, demonstrations by public agents concerned about the competitiveness and employment of the food industry. It is possible that pressure from the government itself contributed to the adoption of less restrictive rules than in the other countries studied (Table 4).

In addition, the pressure exerted by stakeholders on public agencies has led to changes in the specific rules even after the regulations have been published. In Brazil, *Anvisa* has postponed the entry into force of the specific rules in one year, arguing that the industry had a stock of packages and previous labels to be consumed (Anvisa, 2023). However, this decision was severely criticized by consumer associations. IDEC has filed a legal action against *Anvisa* to enforce the use of FOPL by the industry (Instituto Brasileiro de Defesa do Consumidor, 2024).

The reaction of entities in each country regarding the specific rules on FOPL is an indication of the voice power of entities on the policymaking arena at intermediate level (Table 5). Stakeholders react to the standards issued by regulatory agencies according to how close the final result is to their points of view. In Brazil, consumer representative organizations expressed the assessment that the Brazilian standard was weak, while industry spokespeople welcomed the new rules, even if they preferred an unregulated environment. In Chile and Mexico, reactions were opposite: consumers associations supported the new regulation, while the industry was skeptical, also identifying possible adverse effects of the regulation.

5 Discussion: expectations on the effect of FOPL

Among the expected offshoots (Table 6) from the application of FOPL regulation on the long-term are positive changes on population diet, reduction of health problems, and reduction of asymmetry of information on supply chain. Chile followed by Mexico have been pioneer in approving law of food labelling and advertising in Latin America (Kanter et al., 2018). Some empirical studies have demonstrated the effect of FOPL on population diet. Taillie et al. (2020, 2021) verified decline in the overall calories, sugar, sodium and saturated fat purchased by Chilean consumers in the post-policy period compared to the pre-policy period. However, there are a few points of attention to ensure it reaches its potential benefits to the

TABLE 5 News on the reaction of entities on the front-of-package labelling specific rules in Brazil, Chile, and Mexico.

AT A GLANCE		BRAZIL	CHILE	MEXICO
Industry	Entity	<i>Rede Rotulagem</i>	ABCChile	CONMEXICO
	Reaction to specific rules	Positive	Negative	Negative
	Main arguments for the reaction	Informative model for consumer; democratic process of definition of FOPL specific rules.	Costs of implementation; Black octagons induce fear of consuming food.	High cost to implement specific FOPL rules
Consumer	Entity	IDEC	CONADECUS	<i>El poder del Consumidor</i>
	Reaction to specific rules	Negative	Positive	Positive
	Main arguments for the reaction	Soft FOPL rules; ineffective signal; too long term to implement specific rules.	Informed consumer choice provides incentives for the industry to offer healthier foods.	Consumer-friendly signs.

Source: Information extracted during the interviews, in addition to information made available on the websites of the aforementioned institutions. Accessible at: <https://www.rederotulagem.com.br/>, <https://idec.org.br>, <https://www.abchile.cl/>, <https://www.conadecus.cl/>, <https://www.conmexico.com.mx/>, <https://elpoderdelconsumidor.org/>.

TABLE 6 Expectations on the effect at micro-level (individuals and organizations) after the implementation of front-of-package labelling in Brazil, Chile, and Mexico.

Micro-institutions – Impact expectations
Positive impact on population diet, reduction of public health problems and of asymmetry of information. It requires complementary policies and actions to reach the potential benefits to whole society.
Difficulties in comparison between countries due to the lack of standardization on the presentation of thresholds.
Difficulties in monitoring due to use of percentage in presenting thresholds.
Difficulty of access of marginalized population to food products with better nutritional conditions due to the lack of knowledge and financial constraints.
Regulatory complexity can also generate significant difficulties and costs for small producers.
Difficulties to include the production of traditional and regional foods.

Source: Original research data derived from interviews conducted.

whole society. For instance, labels in Chile have caused a demand decrease for breakfast cereal category, but not for chocolates or cookies (Araya et al., 2022). Jáuregui et al. (2020) found similar results in Mexico. The authors observe the FOPL can foster healthier food choices, mainly among low- and middle income groups.

On the supply side, Chilean firms are pushed to reformulate foods with high levels of nutrients targeted by regulation (Reyes et al., 2020; Scarpelli et al., 2020). In the Chilean case, the implementation of the law resulted in a reduction of the energy and content of nutrients of concern in food-packed products, such as dairy, sugary beverages, flour-based foods, confitures and similar, fish and seafoods, fats and oils, condiments and sauces, and sugars (Scarpelli et al., 2020). However, additional research on the influence of FOPL in the food product reformulation is needed since the law implementation is recent in some countries, as in Brazil, and there are no data available yet (Roberto et al., 2021).

The lack of standardization challenges the comparison of food restrictiveness among countries on the same basis (Kasapila and Shaarani, 2011). Some countries present the limits as percentage of total energy of the product, while others use g/100g. The use of percentage thresholds brings challenges to implement FOPL, especially for small companies which often do not have adequate regulatory support. It also may contribute to errors and make

inspection and monitoring functions more difficult, as explored during the interviews.

The use of information exhibited on labels depends on the consumer’s ability to correctly interpret it. Some consumer characteristics are positively associated with the likelihood of using nutrition labelling, such as education level, feminine gender, household with two or more members, and awareness of nutrition and product safety (Barahona et al., 2023). In this sense, the way in which the nutritional information appears on the label can make the labelling program more effective, or, on the contrary, weakened.

Front-of-package labelling is an essential tool in the effort to reduce obesity and chronic diseases, but it does not do it alone. Especially when it comes to situations of poverty, when people do not have enough knowledge to evaluate labels and the financial freedom to choose their food, it is likely that consumers remain prone to buy a cheap product that they like, even in the presence of a dissuading front-of-package labelling. As long as the products high in sugar, sodium, and fats are present in marginalized areas, in which healthier products that are more expensive are not promoted, the most vulnerable population will probably continue to buy cheap unhealthy food (Brambila-Macias et al., 2011). However, for low income consumers, welfare gains from labelling are greater than those obtained from taxation of foods containing high levels of sugars and fats (Barahona et al., 2023).

Additional action or complementary regulation can mitigate this situation. This topic was lastly explored on the in-depth interviews to answer the question: “what other measures could be taken to make the regulation more efficient and inclusive?”

The links between labelling and marketing regulations, such as the advertisement restriction of products with “high in” stamps for children, are fundamental pieces for behavioral changes that can positively influence obesity rates (World Health Organization, 2015, 2019, 2023).

Similarly, front-of-package labelling can also serve as a tool to guide public procurement to avoid the purchase of unhealthy food, especially concerning school feeding programs. Avoiding “high in” stamps in schools can also help to change the diet of future generations, as schools, from elementary to secondary, are an excellent venue to teach about healthy food and nutrition.

Still regarding efficiency and inclusion of FOPL, regulatory complexity can generate difficulties and costs for small producers to

enter the market or even keep a specific niche market, with the possible effect of further reducing their production and causing further volume concentration on large companies. For example, small producers of traditional foods from their region, such as jams and cheeses, which are usually high in sugar, fat, and sodium, can face difficulties applying FOPL. There is a risk of losing traditional and historically consumed foods, representing a cultural loss. The possibility of cultural loss should be considered and additional terms to include these producers should be granted in the FOPL law, as happened in Chile and Brazil.

6 Implications in the design of public policies

Through a comparative analysis of the three regulations, considering the devices and mechanisms for the thresholds on food nutrients, marketing restrictions, and timeframe for compliance with the rules, it was possible to observe that Mexico presented slightly more restrictive law than Chile and much more restrictive law than Brazil. Mexico has chosen more restrictive critical nutrient thresholds, leading to a higher percentage of products in the shelves affected by the new regulation.

In addition, Chile and Mexico have included restrictions on marketing, especially regarding marketing aimed at children and sales of products with FOPL to schools. Finally, Mexico and Chile have chosen a longer implementation schedule, as the process was carried out in three longer phases, while in Brazil only in a single shorter phase. There is no single model that fits all countries. Although the responsibility for promulgating standards falls on regulatory agencies, the establishment of stakeholder participation mechanisms generated commitment from the parties to the outcome of the process.

In addition to the results of the objective analysis, the main goal in this paper was to discuss meso-institutions that are shaping arenas for policymaking, starting from the understanding that laws established at the macro-level are not spontaneously implemented. On that field, four main highlights emerge.

First, meso-institutions that shape the legislature as well as regulatory agencies activities can either encourage or restrict stakeholder participation in policymaking. In the visited cases of Brazil, Chile and Mexico, the participation of organizations representing food industry and consumers was allowed by regulations of legislative and regulatory bodies. Stakeholder participation increases the likelihood of determinations imposed by the regulatory body being feasible and meaningful to end users. The absence or poor representation of important segments in the decision-making process may challenge inclusiveness and trust in regulatory decisions (Ménard et al., 2018). Technocratic decision processes would likely result in high adaptation costs for providers and, for most consumers, difficulties in understanding mandatory standards. This situation refers to Ostrom's criticism (Carey et al., 2016), when the rules are decided without listening to the actors or ignoring the adaptation and learning mechanisms.

On one hand, the effectiveness of signaling systems depends on the consumer being able to interpret the signs and extract the consequences of the information content, as well as on monitoring and enforcement mechanisms. On the other hand, signaling should not impose high adaptation costs on the production chain. Holding public hearings in

which representatives of interested organizations, experts, and ordinary individuals spoke created a space for organized debate, which reverberated in the media and increased interest in food quality.

Second, the discussion of mandatory labelling can be interpreted as a struggle to define proper rights for the food industry and the consumer. It is a mistake to understand the food industry as a monolithic entity, just like the consumer, which exhibits different lifestyles and perceptions. In order for information gaps to be mitigated, however, it is necessary to arbitrate the interests of different segments of food supply chain. This function can be performed more or less efficiently, depending on the meso-institutions that regulate the functioning of the legislative power and regulatory agencies. Good meso-institutions are essential for the effectiveness of the law (Ménard et al., 2020).

Third, the political arena is not the only one in which stakeholders dialogue. Specific rules result from the interaction of different interests in different arenas, such as the legislature, regulatory agencies, the scientific community, as well as the media and public opinion. Achieving a prominent position in one or more arenas can influence regulation enacted by government agencies. In democracies such as those visited in the case studies, the state tends to bow to hegemonic positions in civil society. In turn, the agencies, without giving up the main function of standardization, can take on the advocacy of healthy eating.

Finally, institutions that encourage stakeholder participation increase the probability of obtaining specific rules accepted by consensus. Although there are ex ante transaction costs involved in the interaction among actors for building and establishing thresholds for FOPL, costs associated to building and running meso-institutions, when there is consensus among actors, lower monitoring and enforcement costs ex post are expected. Consensus here does not mean that all stakeholders fully support the regulation, but that the regulation is minimally acceptable to all parties. Parties must understand the new regulation as an advancement or improvement over the *status quo*.

7 Conclusion

The comparison between the cases of FOPL adoption with regard to the process of development of norms, as well as the product of this process, has shown that in the three countries – Chile, Mexico, and Brazil – the regulatory agencies instituted mechanisms for the participation of stakeholders.

Different points of view were expressed throughout the debate, including divergences between government bodies aimed at different policy objectives. Associations of consumers and health professionals defended stricter limits and stronger symbols, while the food industry defended communication that is more neutral and the gradual implementation of the new standards. The dialogue took place in different arenas, including mass media and social media. The coordination of the stakeholders' engagement highlighted the important role of institutions at the intermediate level in order to have a feasible and acceptable regulation.

As a result of the dialogue process specific to each country, the norms differed in terms of sodium, fat, and sugar content thresholds, as well as in terms of visual communication instruments (Chile and Mexico more restrictive; Brazil more tolerant).

In the three countries studied, the general objectives of the healthy eating policy as means of preventing metabolic diseases were translated into different sets of practical rules and mandatory procedures for agents in the agrifood chains. Although none of the interest groups involved had their positions fully accepted, the new regulations were generally perceived as advancements compared to the status quo.

The present study sought to understand how the processes of selection and implementation of FOPL were regulated, a process that is mediated by the so-called meso-institutions. Among the limitations of the study, the lack of statistical validation stands out, since the number and type of interviews was insufficient for that, as well as the lack of indicators of the effectiveness of the policies adopted in the three countries targeted in the article. At the same time, these limitations open up opportunities for future research. Will different FOPL systems affect public health differently?

Finally, meso-institutions can be involved in the food system governance. For example, in the context of regulatory supervision on product compliance, meso-institutions come into play when consumer organizations report irregularities and demand action from the regulatory agencies. Complexities such as conflicts of interest and resource constraints, however, shape the effectiveness of meso-institutions involvement. Future studies should look deeper into understanding these dynamics to improve food system governance and promote food security, sustainability and public health.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical approval was not required for the studies involving humans because according to 'Resolution No. 510/2016 of the Brazilian Health Council.' The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants' legal guardians/next of kin in accordance with the national legislation and institutional requirements because: Article 1: This Resolution establishes the regulations applicable to research in Human and Social Sciences, where methodological procedures involve the use of data obtained directly from participants or identifiable information, or may pose greater

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risks than those encountered in everyday life, as defined in this Resolution. Sole paragraph: The following research will not be registered or assessed by the CEP/CONEP system: VII – Research aimed at theoretical exploration of situations that spontaneously and contingently arise in professional practice, provided they do not disclose data that can identify the subject.

Author contributions

FG: Conceptualization, Data curation, Writing – original draft, Writing – review & editing. MV: Methodology, Writing – review & editing, Writing – original draft. RN: Validation, Writing – review & editing, Writing – original draft. VS: Conceptualization, Funding acquisition, Methodology, Project administration, Writing – original draft, Writing – review & editing, Supervision.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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