The living wage in Mexico's car manufacturing industry: the case of BMW in San Luis Potosí

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Abstract

This research employed the Anker and Anker (2017) methodology to measure the living wage and assess the socioeconomic reproduction capacity of workers at the lowest wage level. This measurement compares the contractual wage with the minimum wage, the extreme urban poverty and the urban poverty wage and calculates the percentage increase needed to come close to a living wage. The results reveal that the contractual wage is 47% above the minimum wage, 48% above the extreme urban poverty wage, but 4% below the urban poverty wage. And it is significantly below the living wage, with a deficit of 49%.

Keywords: living wage; motor vehicle manufacturing; San Luis Potosí; Mexico; wage policy.

1. INTRODUCTION

Given its relevance in generating employment, the concept of a living wage in the motor vehicle manufacturing industry emerges as a critical area of interest. According to the International Organization of Motor Vehicle Manufacturers (OICA) (2022), Mexico has experienced a substantial increase in the generation of employment in this industry compared to the North American region, rising from 22% in 2001 to 32% in 2021. Understanding the living wage is key to improving working conditions under the new trade agreement and to counteract the precariousness of wages in recent years.

Specialized literature consistently identifies Mexico as a country with significantly lower labor costs than other economies. For example, a Stanford study (2010) ranks it as having the lowest labor costs among 18 countries analyzed. However, as Hernández (2018) argues, this comparative advantage has experienced inevitable tensions since 2008, when the global motor vehicle crisis led firms to seek cost-cutting strategies, including lower wages.

More recent research (such as that by Rodríguez-Abreu and Sánchez-Peña, 2017) has demonstrated the wage gap in the motor vehicle manufacturing industry. In 2016, a Mexican worker earned an average of USD$3.14 per hour, while their counterparts in the United States and Canada earned an average of USD$28.60 and USD$26.34, respectively. These findings highlight the need for a deeper analysis of wage dynamics in the sector and their impact on the working conditions of the workforce.

Meanwhile, Covarrubias (2019) argues that wages have experienced remarkable stagnation over the decades. According to his calculations, the daily wage has barely increased from USD$1.9 in 1994 to USD$2.3 in 2018. Similarly, Moreno-Brid *et al.* (2021) emphasize that wage levels in the automotive sector remain unsatisfactory, with a figure equivalent to less than twice the current minimum wage. These collective findings highlight the persistent problem of remuneration in the motor vehicle industry and the need to address it urgently.

In the current context of international discussions on wage regulations and union participation, wage levels are becoming unsustainable. Specifically, within the framework of the Treaty between Mexico, the United States and Canada (T-MEC), the persistence of low wages is referred to as an illegal practice (social dumping). According to the Ministry of Economy (SE) (2020), this international treaty establishes a minimum wage of USD$16 per hour based on regional content requirements in order to benefit from preferential tariffs under the agreement. In addition, the T-MEC introduces provisions aimed at ensuring the full exercise of trade union rights, promoting trade union freedom and collective bargaining. Thus, these provisions aim to strengthen labor rights in Mexico, especially in an industry that shows limited wage evolution despite being crucial from an economic point of view (Carrillo and García-Jiménez, 2019).

In the context of the labor dynamics of an industry of such importance for Mexico, there is an urgent need to address and conceptualize the living wage. This concept seeks to quantify the socio-economic reproductive capacity of workers in order to determine the amount necessary to meet their basic needs and guarantee a decent standard of living.

This article focuses on exploring the living wage in the motor vehicle manufacturing industry, specifically in the BMW plant in San Luis Potosí, Mexico, using the methodology proposed by Anker and Anker (2017).[1] This methodology assesses the socioeconomic reproductive capacity of workers at the first wage level (according to their collective contract). By comparing the living wage with the contractual wage, the minimum wage, and the income associated with extreme urban poverty and urban poverty, the necessary wage adjustment is determined in order to achieve a better level of economic welfare for the sector's working population.

The study is divided into four sections: it begins with an overview of the living wage concept and its application in the Mexican motor vehicle industry. Next, the methodology used is detailed, specifying the values and indicators considered. The results obtained are then presented and discussed. Finally, conclusions and suggestions for wage policy are given.

2. LIVING WAGE IN THE MEXICAN MOTOR VEHICLE INDUSTRY

The concept of a living wage has been the subject of various definitions and methodologies, focusing on determining the adequate cost of living for workers and their families. According to Anker (2006), it involves identifying a wage threshold that allows for a decent standard of living. Its calculation is based on the income of a standard workweek, avoiding dependency on overtime and servitude-like situations (Guzi *et al.*, 2022). Historically, this concept has been widely debated in industrialized countries during the last century (Anker, 2011; Figart, 2004; Stabile, 2008). In Anglo-Saxon literature, it is known as the living wage, while in Spanish, it is known as "salario digno" (Anker and Anker, 2017).

Glickman (1997) defines it as an income that ensures self-respect, family dignity, and civic participation. Richards *et al.* (2008) argue that it should provide economic security and prevent poverty. Meanwhile, King and Waldegrave (2012) define it as essential to cover basic needs. Glasmeier (2022) sees it as a tool to meet family needs and promote financial independence.

The Global Living Wage Coalition (GLWC) (2023) defines the living wage as compensation for a standard workweek that ensures a decent standard of living for the worker and their family. Anker and Anker's (2017) proposal is widely accepted and includes food, housing, essential family expenses and a margin for emergencies, resulting in a basic but decent standard of living.

In addition, some terms are closely related to the concept of a living wage and facilitate its calculation and understanding. One of the most important is the poverty line, which Anker (2006) defines as the income required for a household to cover both a nutritious diet and other non-food needs. However, its value varies according to the national context in which it is applied.

Other relevant terms include minimum wage and subsistence wage. While the former is a legal requirement, the latter is a minimum income to cover basic needs. In contrast, the living wage, while desirable, is not mandatory and its adoption is voluntary (Guzi *et al.*, 2022).

These concepts seek to establish a wage threshold based on national and international criteria (Mateer *et al.*, 2020). Practical examples include municipal living wage regulations in the United States, where the poverty line is used as a reference for calculating living wages (ACORN, 2003).

The novelty and relevance of the living wage concept and calculation methodology have led to its application in various international contexts. In Vancouver, Canada, for example, a comprehensive measurement was conducted that included aspects such as food, clothing, housing, transportation, childcare, medical services, education, emergency funds, and other essential expenses (Richards *et al.*, 2008).

In Asia, the 2009 *Asian Floor* campaign for garment workers included elements such as the daily cost of food, health expenses, housing, clothing, childcare, transportation, fuel and education (Merk, 2009). In New Zealand, a study detailed expenses for a family (two adults and two children) considering adequate housing, food, clothing, education and social participation (King and Waldegrave, 2012). In the United States, it was based on family size, composition, and geographic location (Glasmeier, 2022).

In the Mexican context, specifically in relation to the motor vehicle manufacturing industry, the estimation of the living wage has been addressed in previous research, with the study by García-Jiménez *et al.* (2021) being one of the pioneers in this sector. Said research adopted the methodology proposed by Anker and Anker (2017), adapting it to regions with a significant presence of motor vehicle manufacturing companies, such as Aguascalientes, the State of Mexico, Puebla, San Luis Potosí and Sonora. Variables such as the cost of a model diet, housing, health, education, transportation and emergency funds were taken into consideration to determine the living wage. These values were combined and compared with the workers' contractual wages, revealing significant discrepancies between the contractual wage and the living wage.

One of the most important findings was that wage gaps were smaller in companies located in regions with a longer history in the motor vehicle manufacturing industry. In contrast, companies in areas with less time in the sector showed more significant differences. It is important to note that the detailed results of this research will not be discussed in this section as they will be addressed in section four, which serves as a point of comparison due to the use of a similar methodology.

3. METHODOLOGY OF THE LIVING WAGE

This article will explore the concept of a living wage, defined by Anker and Anker (2017, p. 270) as:

> the monthly remuneration that a worker receives for eight hours of work, which must be sufficient to guarantee a decent and dignified standard of living for their family, including food, housing, education, medical care, transportation, clothing and provisions for eventualities, among other essential needs.

The methodology used is based on standards specific to the Mexican state of San Luis Potosí, with complementary national and international indicators. Visits were made to grocery stores to determine the cost of essential products, as well as interviews[2] with operators and their families in July 2022 to understand their eating habits and other relevant aspects, ensuring a contextualized approach to regional standards.

The average household size in the state was first determined using data from INEGI's Population and Housing Census (2020) in order to calculate the living wage. The Anker methodology uses two approaches: the weighted average household size and the adjusted fertility rate. These values were then averaged in order to obtain an adjusted estimate of household size for the state in question.

Households with two to seven members were used to calculate the weighted average size. The resulting weighted average household size was 3.69. The adjusted fertility rate is obtained by applying the following formula:

> *The Adjusted Fertility Rate (TFA) is equal to the State Fertility Rate (TFR) multiplied by (1 - under-5 mortality rate in the federal state (TMR)) + 2*

The reference mortality rate is the number of infants who died before the age of 5, while the fertility rate represents the number of live births per 1,000 women. Both measures were taken from the National Population Council (CONAPO) (2020). The average household size based on the adjusted fertility rate was 3.84.

Following the above procedure, the reference household size for the calculation of the living wage (3.74) was obtained as the average between the weighted average household size (3.69) and the adjusted fertility rate (3.84). This value allows us to combine both measures and obtain a household size adjusted to the demographic characteristics of San Luis Potosí, Mexico (see Table 1).

Table 1. Calculation of adjusted family size in San Luis Potosí

Data	*2020*
A. Fertility rate of the federal state	2.09
B. Infant mortality rate before age 5	0.12
C. Adjusted fertility rate	3.84
D. Weighted average household size	3.69
Adjustment of family size ((C + D) /2)	3.74

Source: prepared by the authors based on CONAPO (2020) and INEGI (2020).

In the second step of the methodology, we proceeded to estimate the number of permanent workers in the reference household size for San Luis Potosí (3.74). To do so, we first calculated the probability that a person between the ages of 20 and 59 is a full-time worker using the formula presented in the methodology of Anker and Anker (2017):

> *Labor force participation rate for workers between 20 and 59 years old multiplied by*
> *(1 - the labor force unemployment rate for persons between 20 and 59 years old) multiplied*
> *by (1 - 0.5 multiplied by the partial employment rate for workers between 20 and 59 years old)*

The labor force participation rate for persons between 20 and 59 years old is obtained by dividing the economically active population (PEA) by the total population of persons in that age group. Meanwhile, the unemployment rate for the same group is calculated by dividing the total number of unemployed persons by the PEA. The part-time employment rate for individuals between 20 and 59 years old is calculated by dividing the part-time working population by the total working population who work between 1 and 45 hours per week. For this study, part-time workers are defined as those working between 1 and 34 hours per week, while full-time workers work between 35 and 45 hours per week. The information for these indicators was taken from the National Survey on Employment and Occupation (ENOE, 2022), corresponding to the second quarter of the same year.[3]

The probability that a person between 20 and 59 years old is a full-time worker is 0.59. Following Anker's (2017) methodology, this value is increased by 1 to obtain the number of people working in the reference household size, which results in 1.59.

In the third methodological phase, we proceeded to calculate the cost of a dietary model that was both nutritious and inexpensive. The foods in the basic food basket were selected based on the recommendations of the following sources: *1)* the list of foods indicated by the National Council for the Evaluation of Social Development Policy (CONEVAL) (2022) for urban communities, and *2)* the local dietary habits of the population of San Luis Potosí, obtained from interviews with the families of BMW workers.

The dietary model proposed by the CONEVAL (2022) for urban communities was used as a reference point in the first stage. Interviews were then conducted with workers and their families in order to develop a dietary model adapted to the eating habits of San Luis Potosi. In addition, the U.S. Department of Agriculture (USDA) (2022) database was used to determine the amount of calories, proteins, fats, and carbohydrates present in each food item included in both the dietary model adapted to local eating habits and the diet recommended by the CONEVAL (2022). This information was used to adjust the amount of grams consumed per day and to calculate the calories needed for a family.

The calculation of the number of calories required for the reference family size (3.74 members) is based on several fundamental parameters of the Anker methodology:

1) The average weight of men and women is considered according to the average height in San Luis Potosi. This information was obtained from the 2020 Census of Population and Housing.
2) The level of physical activity of the family members of people working in the motor vehicle sector is considered. The Ministry of Health, through the Mexican Official Standard (NOM-037-SSA-2012, *Diario Oficial de la Federación*, 2012, July 13), classifies physical activity as "moderate" for people working in industry due to the sedentary nature of work on production lines. Moderate activity is assumed for children living in urban communities.

Based on the above values and applying Anker's methodology, it was determined that each person in the reference household requires a total of 2,282 calories per day (see Table 2). However, since the dietary model created based on data from the CONEVAL (2022) and local eating habits provide a lower level of calories (2,130 vs. 2,282), the number of grams consumed was adjusted to obtain the calories required by each person in the reference family size according to their level of physical activity and their protein, fat and carbohydrate needs (see Table 3).

Table 2. Values considered in the calculation of a nutritional model in San Luis Potosí

Indicators	*Parameter*
Family size (persons)	3.74
Number of workers per family (persons)	1.59
Average height (cm)	163
Male (cm)	167
Female (cm)	160
Calories required according to the parameters of the Anker methodology based on height and intensity of physical activity (column E of table 3).	2 282
Calories derived from the CONEVAL information (2022) and local eating habits (column D of table 3).	2 130

Source: prepared by the authors based on the adaptation of the methodology of Anker and Anker (2017) and data from INEGI (2020).

Table 3. Adjusted healthy dietary model: grams consumed in the CONEVAL and grams adjusted to calorie requirements

Food	*Grams consumed per day based on the CONEVAL's basic food basket (2022)*	*Grams consumed per day adjusted to the required calories (2,282) according to the proportions of proteins, fats and carbohydrates necessary for the physical activity* [a]	*Calories in the CONEVAL's basic food basket (2022)*	*Calories in the basic food basket adjusted to required calories according to Anker methodology (2017)*
Column A	***Column B***	***Column C***	***Column D***	***Column E***
Corn tortilla	155	316	330	354
White rice	9	15	32	35
White noodles	6	6	22	23
Sweet bread	34	30	125	134
Potatoes	45	40	34	37
Bananas	35	30	42	45
White beans	51	30	170	182
Whole milk	204	200	1 011	1 083
Panela cheese	5	5	4	5
Chicken eggs	33	7	48	51
Pork loin	20	7	38	40
Beef	21	10	35	37
Fish (mojarra tilapia)	21	5	18	19
Lettuce	56	60	8	9
Other green vegetables	56	60	16	17
Onion	42	60	17	18
Tomatoes	63	67	11	12
Papaya	29	30	12	13
Vegetable oil	11	10	97	104
White sugar	15	13	58	63
Coffee	3	2	0	0
Total calories			2 130	2 282

Note: [a] The adjusted dietary model in San Luis Potosí followed the guidelines of NOM-037-SSA-2012 (Diario Oficial de la Federación, 2012, July 13) for dyslipidemias. According to this regulation, a healthy diet includes carbohydrates (50-70%), fats (25-35%) and proteins (13-15%). In the adjusted model, carbohydrates (52%), fats (32%) and proteins (15%) are established.

Source: prepared by the authors based on the adaptation of the methodology of Anker and Anker (2017).

The cost was estimated once the dietary model (basic food basket) was established. For this purpose, visits were made to places where BMW employees do their shopping, mainly supermarkets and convenience stores (seven in total), in order to investigate the prices of the foods selected for

the model. Based on this information, average prices were calculated and those whose coefficient of variation was less than 1 were used.[4] The estimated costs associated with the basic food basket, adjusted to the average family size in San Luis Potosi (3.74 members) and the grams consumed per day adjusted to the calories required (2,282) according to the proportions of proteins, fats and carbohydrates necessary for physical activity, are detailed in Table 4.

Table 4. Food cost per gram consumed adjusted to the required calories (2,282) in the dietary model (basic food basket)

	Food	*Grams consumed per day adjusted to the required calories (2,282) according to the proportions of proteins, fats and carbohydrates necessary for the physical activity*	*Average cost per kilo*	*Cost per gram consumed adjusted to calories required (2 282) D = (B * C) /1000*
	Column A	***Column B***	***Column C***	***Column D***
1	Corn tortilla	316	15.47	4.88
2	White rice	15	20.91	0.31
3	White noodles	6	8.77	0.05
4	Sweet bread	30	9.57	0.29
5	Potatoes	40	39.55	2.11
6	Bananas	30	23.68	1.09
7	White beans	30	29.63	0.89
8	Whole milk	200	20.11	4.02
9	Panela cheese	5	53.51	0.27
10	Chicken eggs	7	76.38	0.61
11	Pork loin	7	116.25	1.07
12	Beef	10	180.98	3.02
13	Fish (mojarra tilapia)	5	180.98	0.90
14	Lettuce	60	14.97	1.40
15	Other green vegetables	60	10.51	0.82
16	Onion	60	30.05	2.00
17	Tomatoes	67	30.85	2.27
18	Papaya	30	30.80	1.49
19	Vegetable oil	10	47.63	0.48
20	White sugar	13	28.64	0.37
21	Coffee	2	66.58	0.13
22	Total cost of the adjusted dietary model (sum of rows 1 to 21)			28.49
23	Other additional costs[a]			6.27
24	Total cost per person per day (row 22 + row 23)			34.76
25	Cost of daily family dietary pattern (reference family size (3.74)) multiplied by individual dietary pattern cost (34.76)			129.98
26	Monthly cost of dietary pattern for reference family size (cost of daily family dietary pattern (129.98) multiplied by (365/12))			3 953.76

Note: [a] The Anker (2017) methodology provides criteria for determining "other additional costs": 1) Salt and condiments (1-3%), 2% was assigned in San Luis Potosi based on observed consumption habits; 2) Food waste (3-5%), 5% was used based on observations; and 3) Food variety (10-15%), 15% was used due to the high diversity of food in the region.

Source: prepared by the authors based on the adaptation of the methodology of Anker and Anker (2017).

In the fourth phase of the methodology, we proceeded to estimate the costs associated with housing in San Luis Potosi. Various regulations and legal guidelines were considered. The cost of adequate housing was defined based on the technical specifications of social housing provided by the National Fund for Affordable Housing (FONHAPO) (2014). For this article, the characteristics of social housing are equivalent to our designation of "decent housing". The price of social interest housing was studied by means of interviews with workers living in them in order to estimate the cost. However, it was observed that most of the dwellings visited did not comply with the parameters established by the FONHAPO (2014). For this reason, it was decided to use the cost of housing as the one reported in the average rental cost in San Luis Potosí, according to the National Household Income and Expenditure Survey (ENIGH) (INEGI, 2018), which is set at MXN$2,467.

In the fifth stage of the methodology, we proceeded to calculate the costs related to health, education and transportation, i.e., those not associated with food or housing (*No Food No House*, NFNH). For this purpose, the ENIGH (INEGI, 2018) was used and adjustments were made based on direct

observations during fieldwork. The data corresponding to the third income quintile was extracted due to the fact that the operators' wages exceeded the levels of the first and second quintiles, consistent with an average wage in the Metropolitan Zone of San Luis Potosí. The procedure was as follows:

1) The percentage of health, education and transport expenditure for the third quintile was determined.
2) Expenses related to alcoholic beverages and tobacco were excluded.
3) Expenditure on food consumed in restaurants was included to take account of the fact that people often eat out because of the distance to work. For this purpose, the item "Restaurants and hotels" was divided in half, assuming that 50% of food expenditure is carried out away from home.
4) For transportation, the sections "purchase of private vehicles" and "operation of private vehicles" were used, splitting the latter in two and keeping the item "public transportation" intact, based on interviews that indicated that employees regularly use transportation provided by the company.
5) Other expenditures were added in categories such as "clothing and footwear", "furniture and household equipment", "health", "education", "communication", "recreation and culture" and "miscellaneous goods and services".

As a result, the proportion of expenditures unrelated to NFNH was determined to be 61.20%. Dividing this total by the adjusted food share yielded an adjusted NFNH/F ratio of 2.02. By multiplying this amount by the food model expenditure (MXN$3,953.77), a preliminary non-NFNH expenditure figure of MXN$8,019.67 was obtained (see Table 5).

Table 5. Estimated health, education, and transportation expenditures

Adjusted proportion of non-food and non-house expenditure (A)	*Lowest cost of dietary model (B)*	*Preliminary estimate of non-food and non-house expenditure (A X B)*			
2.028	3 953.77	8 019.67			
Expenditure items	*Preliminary estimate of non-food, non-housing expenses*	*Percentage share of expenditure X in the sum of percentages of adjusted non-food and non-household expenditure*	*Preliminary Estimated expenditure X (C x D)*	*Verification of expenditure in secondary sources*	*Difference between column F and column E*
	Column C	*Column D*	*Column E*	*Column F*	*Column G*
Health	8 019.67	0.07	575.18	1 366	970.59
Education	8 019.67	0.27	2 131.87	2 883	2 507.44
Transportation	8 019.67	0.13	1 076.56	5 050	3 063.28
			3 783.61	**9 299**	**6 541.30**
Estimated total cost of non-food and non-housing expenses (NFNH)					14 560.98

Note: all amounts are in Mexican pesos (MXN).

Source: prepared by the authors based on the adaptation of the methodology of Anker and Anker (2017).

To determine the costs associated with health, education and transport, the following procedure was used based on the methodology of Anker and Anker (2017):

1) The preliminary expenditure of MXN$ 8,019.67 (see table 5, column C) was taken and multiplied by the percentage of the expenditure of interest (61.20%).
2) Based on this calculation, the percentage of expenditure on health (0.07), education (0.27) and transportation (0.13) was determined, resulting in the proportions 0.07/61.20, 0.27/61.20, and 0.13/61.20% (column D).
3) These percentages were converted into preliminary amounts (column E), which were compared with the average ENIGH expenditure (column F).
4) The adjusted figures for health, education and transport (column G) were obtained by adding the mean between the preliminary amounts (column E) and the average ENIGH expenditure (column F).
5) The estimated total costs of non-food and non-house expenditures were compared (MXN$9,299.00 and 6,541.30; columns F and G, respectively). Following the methodology of Anker and Anker (2017), the lower of these two amounts was selected.
6) Finally, MXN$6,541.30 and 8,019.67 were added together, resulting in a total of MXN$14,560.98 for non-food and non-household expenditures.

To determine the total living wage, the costs associated with each expenditure category were combined for the reference family (3.74 members) and 1.59 full-time workers per family, following the methodology proposed by Anker and Anker (2017):

1) Food costs: the monthly cost of the dietary model was considered for the reference family size: MXN$3,954 (see row 26, Table 4).
2) Housing costs: average monthly cost according to ENIGH (INEGI, 2018): MXN$2,467.
3) Estimated total cost of non-food and non-house expenditure: MXN$14,560.98 (last row, table 5).
4) Unexpected events: An additional 5% was added to the total monthly household expenses for a basic but adequate standard of living for the reference family size: MXN$1,049 (row 4, table 6).

Table 6. Total monthly cost of living in San Luis Potosi (Mexican pesos and U.S. dollars, 2022)

Starting values	*San Luis Potosí*	
Peso to USD$ exchange rate	19.26	
Full-time working days per month	27	
Number of full-time workers for the reference family size	1.59	
Reference family size	3.74	
Number of children in the reference family size	2	
Ratio of non-food non-house costs to food costs (NFNH).	2.028	
Additional percentage for unexpected events	5	
Part I. Family expenses	*Pesos (MXN)*	*USD$*
(1) Cost of food per month for the reference household	3 954	218
Cost of food per person per day	35	2
(2) Housing costs per month	2 467	136
(3) Estimated total cost of non-food, non-house expenses, taking into account post-check	14 561	804
Preliminary estimate of the non-food, non-housing cost (NFNH)	8 020	443
Cost of health after post-check adjustment	971	54
Cost of education after post-check adjustment	2 507	139
Cost of transportation after post-check adjustment	3 063	169
(4) An additional 5% for sustainability and emergencies	1 049	58
(5) Total household costs per month for a basic but decent standard of living for the reference family (5) [5 = 1+2+3+4].	22 030.83	1 217
Part II. Necessary wage per month	*Pesos (MXN)*	*USD$*
(6) Living wage per month (6 = 5 / 1.59 workers)	13 855.87	766
(7) Mandatory deductions from pay (7) (taxes plus social security)	2 309	128
(8) Gross wage required per month for living wage (8 = 6 + 7)	16 165	893
Part III. Living wage in the industry, considering the typical value of benefits and cash insurance in the industry	*Pesos (MXN)*	*USD$*
(9A) Value per month of in-kind benefits in the industry (in-plant food)	404	22
(9B) Value of standard cash bonuses in the industry (Christmas bonus and vacation bonus)	604	33
(10) Net living wage paid when workers receive typical in-kind benefits and cash allowance in the industry [10 = 6-9A-9B].	12 848	710
(11) Gross living wage in the industry if the worker receives the typical benefits in kind and the cash allowance in the industry [11 = 8-9A-9B].	15 157	837

Source: prepared by the authors based on the adaptation of the methodology of Anker and Anker (2017).

When these components are added together, the total monthly cost of maintaining a basic but adequate standard of living for the reference family is MXN$22,030.83 (row 5, table 6).

To determine the net monthly living wage per worker, the total monthly costs (MXN$22,030.83) were divided by the average number of workers per household (1.59), resulting in a net monthly living wage of MXN$13,855.87 (row 6, table 6), which is the amount needed to cover the total living costs of the reference family.

Mandatory deductions and taxes associated with the wage must be taken into consideration to determine the gross monthly living wage. According to the proposed methodology:

1) Net monthly living wage: As determined above, MXN$13,855.87.
2) Income Tax (ISR): The ISR rate stipulated by the Tax Administration System (SAT) of the Ministry of Finance and Public Credit (SHCP) (2018) was used.
3) Mandatory deductions: some were included, such as Social Security payments.

Adding the net monthly living wage to the percentage corresponding to income tax and social security deductions gives the gross monthly living wage. This amount is MXN$16,165 (line 8, table 6), which is the total wage before deductions and tax obligations.

To obtain an accurate representation of the living wage that a first-level operator should receive at BMW's San Luis Potosi plant, certain benefits and allowances provided by the company must be considered:

1) Benefits in kind: the cost of food that workers receive at the company's plant was deducted (row 9A, table 6).
2) Cash bonuses: regular cash bonuses such as Christmas and vacation bonuses have been deducted (row 9B, table 6).

After considering these deductions, the operator's net and gross living wage is obtained, considering typical in-kind benefits and cash allowances provided by the company. These amounts are MXN$12,848 and MXN$15,157, respectively (rows 10 and 11, table 6).

4. RESULTS AND DISCUSSION

The analysis reveals a significant discrepancy between the contractual wage and the living wage for a family of 3.74 members. According to BMW's collective agreement, the contractual wage for the first level is set at MXN$306 per day (MXN$9,307 per month, calculated by multiplying 306 by 365/12), while the living wage is MXN$13,856, a difference of 49%. This demonstrates the need to re-evaluate the wage structures at the BMW San Luis Potosi plant to ensure a living wage.

When taxes and social security contributions are considered, the gap between the contractual wage and the living wage widens. The wage received is MXN$9,966, while the living wage, which includes these factors, is MXN$16,165. This 62% difference illustrates the challenge for operators and their families to achieve a decent standard of living according to the criteria established in this analysis (see Table 7).

Table 7. Percentage differences of the living wage with respect to wages paid in San Luis Potosí (2022)

Items	*Living wage*	*Contractual wage*	*Percentage difference between contractual wage and living wage*
In-kind contributions			
Base wage	13 856.00	9 307.50	-49%
Taxes plus social security	2 309.40	658.67	
Total	16 165.40	9 966.17	-62%

Source: prepared by the authors based on the adaptation of the methodology of Anker and Anker (2017).

When compared with other indicators (see Table 8), the contractual wage is 47% higher than the minimum wage in Mexico, MXN$9,966.17 versus MXN$5,258.13 (172.87 multiplied by 365/12). With respect to the urban extreme poverty wage threshold, the contractual wage is 48% higher at MXN$9,966.17 compared with MXN$5,139.35. Nevertheless, compared to the urban poverty wage, workers' wages are 4% lower (MXN$9,966.17 compared to MXN$10,327.32).[5]

Table 8. Percentage differences between wages paid with respect to other reference wages (2022)

Types of reference wages	*Reference wage*	*Percentage difference between paid wage and reference wage*
Urban poverty line wage	10 327.32	-4%
Urban extreme poverty line wage	5 139.35	48%
Minimum wage in Mexico	5 258.13	47%

Source: prepared by the authors based on the adaptation of the methodology of Anker and Anker (2017).

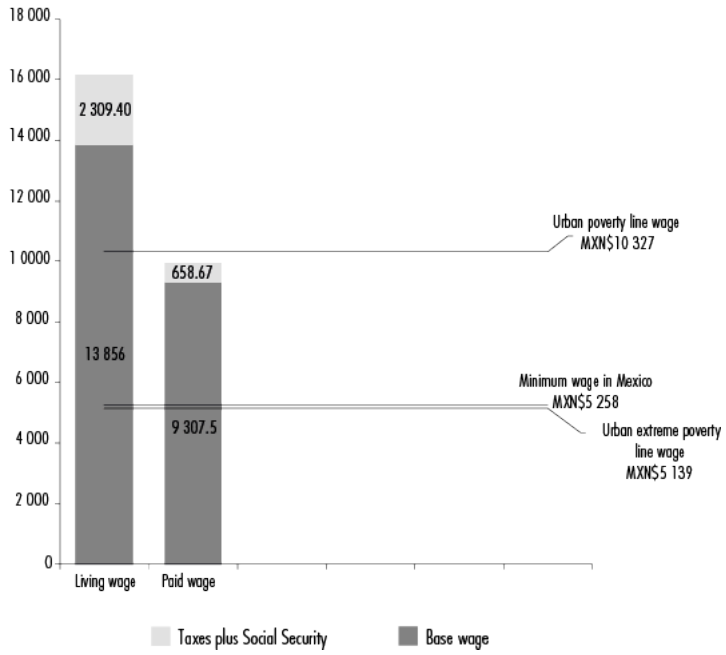
Meanwhile, the discrepancy between the urban extreme poverty line wage (MXN$5,139.35) and the urban poverty line wage (MXN$10,327.32) with respect to the living wage (MXN$16,165) estimated in this exercise is 214% and 56%, respectively. These differences may be associated with the fact that, in the exercise conducted in this article, it is clear that the nutritional content of the dietary model considered by CONEVAL is below the macronutrients necessary for the physical activity of workers in BMW, as established by NOM-037-SSA-2012 (*Diario Oficial de la Federación* (2012, July 13)).

Another possible source of discrepancy lies in the prices used by CONEVAL to establish the poverty lines since they are based on the INPC published by INEGI (2022). However, these prices do not necessarily reflect the real cost of goods and services purchased by workers in San Luis Potosi. Local market conditions and the consumption habits of the population in the region may differ from the national averages used in the index, which could lead to discrepancies in the estimation of poverty lines.

These results highlight the urgent need to adjust the nutritional content of the basic food basket, as well as the prices of food and the set of goods and services considered in the CONEVAL methodology.

Although the contractual wage does not represent a living wage, it exceeds the official minimum wage and urban extreme poverty (see Figure 1). However, a wage increase is still needed to overcome urban poverty.

Figure 1. Comparison of living wage vs. paid wage at BMW San Luis Potosi plant, 2022



Source: prepared by the authors based on the adaptation of the methodology of Anker and Anker (2017).

When comparing the contractual wage with the living wage of the BMW plant in San Luis Potosí with other Original Equipment Manufacturers (OEM) in Mexico, according to García-Jiménez *et al.* (2021), it can be seen that the company in question occupies an outstanding position (4th place). The Volkswagen-Puebla plant leads the ranking, exceeding the living wage by +9%, followed by Chrysler/Fiat-Toluca, with a difference of -9% below the living wage. In third place is Nissan A1-Aguascalientes with a difference of -46.5%. BMW San Luis Potosí is in fourth place with a difference of -49%. Below BMW are companies such as Nissan A2-Aguascalientes with a difference of -69.1%, Ford-Hermosillo with -70%, and General Motors-San Luis Potosí, which has the largest difference with -90%. This data suggests that BMW San Luis Potosí has similar wage differentials to companies established in Mexico between 1982 and 1993, surpassing others that arrived recently (see Table 9).

Table 9. Comparison of the wage gap between different OEM plants in Mexico

Arrival period	*OEM plant*	*Wage gap between contractual wage and living wage (base wage)*
1962-1981	Volkswagen, Puebla	+9%
	Chrysler-Fiat, Toluca	-9%
1982-1993	Nissan A1, Aguascalientes	-46.5%
	Ford, Hermosillo	-70%
1994-2021	Nissan A2, Aguascalientes	-69.1%
	General Motors, San Luis Potosí	-90%
	BMW, San Luis Potosí	-49%

Source: prepared by the authors based on García-Jiménez et al. (2021).

The estimated wage gaps in Table 9 reveal a paradox between General Motors and BMW. Although they share a geographical location, General Motors has a -90% living wage difference, while BMW has a -49% living wage difference.

However, the evidence presented suggests that the wage gap between the paid wage and the living wage increases when motor vehicle manufacturing companies arrived more recently in the country, suggesting greater precariousness with trade liberalization.

The wage gap between General Motors and BMW can be attributed to several factors. Intense competition among workers for jobs, driven by the entry of new companies such as GM, can put downward pressure on wages. In addition, these new firms may not comply with established labor and wage standards, resulting in less favorable conditions for workers. Trade liberalization has facilitated company mobility and labor flexibility, allowing wages to adjust to market conditions, which can lead to further wage insecurity, especially if labor regulations are not strong enough to protect workers. In

summary, the widening wage gap is due to the time companies have been operating and factors such as labor competition, the commitment of companies to labor standards and flexibility due to trade liberalization.

5. CONCLUSIONS

The study clearly shows that although the contractual wages are competitive and exceed the minimum wage and extreme urban poverty, they still do not reach the level necessary to guarantee a dignified standard of living. This finding has implications for wage policy in the motor vehicle industry, which is crucial to Mexico's growth and investment.

The methodology based on Anker and Anker (2017) provides a robust tool for measuring the living wage and a guide for wage policies that improve the living conditions of workers in the motor vehicle manufacturing sector. It is essential that companies, both established and emerging in Mexico, consider these findings and adopt wages that meet the needs of their workers.

Implementing the T-MEC offers an opportunity to improve working conditions in Mexico by promoting union participation and bargaining. Workers need to be involved in wage discussions, especially in the presence of transnational corporations such as BMW, which have raised the cost of living in cities such as San Luis Potosi.

The study suggests extending the methodology to the auto parts sector, offering opportunities for future research and a more complete understanding of wage dynamics throughout the automotive supply chain, facilitating more effective policies to benefit a greater number of workers.

In summary, the T-MEC makes the discussion of the living wage critical. The labor clauses in the agreement could encourage a transition to fairer wages in the motor vehicle industry. Companies and unions must proactively improve wage conditions to ensure a fair future for workers in the sector.

Policy proposals based on this article and research on living wages (García-Jiménez *et al.*, 2021 and 2022) in the motor vehicle industry are as follows:

1) Establish a minimum wage for the sector. Establishing a minimum wage for the motor vehicle industry is essential to ensure decent working conditions.
2) Periodically review and update wages using the living wage calculation as a reference criterion. Regular wage review mechanisms must be implemented based on cost of living, inflation and productivity indicators for the sector and it must be ensured that wage increases promote a roadmap to achieving a living wage for the motor vehicle industry.
3) Wage transparency. Requiring motor vehicle companies to publish wage ranges would facilitate comparing and negotiating wages across regions.
4) Education and training. Promote training programs for motor vehicle manufacturing workers in areas such as Industry 4.0 and electromobility, preparing them for higher-paying roles in the sector's technological evolution.
5) Tax incentives. Offer tax incentives to motor vehicle companies that adopt fair practices and exceed (or come close to) the proposed living wage.
6) Monitoring and sanctions. Establish an independent regulatory body to monitor wage policies and sanction non-compliance by motor vehicle companies according to established standards.
7) International cooperation. Promote cooperation with unions in the United States and Canada to establish uniform labor and wage standards in the T-MEC motor vehicle industry.

These proposals are designed to ensure that workers in the motor vehicle industry move closer to receiving decent, fair and adequate compensation that reflects their contribution to the sector's productivity and allows them and their families to improve their well-being.

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[1] The authors adapted the methodology of Anker and Anker (2017) to perform the calculations. Richard Anker and Martha Anker are not responsible for the calculation of living wage costs in the company in question.

[2] Ten interviews were conducted with first-level workers as part of a non-representative sample at the study site. Interviewees' participation was informed, voluntary and anonymous.

[3] We chose to use the second quarter of the ENOE because this period was considered to provide the most accurate record of employment. This is because the second quarter is less affected by summer and winter vacations, which allows for a better representation of the employment situation without significant seasonal influences.

[4] In the case of coefficients of variation greater than 1, the lowest price was taken as the reference price.

[5] The following procedure was used to calculate the urban extreme poverty line wage and the urban poverty line wage:

a) The value of the extreme poverty line by income in the urban municipalities of CONEVAL (2022) was multiplied by the size of the reference household (3.74 rounded to 4). (2022) was multiplied by the size of the reference household (3.74 rounded to 4) and then divided by the number of full-time workers in the reference household: 2,042.89 * (4/1.59) = 5 139.35.

b) We multiplied the value of the CONEVAL income poverty line in urban communities (2022) by the size of the reference household and then divided by the number of full-time workers in the reference household: 4,105.11 *(4/1.59) = 10,327.32.

The values of the extreme poverty line by income (which corresponds to the monetary value of the basic food basket per person per month) and the poverty line by income (which corresponds to the monetary value of the basic food basket plus the non-food basket per person per month) for urban municipalities correspond to the month of July 2022, the period during which the fieldwork was conducted. According to the CONEVAL (2022), its value represents "the cost of a set of goods and services acquired by the Mexican population constructed from the consumption patterns observed in a set of reference households and taking into account regulatory nutritional aspects in Mexico". This indicator is updated monthly based on information from the National Consumer Price Index (INPC) published by INEGI.