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Obesity and Public Health in Mexico: Transforming the Hegemonic Food Supply and Demand Pattern

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Abstract

Excess weight and obesity are a major public health problem affecting Mexico's economic development. Studying them from a medical or epidemiological approach has proved insufficient, given the size of the problem and myriad factors underlying it. It is therefore time to bring an economic perspective into the analysis to find the structural causes, looking at the ways food is eaten, which shape the hegemonic supply and demand patterns imposed by the globalization of the markets, infringing on local patterns. The empirical evidence shows that the shift from a traditional diet to an industrialized diet with high sugar content and refined flours has fueled the prevalence of this public health problem.

Keywords: Food consumption, supply and demand, excess weight and obesity, food industry, public health.

INTRODUCTION

The signing of the North American Free Trade Agreement (NAFTA) marked the beginning of skyrocketing excess weight and obesity in Mexico (Jacobs and Richtel, 2017), thanks to the new economic model, the changing food production and demand, as people migrated from rural areas to urban hubs, demographic growth concentrated largely in cities, and the so-called food transition. Obesity, to a greater extent, is no longer a purely sociocultural concern related to the aesthetic conservation of one's figure, but has rather become a serious health problem derived from ailments related to excess weight and the accumulation of body fat (Vigarello, 2011). Recent reports have warned of the magnitude of the problem in Mexico, given that 72.5% of the adult population is overweight (INSP, 2016).

Although excess weight and obesity do impact people, they also have consequences for economic development and human capital in countries, especially in low-income countries, ranging from productivity to the costs of treatment. Given their relevance as a public health problem, several different approaches have emerged to explain this issue. Theories spill over beyond the medical standpoint, insofar as the economy-food-health complex entails a consideration of other components of the social life to be fully understood, including the cultural or behavioral aspects, but principally the economic. Moreover, the existence of negative structural factors in development goes far beyond the medical-epidemiological viewpoint, which only deals with diagnosis, treatment, and prevention campaigns.

Economics can elucidate the causes underlying a public health problem that impacts national economic development by encroaching on the food supply and demand pattern, as it imposes, on the supply side, a consumption model that aims to respond to a pragmatic demand, which seeks to optimize time and distance by being concentrated in metropolises. This has influenced the modeling, standardization, and homogenization of the food consumption pattern, revolving around the need to reduce preparation and consumption time, but has also undermined food quality, via the addition of low-nutrition industrialized products.

The dominant food supply and demand pattern is a driver of excess weight and obesity. The advent and direction of excess weight and obesity have been shaped by the market, in addition to Mexico's demographic behavior, generating a higher risk for the adult population, given their manifestation in childhood. These trends augment the demand for medical care for such ailments as diabetes and entail new costs, mainly due to complications in coronary and cardiovascular disease.

As such, burgeoning excess weight and obesity will gradually erode the country's competitiveness and economic development potential and further weaken health sector finances if the country fails to implement corrective public policies designed to regulate the supply and its contents, as well as disseminate more information about the risks of making poor food choices.

OBESITY: A MULTIFACETED VISION

Given the size of the epidemic, its significance as a public health problem, and also its direct association to myriad degenerative chronic diseases that push up public health spending, affect labor productivity and competitiveness, and lead to more early deaths, impacting economic activity on the whole, obesity is no longer merely a medical problem, insofar as it extends to other components of the social life, like the cultural or behavior aspects, but above all, the economic.

Obesity is defined as the excess accumulation of body fat that can be harmful to health. Epidemiological studies tied to cardiovascular diseases, like hypertension or heart attacks, certain types of cancer, bladder diseases, depression, muscular-skeletal disorders, and respiratory symptoms. There are different degrees of obesity across all age groups; in individuals with excess body fat in the intra-abdominal cavity, the risk of developing it goes up significantly (OMS, 2017).

To determine the nutrition status of individuals and identity obesity-related ailments and monitor health risks, the Body Mass Index (BMI) is used, which is the result of dividing a person's weight (w) by height (h), squared: BMI = w/h2. To the extent that BMI does not depend on gender or age, it is a useful measure to determine the prevalence of obesity. If BMI is less than 18.5, the person is considered underweight; normal weight is in the 18.5 to 24.9 range; and higher than 30 is obese. Although the standardization of these thresholds enables individual evaluations, the risk that the population will suffer from heart disease, strokes, and diabetes rises starting at a BMI of 21, as well as if the waist circumference in men and women is greater than 102 and 88 cm, respectively (OMS, 2017).

Excess body weight is a gradual process that tends to begin in childhood and adolescence, beginning with an imbalance between ingestion and energy used, determined by genetic and environmental factors that lead to a metabolic disorder, and, subsequently, the excess accumulation of fat beyond expected values for gender, height, and age. These factors interact with individual genetics, that is to say, the incidence rates cannot be correlated with differences across individuals solely. Likewise, genetic differences across individuals do not drive the likelihood of developing obesity (Soto and Lagos, 2009).

Based on the foregoing, we posit that obesity is rather the result of unhealthy lifestyles, combining poor diet, sedentarism, and physical inactivity (Moreno *et al.,* 2014). Other assertions refer to economic, demographic, and social changes as the cause, comprising the ecosocial model used to analyze the set of internal causes produced in the biology of individuals, shaped by economic, social, and cultural influences (Krieger, 2001; Rivera *et al.,* 2012).

A complex systems approach has also been posited to study obesity, analyzing the way in which individual and contextual factors link up, and how this interaction gives rise to properties that cannot be explained merely through the habitual procedures of epidemiological analysis, or within the ecosocial model. Thus, the problem of obesity is a dynamic phenomenon that needs to be tackled from a holistic standpoint to overcome the risk factors of the health to disease spectrum and the direct influence of the socioeconomic and cultural environment (Muñoz, 2017).

Beyond the perspectives related to epidemiological, behavioral, and socioeconomic aspects, or the dynamics of complex systems, another striking approach grants to the environment an overwhelming role in the proliferation of obesity. The built and food environments comprise the obesogenic environment conducive to the emergence of body fat accumulation patterns. The basis is that the biological information of each individual is subject to environmental conditions, from gestation and throughout the entire life. This environment is shaped by state, industrial, and sociocultural dimensions (Martínez, 2017).

Another approach concludes that the problem of obesity is the outcome of accelerated changes in food demand, driven by genetic susceptibility, but also by changing lifestyles, culture, social organization, and economic development. The transformation of demand obeys the fact that the international supply does not face market constraints; although the changes are functional, to a greater degree in urbanized societies, gradually, they start to also be in rural zones, as the predominance of single-crop farming oriented toward industrial supply has broken the self-consumption and regional self-supply strategies that existed before in rural populations, making them reliant on the global food supply. In addition to that, economic crises generate cyclical price increases, which are not offset with direct income or via social welfare programs; accordingly, the population, frequently poor, chooses the cheapest foods, leading to an imbalanced diet, and impacting their health, due to their low quality.

THE ECONOMIC EXPLANATION

The tapestry of the economy, diet, and health could explain how the causes of excess weight and obesity are multi-factor and go beyond just a socioeconomic, cultural, or medical approach. The medical approach covers etiological research, diagnosis, and treatment of obesity in its manifestation as an illness in the biological realm of the individual, whether due to genetic origin, behavior (diet), or eating habits, which comprise a dynamic socioeconomic environment. That is to say, this approach may tackle the consequences of the dietary decisions consumers make, but it cannot explain the structural causes driving them, among others, the composition of the supply, the evolution of demand, or rules and regulations on food quality (IMCO staff, 2015).

The economic approach aims to explain the structural causes underlying a public health problem that has an impact on economic development, by looking at the way food is eaten as part of a larger hegemonic supply and demand pattern embedded in the globalization of markets that encroach on local dietary patterns. This hegemonic pattern imposes, on the supply side, a consumption model that is meant to respond to more pragmatic demand inherent to the dynamics of open markets.

A point of departure to understand how consumption works and consumer attitudes toward food begins with the premise that both human labor and consumption are a vital part of any society in its production process. In contemporary societies, income is a reflection of progress, which is bound up in the degree to which various types of commodities are consumed, although food is one of the most important.

The twentieth century bore witness to the emergence of diverse theories underscoring the role of consumption and income in the economy. Keynes (2003) sparked interest in analyzing investment and consumption. According to this author, when investment rises so too does labor, driving up consumption, which is reflected in a greater desire to invest

and which leads to a virtuous cycle. By the end of the nineteen-thirties, Keynes had turned the consumption function and the interest rate into two of the essential building blocks of the income-spending approach, which serves to determine national income and social development.

In particular, the consumption function says that when income rises, the consumer tends to spend one percentage point less of the total amount; on the contrary, the consumer is inclined to save one percentage more. Keynes explained this as short-term consumer spending behavior, considering that when income falls with respect to recent levels, people protect their consumption levels by not reducing its volume proportionately to the amount of income decline and, on the contrary, when income increases, consumption does not increase proportionately. This is a driver that prevents food conditions from being homogeneous, as is the case in Mexico, where the changing dietary pattern is evolving on the side of adopting strategies that change consumption pursuant to the oscillating prices of products and the type of supply, designed based on pragmatism in demand.

Other noteworthy theorists who have studied the consumption and income function are Ando and Modigliani (1963), the brains behind the hypothesis of the consumption life cycle. According to these authors, individual enjoys a flow of income that is relatively low at the beginning and end of their lives, when productivity is initially low, and high during mid-life. This hypothesis leads to the inference that the transformations in food consumption patterns obey income oscillations, in which prolonged and unchanging cycles in the wealth distribution structure permanently impair nutrition.

There are technical procedures available to measure consumption behavior in broad strokes and group it into categories. The most widespread is Engel's curve, which explains oscillations in food consumption as a function of employment and income. This curve shows the baskets of goods demanded by different income levels, in which consumers increase their spending on food to a lesser degree than their income rises.

Such approaches are of vital importance to understanding how individuals, even though other factors like culture, territory, and advertising play a role, rely on their income as a central aspect when it comes to defining and consolidating their food demand, in light of the constraints of the prevailing supply. Dietary patterns are made up of the set of products that an individual, family, or local community considers necessary to satisfy its needs at a given time in history, also known as the habitual diet, given the frequency with which each product is consumed depending on its availability. Although dynamic over time, its transformation derives from changes in cultural customs, the territorial availability of products, individual preferences, and the push of the market, with the agri-food productive structure, its sourcing, and access capabilities balanced on the fulcrum of income.

One constant in the food consumption pattern in each nation was that until the mid-twentieth century, it evolved and was opened to external influences. For centuries, the exchange of products across cultures served to enrich the nutritional value of food, diversify the diet, improve flavors, and even the way dishes are presented. Over the past three decades, however, the dietary pattern changed as a result of trade liberalization, the globalization of markets, and the dominance of the food industry, but above all, thanks to technological innovations that enabled the incorporation of instruments to ease and speed up food preparation, as well as improved packaging and conservation prolonging its shelf life in both stores and households.

Thus, the dietary pattern has been industrialized, homogenized, and standardized across the globe, driven by demand toward a more pragmatic diet that includes semi-processed and industrialized products and responds to changes in labor market conditions, the incorporation of women into the workforce (both formal and informal), leaving some traditional household chores uncovered, like cooking, and leading to the need to optimize time and distance, because the population is now centered in cities, but mainly to reducing food prep time and post-consumption activities (Torres, 2003).

Most industrialized products gain immediate acceptance among consumers, which has rapidly changed the traditional food supply-demand pattern. This did not mean strictly greater diversification of products or better food quality, but rather the adoption of new inputs, habits, packaging, and supply methods through better organized distribution channels that responded to changes in lifestyles belonging to the urban sphere. With that came the presence of products easy to prepare, which changed the cultural environment for the consumer, as this pattern emerging in the cities put pressure on the advent of a homogenous supply fostered by the food industry, which requires new technological competencies at companies and blurs the food heterogeneity characteristic of cultural diversity.

From the productive standpoint, the result has been the shift from a supply-driven model in which producers could define, pursuant to their own interests, the consumption structure in cities, to a demand-driven model in which diverse consumer segments oblige companies to meet their specific needs, which have very little relation to the natural product, but rather to transforming it and adding value, and where distribution fuels permanent changes in the hegemonic food supply-demand pattern (Torres, 2010). The domestic supply of processed foods expands to the extent that the dynamics of open markets become more rapidly and effectively connected.

The foregoing is possible thanks to the forces of globalization and the expansive evolution of international food distribution companies, like Walmart, who do not face seasonal supply constraints, because they are plugged in to markets all around the world to guarantee a regular supply of any product. This explains the unlimited growth in the number of self-service stores, beyond real local demand, the development of new sales technologies, the design of organizational strategies, the absorption of local firms by international chains, and their unlimited progress at practically every scale of cities. One additional aspect in this configuration is the massive advertising, creating new and superfluous consumption needs, in a context of competition among companies tied to the food sector (Torres, 2010).

The way in which the food industry now shapes food and beverage production, distribution, and advertising changes food habits, shifting toward the overconsumption of high-calorie industrialized products and additive replacing original products, in response to current lifestyles at the cost of impoverishing food quality and generating consumption patterns differentiated by income level.

Although the high- and low-income strata are facing a food supply predicated on industrialized products, the former can assimilate into their diet more, better quality, and higher prices, while the latter not only sacrifice quantity, but also the quality of the food they eat. In any event, the hegemony of the supply and demand pattern permeates into every corner of the social structure, beyond its role in spending, via industrialized products and bottled beverages, which, alongside the base diet, high in carbohydrates, helps fuel a widespread deterioration in food quality.

Consequently, at high income strata, there are ailments like excess weight and obesity associated with an imbalanced and costly diet. Likewise, these ailments appear in the lower income levels, in addition to undernutrition due to deficient diets, characterized by an excess of fatty foods, refined sugars, and low-fiber foods, the advent of industrialized foods and beverages, low cost, high calorie density, and poor quality, replacing a traditional diet based on grains, cereals, and legumes. Both the lack of and overconsumption of food and the imbalance in the intake of macro and micronutrients have repercussions for what is nowadays known as the double burden of malnutrition (Cepal and WFP, 2017).

Thus, any analysis from an economic standpoint about the structural and multi-faceted causes underlying obesity is important at present. Global statistics have shown that the magnitude of obesity continues to rise; the prevalence of excess weight and obesity is higher in medium-high income countries, but there are also high levels found in medium- and low-income countries. Changing lifestyles over the past decades, but above all, the Americanization of customs and the diet, have shaped environments that are increasingly obesogenic, and whose negative health effects are evident (Dávila, 2015; Moreno *et al.,* 2014).

According to the United Nations Children's Fund (UNICEF), obesity has practically tripled throughout the world. In 2016, over 1.9 billion adults 18 years and older were overweight; of them over 650 million were obese; 41 million children under the age of five were overweight or obese; and 340 million children and teenagers (ages 5 to 19 years) were overweight or obese (UNICEF, 2017).

In addition to the above, one recent study that collected data on 130 million people found that globally, the number of obese children and teens has grown tenfold over the past four decades. The research concluded that global childhood and teenage obesity rates have risen from less than 1% (5 million girls and 6 million boys) in 1975 to nearly 6% in girls (50 million) and nearly 8% in boys (74 million), as of 2016. That is to say, the number of obese individuals in that range went from 11 million in 1975 to 124 million in 2016. Moreover, 213 million children and teens are overweight, which is the prelude to obesity (NCD-RisC, 2017).

In Mexico, the prevalence of obesity has been on an unprecedented rise over the past three decades. Mexico and the United States, for years now, have been in the top spots when it comes to the global ranking of adult obesity (30%), ten times higher than the rate in Japan and South Korea (4%). At present, Mexico is ranked first in childhood obesity and second in adult obesity (seven of every ten adults is overweight or obese); the problem is found not only during childhood and adolescence, but even as early as the preschool age (SSA, 2013; UNICEF, 2017).

Thus, at play in the reproduction of obesity are multiple factors that have spurred changing lifestyles, but above all, shifts in the diet. These changes have led to sedentary, automated lifestyles with fewer chances to engage in physical activity, which, together with what has come to be known as the food transition, could explain the rise in excess weight and obesity, alongside the spread of chronic-degenerative diseases. It is therefore important to analyze the structure of the food supply and demand, beginning with the encroachment on the traditional dietary pattern, and how this can explain the structural causes underlying this public health problem which inhibits economic development.

CHANGES IN THE SUPPLY AND DEMAND PATTERN AS A TRIGGER FOR EXCESS WEIGHT AND OBESITY IN MEXICO

There is consensus in the specialized literature as to the notion that the rise in obesity is bound up in the food conditions facing the population, which affects its health structure. In Mexico, the transformation and impoverishment of the diet in this third millennium are related to the changing economic development model, which began to shift in the nineteen-eighties.

The 1982 crisis detonated an unpayable debt, which led to the reorientation of economic policy and the implementation of a macroeconomic stabilization and structural adjustment policy, under a new open economy development model. In conjunction with that, trade liberalization commenced, and rule for foreign investment and domestic regulations were considerably loosened. The government also launched a program to privatize public enterprises and redefine the duties and reach of the State in the economy, its responsibilities, and the nature of its role as interventionist; moreover, the market was placed front and center as the means to allocate resources in the country, with the vast majority of assets being privatized, and economic growth in the country coming to rely on foreign investment and international trade (Moreno *et al.,* 2014).

As a result of this open-economy model, over the past three decades, domestic imbalances have been exacerbated and significant economic and social gaps have widened, impacting what the population is consuming. Furthermore, economic stagnation and recurring economic crises have concentrated income in the hands of the few, undermined employment, worsened social lags, and made food security worse in terms of access to food.

The change in strategy affected food consumption trends in the country, as the food supply and demand patterns became homogenized and standardized around the world in the context of globalization, leading to the consolidation of a national hegemonic supply and demand pattern with an increasingly lower shower of primary products. This was made possible thanks to an open economy model that favored the shift from development revolving around the domestic market with a significant portion of regionally-grown crops to one revolving around the international market whose comparative

advantages are above the objectives of food sovereignty, national sovereignty, nutritional security, and even more, national security.

The earlier dietary patterns in Mexico responded to local or regional factors and were defined by domestic crops in accordance with the natural resources for agriculture, fishing, and hunting, the climate and the culture, leading to a heterogeneous food and nutrition structure in territorial terms. Beginning with the Green Revolution in the nineteen-forties, the rural sector began to become homogenized and subject to the logic of food industrialization, which in turn translated into the gradual standardization of mass consumption, and the application of toxic products to food production, which only the highest-income earners can avoid eating if they pay more for products grown with clean technology, like organic food. Most organic food has some kind of certification to make sure it is grown, raised, and processed with natural methods, free from chemical additives and synthetic compounds. Nevertheless, in the rural environment, there is a sector of the population that also grows without agrochemicals and eats what they harvest themselves, but these strategies have practically disappeared as a result of globalization (Torres, 2003; Trápaga, 2002).

Lags in growing commodity foods, starting in 1965, in light of burgeoning economic growth, led to the State's decision to renounce producing the foods that the Mexican population was eating to look for the cheapest prices in the international market, but above all, artificial food dependency emerged as a result of productive specialization in goods that would obtain the most foreign currency (fruits and vegetables) to pay off the bill for the growing imports of commodities and foods that Mexicans eat most (grains, oil fruits, meat, and dairy), helping the country along the path toward a food transition that would subsequently impact the domestic production structure, the makeup of the supply, and would gradually erode local dietary patterns (Trápaga, 2002).

Mexico's food consumption pattern is extremely polarized by income level, and the future of the population in terms of nutrition can be evaluated based on this stratification. The crisis of the past three decades has led Mexican households to restrict what they eat in terms of frequency and volume, with the amount of spending allocated to food rising gradually. The food structure is shaped by a higher demand for animal-origin protein-rich foods, but also sugars, fats, oils, and highly processed products, which supplant natural sources of carbohydrates (see Table 1).

Table 1. Mexico: Composition of Current Monetary Expenditures on Food and Beverage by Product, 1992-2016 (percentage)

Current monetary expenditures on food and beverages	*1992*	*1998*	*2004*	*2010*	*2016*
Food and beverages consumed in the home	**85.7**	**88.7**	**77.7**	**79.5**	**78.0**
Grains	13.7	15.1	13.7	14.9	14.0
Meat	23.6	21.5	17.9	17.6	18.1
Fish and seafood	2.0	1.8	1.9	2.1	1.9
Milk and byproducts	10.3	11.6	10.2	9.7	8.4
Egg	3.2	3.1	2.5	2.7	2.7
Oils and fats	1.8	2.0	1.2	1.4	1.0
Tubers and similar	1.3	1.6	1.1	1.3	1.1
Vegetables, legumes, leguminous plants, and seeds	12.3	11.8	9.3	9.6	9.0
Fruit	4.2	3.8	3.2	3.4	3.6
Sugar and honey	1.3	1.5	1.0	1.0	0.9
Coffee, tea, and chocolate	1.0	1.1	0.8	0.8	0.8
Spices and condiments	0.9	0.9	0.8	0.8	0.8
Other miscellaneous foods	4.4	5.0	6.1	6.8	8.7
Alcoholic and non-alcoholic beverages	5.7	8.0	8.1	7.4	7.0
Food and beverages consumed out of the household	**14.3**	**11.3**	**22.3**	**20.5**	**22.0**
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Created by the authors based on INEGI, National Household Income and Spending Surveys (ENIGH), various years.

Thus emerges a hegemonic supply and demand pattern of poor-quality food, harmful to all sectors of the population, spurring health problems like excess weight and obesity, not to mention having a major impact on the development of

chronic and degenerative diseases. The lack of adequate information or a consumer-oriented government policy has brought the problem to such a size that excess weight and obesity are now classed as health emergencies.

DETERIORATING GOOD CONDITIONS AND THE SIZE OF THE EXCESS WEIGHT AND OBESITY PROBLEM IN MEXICO

The recurring crises ailing the Mexican economy since the nineteen-eighties ate away at the population's income, especially in the bottom three deciles. They moreover had an impact on the transforming food conditions facing Mexicans, both in terms of their openness to eating products unlike their local habits and because in open markets, deteriorating purchasing power is not a determinant restriction on accessing new supply, of which much is destined to popular consumption.

The National Household Income and Spending Surveys (ENIGH) from the years 1992-2016 reveal a nominal increase in current income, but differently in each stratus. The results tend to be interpreted as better conditions for households, even though the increase has been limited to just the top three strata. Purchasing power on the whole has waned due to the effect of inflation. As such, the income differential in the top deciles reflects spiraling social inequality.

Income concentration, measured by the Gini coefficient, began to rise starting in 1994 as a function of total current income. It ranged between 0.470 in 1992 to 0.455 in 2004, and, finally, 0.448 in 2016. The figures on distribution by stratum indicate that during the aforementioned period, the share of the poorest 80% of Mexican households in total income went from 46.3% to 48.2%, which matches up with the reduced share for the top decile, from 37.7% to 36.3%. In spite of that, the trend by which a small group of families appropriates much of the wealth generated has persisted over time. In 2016, the top earners concentrated 36.3%, while the lowest earners had just 1.8% (see Table 2).

(SEE TABLE 2)

This means that the weight of the economic adjustment made as part of the open economy model strategy fundamentally affects the low- and medium-income earners, who saw consumption and the quality of their food drop. These changes, whose impact was not immediately felt and could not be immediately detected, tend to represent a crucial aspect when it comes to evaluating the intellectual and competitive capacity of an entire generation. Nevertheless, the lowest earners developed at least two strategies to deal with the relative loss of income: more intensive use of the labor force by increasing the work day for the head of household or having other members working in the informal economy; and making changes to the family structure of spending on basic and non-basic goods, even if it did not manage to reverse decelerating consumption.

Looking at a comparative structure of family spending on the different categories comprising it, food is the number one and most important thing on which families are spending money. In 1992, spending on food accounted for 35.6% of total expenditures, above transportation, at 16.2%, housing, at 7.8%, and health, at 3.5%. Despite being the number one category, food has experienced a marginal decline over its historical share. In 1992, food represented 35.6% of total monetary expenditures, which fell to 35.2% by 2016 (see Table 3).

The differences in individual income level and by social strata result in the emergence of diverse dietary patterns, with different value compositions. As such, family spending with respect to the segmented income structure necessary leads to another school of interpretation.

In the food economy, there is an assumption that to the extent that family income rises, spending on food decreases, or rather, is more diversified, aggregated, and sophisticated. The problem is when there is an imbalance in income that affects the base of the social pyramid in greater proportion, which induces the phenomenon of localized hunger and undernutrition in widespread groups, not to mention atypical distortions in the dietary pattern.

In a market economy, more than just open markets, income does not adhere to a balanced social allocation, as its objective, based on competition between economic agents, is not equity, but rather the rationality of market laws. This premise leads to a narrowing of the apex of the social pyramid, where a small group is ensured better quality food without impact on their spending; at the same time, it breathes life into certain categories of the supply. In another sense, the base of the pyramid is maintained in a latent state of underconsumption, although it is in any event reactive to other categories in the same base. At the same time, spending is redirected in order to offset falling individual and family income. Priority scales are established, some goods and services are sacrificed, and others are replaced, or their customary level of consumption declines.

Table 3. Mexico: Composition of Total Monetary Spending, 1992-2016 (percentage)

Category/Year	*1992*	*1998*	*2004*	*2010*	*2016*
Food, beverage, and tobacco	35.6	31.5	34.0	32.7	35.2
Clothing and footwear	7.8	5.6	5.4	5.6	4.6
Housing, electrical power, and fuel	7.8	9.0	8.5	9.3	9.5
Cleaning, domestic items, and furniture	8.4	6.6	6.0	6.2	5.9
Health and medical services	3.5	3.3	3.6	2.7	2.7
Transportation	16.2	18.3	18.0	18.6	19.3
Education and leisure	13.1	14.7	13.9	13.6	12.4
Personal care, transfers, and ore	7.7	11.1	10.6	11.4	10.3
Total	100.0	100.0	100.0	100.0	100.0

Fuente: elaboración propia a partir de INEGI, Encuestas Nacionales de Ingresos y Gastos de los Hogares (ENIGH), varios años.

As such, insofar as we analyze the evolution of the different strata in spending, there are consumption asymmetries. The polarized structure of spending on food is more significant in specific higher-priced or higher-added value products, given difficulties to access them for the lower-income sectors. Such is the case of fruit, meat, fish and seafood, and dairy and its byproducts. Nevertheless, inequality is best expressed in the line item of food and beverages consumed outside the household. The ample supply called fast food facilitates, at present, eating out of the home; in Mexico, more than 70% of the population lives in cities, although there may be different implications and conditions they face depending in income strata and nutrition level. Among the employed population in the lowest strata, it is common to bring homemade food to work. Thus emerges a flexible type of supply, like sliced bread, cold cuts, condiments, or dehydrated food, like powder soups, avoiding eating in fixed places, although there is still an impact on spending.

In this category, the proportion of spending in the highest-earning group during the time period was six times higher than the lowest-earners. In fact, the top four deciles of highest earners concentrate over 70% of spending in this category. This is related to both the bait of eating out and the places and circuits where the highest earners go out to eat (restaurants, cafeterias, fast food joints, etc.). As such, there is clearly a trend to eat out, which is directly tied to new consumption patterns underpinned by the idea of modernity and pragmatism.

Groups classed as “medium” and “medium high" earners (deciles IV to VIII) confronted the situation relatively better, keeping their proportion of spending constant. From there emerges the hypothesis that the strata that reduce their proportion of spending tend to displace or supplant certain products in their diet, without this necessarily entailing underconsumption. Rather, It may only mean that the temporarily or permanently eliminate higher-value or higher-quality products.

Undoubtedly, the highest-earning households do not suffer from the crisis as much, by keeping their spending growth in this category constant; as the trend is toward marked diversification by virtue of the oscillations in the supply or the trends in food information, even though it is where external influences have the greatest weight. By contrast, the poorest groups are not only on the underconsumption line, in terms of quantity, but also sacrifice quality in light of the diversification they were obliged into with the crisis and falling purchasing power. It is for this reason that they displayed a nutritional imbalance as a result of overeating sugars, through bottled beverages, refined sugars in hamburgers and pizza, but also because their consumption of traditional products (like tamales, tacos, and fried items) was affected by impaired quality of the inputs used to make them, among other reasons.

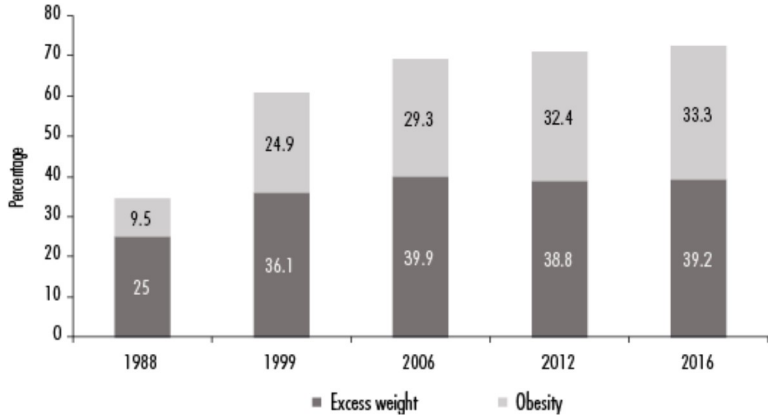
Because the three highest income strata also prove to be in all of the survey periods the most dynamic in terms of their spending, we could also deduce the prevalence of irrational management, with a high amount of food wasted, and a less balanced diet. The lower income groups, on the other hand, in all periods, but especially during crises, see their nutritional situation affected. As such, crises induce the homogenization of the food and nutritional conditions broken only, in social terms, due to changes in the supply structure.

Moreover, the distribution of spending does not have the same effect by social stratum within an extremely concentrated income structure. Several groups in the lower income strata end up spending up to 80% of their income to buy food; even so, they are far from desirable nutrition, which can even be unstable or affected by the ups and downs of macroeconomic variables, not reflected in individual income levels, and which do not permit them to capitalize on the flexibility of the supply of distribution companies in open economies. This latter situation has a perverse effect, boosting junk food, which has a negative impact on nutrition and the income of the poorest, without any regulation or oversight from official bodies.

All of the above in Mexico has led excess weight and obesity to grow disproportionately starting in the nineteen-nineties, coinciding with trade liberalization and embedded in the hegemonic food supply and demand pattern, moreover affecting all age groups. Childhood obesity has taken off alarmingly in recent years, with the problem extending to the teenagers and preschoolers, too. At present, one in three adolescents age 12 to 19 years is overweight or obese; in the preschool age population, the combined prevalence rose to an average of 26% in both sexes, representing 4.1 million preschoolers living with this condition.

The problem is even more severe if we look at the burden attributable to adults alone over time. Between 198 and 2016, the combined prevalence of excess weight and obesity in adults practically doubled, from 34.5% to 72.5%, although the biggest jump happened in the nineteen-nineties. However, the dynamic was different for the two factors: excess weight grew 57$, going from a prevalence of 25% to 39.9% during the time period; obesity skyrocketed 251% if we look at the change of prevalence from 9.5% at the beginning of the period to 33.3% by the end (see Figure 1).

Figure 1. Mexico: Prevalence of Excess Weight and Obesity in People Aged 20 Years or Older, 1988-2016



Source: Created by the authors based on ENSANUT, various years.

The consequences of excess weight and obesity are diverse chronic or degenerative diseases that undermine Mexico's economic activity du to premature deaths and low productivity. Likewise, they have a significant impact on the Health System, as a good deal of resources need to be allocated to medical care, lowering the income of the sick, and affecting the household income-spending ratio. Between the years 2000 and 2015, the number of total deaths per disease related to excess weight and obesity grew faster; deaths from cancer, osteoarthritis, cardiovascular problems, and diabetes mellitus grew 34.4, 39, 70, and 111.3%, respectively (see Table 4). Nevertheless, the increased mortality in diabetes mellitus and hypertension was striking; the former rate went from 46.1% to 82.6%, while the second changed from 9.7% to 21.4% in the time period (SSA, 2015).

As a result, in 2013, the National Strategy for the Prevention and Control of Excess Weight, Obesity, and Diabetes (SSA, 2013) was launched, but the results have been less than satisfactory to the extent that rather than bringing down the prevalence of excess weight and diabetes, their prevalence rose, as did the number of patients with chronic and degenerative diseases.

Table 4. Mexico: Total Deaths by Disease Attributable to Excess Weight and Obesity, 2000-2015 (people and percentage)

Indicator/Year	*2000*	*2005*	*2010*	*2015*	*TC Period (%)*
Cancers*	7,047	7,834	8,581	9,468	34.4
Osteoarthritis	118	161	152	164	39.0
Cardiovascular disease	55,684	65,116	83,074	94,639	70.0
Diabetes mellitus	46,614	67,159	82,964	98,492	111.3

* Includes esophageal, breast, pancreatic, cervical, colon, and rectal cancer.

Source: Created by the authors based on SSA (2015).

At present, Mexico is dealing with a public health crisis caused by excess weight and obesity, whose social cost is only rising. It is estimated that in 2017, the health costs generated by diseases associated with excess weight would rise 150 billion pesos, of which treatment of diabetes alone would range between 80 and 100 billion pesos, which would be equivalent to between 70% and 90% of programmable health spending (IMCO Staff, 2015; SSA, 2015). As such, the magnitude, frequency, and rate of growth of excess weight and obesity represent a health emergency that is currently jeopardizing Mexico's economic development.

CONCLUSIONS

At present in Mexico, excess weight and obesity represent a public health problem, given their prevalence, consequences, and relationship to the principle causes of mortality. In this scenario, substantial changes are required in health policies and social and economic structures, principally where food production and consumption are concerned, as the new supply and demand pattern is tied to the rise in chronic degenerative diseases, as is the case with obesity.

Nutrition is essential to human development; but the Mexican diet in the twenty-first century is very different than it was in the twentieth. It is has become clear that the shift from a traditional diet based on grains, cereals, and legumes to a diet of fast and industrialized food based on refined flours and sugary beverages, driven by the food industry, are factors that predispose people to obesity, in addition to the increasingly common sedentary lifestyle.

Epidemiological studies, the use of indicators like the BMI, and measuring the waist circumference, are all strategies to clinically detect the ailment, in order to appropriately classify the disease and risk associated with it, to develop prevention or management measures for both obesity and related diseases, especially in genetically susceptible populations. But they are not enough, in the sense that it is imperative to devise and coordinate holistic multi-sector strategies that tackle the problem emanating from excess weight and obesity, that deal with forms of production and ways in which food is eaten, as well as the dearth of a regulatory framework to guarantee quality standards for products that have become part of the national dietary pattern.

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