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THE CORN TORTILLA:

a national price increase and its symbolism in the context of social differentiation in urban area of San Cristobal de las Casas, Chiapas

Jorge López Arévalo[1]
jalachis@hotmail.com

Bruno Sovilla[1]
brunosov@yahoo.it

Germán Martínez Velasco[2]
gmartine@ecosur.mx

Autonomous University of Chiapas[1], El Colegio de la Frontera Sur[2]

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

8

ABSTRACT

This article analyzes the impact of the rising price of tortillas in low to high income households in San Cristóbal de Las Casas, Chiapas. Based on field data, the study states that the tortilla is a Giffen good for poor urban households. A Giffen good is a characteristic of a product which states that as the price increases, demand does not diminish but rather increases. This contradicts the law of demand that states that the consumption of a product decreases relative to an increase in its price. In this sense, in the sociocultural context of a federal entity such as Chiapas, the process of growing indigenous urbanization has brought a separation from the primary means of food production, which is land. This study confirms that it is the poor and urban indigenous population which is greatly affected, since they have a higher Giffen behavior of a greater consumption of tortillas despite an increase in price due to the cultural character that the tortilla represents.

Keywords: *Tortillas, Giffen, Chiapas culture*

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

9

There was a family that did not know how to plant a cornfield,

and at home there was corn.

I do not understand how you can live without a family cornfield,

I don't know what they did to get corn

Ricardo Pozas, 1979

The study of maize in Mexico has been addressed both in from a technical perspective in relation to its origins, that establishes it to be a plant of Mesoamerican origin with special reference to Mexico and its primitive species called teosinte (Beadle, 1977) , as well as from its adaptive versatility - grown at both sea level and high altitude mountains.

In the field of social sciences maize has also drawn attention for study from various disciplinary perspectives such as the economy, with various analysis focusing on the economic effects in the Mexican population and maize production related to trade and tariff liberalization (Calva, 1993) as well as the effects from the use of this crop for energy generation purposes such as ethanol (SIAP, nd); There have also been important efforts related to food security risks for Mexican rural populations that have been identified to be contingent on the purchase of the staple grain and loss of quality of its consumption, due to the displacement of the native, better quality, seed. (Appendini, et al, 2003).

As part of the studies of maize in Mexico, this contribution is presented of which the main objective is to test the concept of a *Giffen good* against a situation in which there is a price increase of a substantial dietary product for thousands of Mexicans, especially in the broad population bases of rural and urban areas. Under this statement, some research questions were raised: With the increase in the price of tortillas in Mexico, what is the response from the poorest sector? Do they react by reducing the

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

10

consumption of tortillas? Or conversely, Do they increase consumption while decreasing the consumption of other foodstuffs?

Thus, this paper presents the results of a study on the differentiated impacts of tortilla consumption due to price increases. The effects can be seen according to the different social strata in an urban area in which there coexists indigenous and mestizo populations. In the first section, the raising of the price of corn tortillas is contextualized in an environment such as found in Mexico, where the tortilla is conceived not only as a food product, but amounts to a symbol and part of national identity in which converge the different layers and cultures of Mexican society. In the second section, the question of corn under the North American Free Trade Agreement (NAFTA) falls; In a third section, the *ad hoc* theoretical assumptions of an economic nature are presented, which shall be contrasted with the findings of the field work and the results that are presented in the fourth section.

CORN: SYMBOLISM AND NATIONAL IDENTITY

The writer Jorge Ibargüengoitia said that the tortilla for Mexicans is "food, plate, utensil and stability." The four references refer to the various simultaneous uses of tortilla: as its own proper food; in its capacity as a taco (plate); as a table utensil and serving spoon to eat other products, and of course that it becomes emotional stability and provides food security for its cultural representation that goes beyond its nutritional character. Corn tortillas, due to their widespread use unlike other Mexican food products, constitute the cultural artifact that cuts through and unites the concepts of class, ethnicity and race, and this quality becomes a symbol of national identity whose significance is elevated to the realm of the sacred. Hence it is said that Mexico is "a community of corn." Undoubtedly, the origins of this myth is found in the indigenous component that now is formed from the ethnic mixing and the same Mexican nation. In the *Popol Vuh*, the

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

11

Quiche story, it is said that the origin of human beings starts from that seed. Also, on the stone sarcophagus of King Pakal found in Palenque, Chiapas, the King is reborn and transformed into the maize god as a sign of his immortality (Fazio, 2007) is displayed. All indigenous myths of Chiapas refer to corn as sacred food and even as the physical-spiritual creation. In the *Chilam Balam*, it states that the Maya were born from corn , they are men of corn. It is equivalent to the mud of the Christian creation. The Huichol people, for example, have stated that "our food is corn, corn is sacred. We do not know how to speak Spanish well, but we know how to talk to the corn. "(Quoted by Silvia Ribeiro, *La Jornada*, 11/02/2006).

These references suggest the idea that corn and tortillas in Mexico emerged as an ethnic product. However, in its historical trajectory to the extent that that product was also assimilated by the different social classes, over the passage of time it has gone on to be an exclusively ethnic product to a multicultural product. Along with Mexican migrants, it has transcended borders to position itself as a transnational device that endorses, in the distance, trans-territoriality of Mexicans. In two studies conducted in the United States in the late 90s, the tortilla industry was one of the fastest growing segments of the baking industry (Cornell, 1998, quoted in Lind & Barham, 2004); Bacon also noted in 1996 that more than 25,000 thousand workers, mostly immigrants in the United States, produced tortillas with a value of 2.5 billion dollars. (Bacon, 1996, quoted in Lind & Barham, 2004)[1]

Among the politically left leaning social segments in Mexico and before the foreseeable effects of the free trade agreement with North America and its imminent impact on agricultural production of the country, the slogan "Without corn there is no country" was coined and was repeated again and again in marches and

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[1] The previous does not deny that in some families on the border states of the United States tortillas have been consumed before

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

12

rallies that surplus, subsistence and infra-subsistence farmers cried to government institutions dedicated to the economy of the Mexican countryside. This slogan has been held not only as a metaphor, but as a sociological truth, which has us recall that this ancient grain is one of "the three friends of the poor: corn, beans and chile" (Guillermo Prieto, said Cepeda, 2007).

Before the structural adjustment of prices, Mexican society had already experienced the great changes brought by the agro-industrial processes that people had showcased as signs of modernity. In its production, tortillas went from hand-molded and deposited individually for cooking on the legendary *comal*, to be homogeneous , industrially stamped, through the tortilla machine that cooks and drives its wholesaling. Corn rose from initially being an input as *nixtamal* and *masa*, to becoming cornmeal. By modifying its consistency and texture and ceasing to be dough (masa) and becoming an industrialized powder (flour) its consumption as an ancestral drink, called *pozol* by the indigenous population, came to an end. Given these historical events, today the consumer population of Mexican tortillas is divided into two social groups in relation to the type of tortillas consumed: the demographically dispersed indigenous rural population that still consumes the ancient *criollo* (native) corn that is transformed into *nixtamal* and *masa* as the ingredient for making tortillas the traditional way, and urban residents of varying incomes, mestizos and indigenous people who are consumers of urban industrial tortillas, whose primary ingredient tends to increasingly be genetically modified hybrid maize, or what is commonly called "yielding varieties" that prior to being a tortilla was turned into cornmeal. Within this large population, urban poor are composed of mestizos and indigenous people who purchase tortillas and who constitutes the vast majority of Mexicans who are exposed to price increases. They are the most vulnerable and live in extreme poverty.

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

13

In short, the above illustrates that corn and tortillas were essential Mexican food since time immemorial -regarded as of divine origin, and that with the passage of time they took on symbolic national benchmarks for quality that the Mexican population would confer upon them. However, in the scenario of a market economy, which in the past they were simply constituted a value of intra-household use where they were produced, processed and consumed, it is now revealed as a true commodity circulating in a stock market exchange in which tortilla flour sellers and buyers dispute prices, breaching not only the economic conditions of its poorest consumers, but also its inherent sacredness.

MAIZE AND NORTH AMERICAN FREE TRADE AGREEMENT (NAFTA)

The NAFTA has converted Mexico as a major player in the globalization process, participating in the new international division of labor, both from the world industrialization through the export and import of manufactured goods and participation in the export and import of agricultural products and labor, mainly to the United States (López, Martinez and Pelaez, 2011).

However the effects of NAFTA and globalization are not homogeneous either for countries, regions or sectors. Moreover, in the same industry there coexist different impacts because of structural heterogeneity [2] . The Mexican agricultural sector is no exception. These subsectors have benefited from the opening of the markets and others have been harmed. In the case of Indigenous agriculture,

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[2] The heterogeneous structure can be defined by considering the productive structure or the occupational structure. The productive structure is heterogeneous when there coexists sectors, branches or activities where the work productivity is high or normal (that is, it reaches the levels that allow for the available technologies), with others in which productivity is much lower. This productive structure corresponds to a certain type of occupational structure. (Pinto, 1976)

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

14

which is largely devoted to consumption, consequences are indirectly perceived (Minutti, 2007). As their staple food, maize imports somehow affected their domestic production because with the low prices, at first it was more profitable to buy than to produce corn.

With NAFTA, the trade deficit in the agricultural sector became the norm. According to Figure 1, in the span of 17 years (1993-2009) relating to the balance of trade surplus in the agricultural sector, surplus was observed only in 3 years: 1993, 1995 and 1997, while through the behavior of corn in Mexico was revealed as a net importer throughout the period, with a significant increase in imports in the last three years[3] .

Figure 1. Trade balance of maize and total agriculture of Mexico, 1993-2009 (millions of dollars)
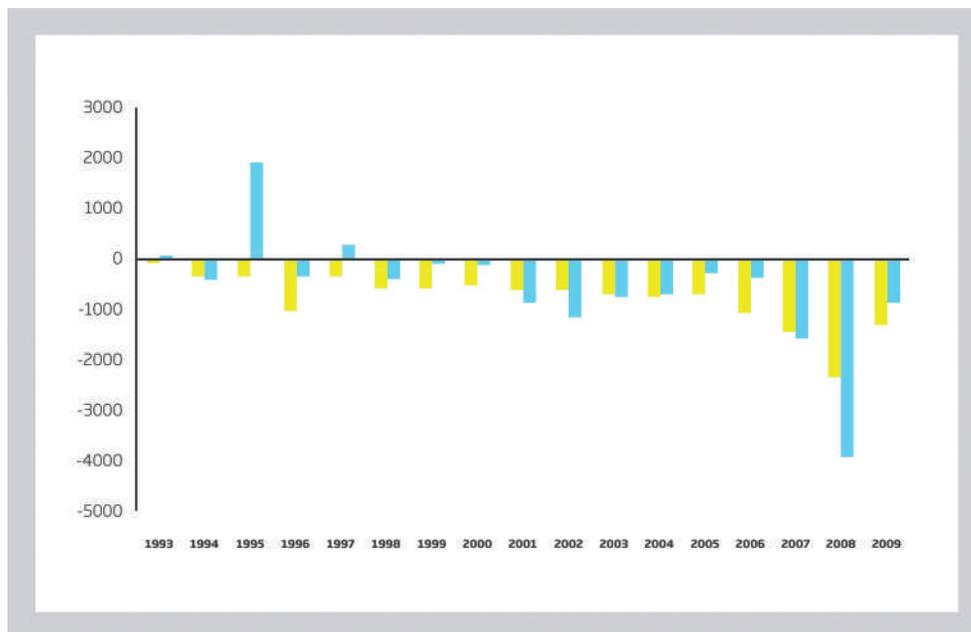
Source: Prepared based BIE-INEGI.
<http://dgcnesyp.inegi.org.mx/cgi-win/bdieintsi.exe/NIVR55#ARBOL>

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[3] It should be noted that this surplus is connected to the devaluation of the peso that occurred in 1995 and 1997, which demonstrated a high sensitivity of the agricultural sector before the variation of the type of true exchange (Puyana and Romero, 2009).

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

15

In Figure 1 it can be seen that the maize deficit can largely be explained by the deficit of the balance of agricultural trade. Moreover, in several years (1996, 1998, 1999, 2000, 2004, 2005, 2006 and 2009) the trade deficit of maize even exceeded the total of the agricultural sector. It appears that the demand for corn shows lower sensitivity to the exchange rate, because even with the strong devaluation in 1995 and 1997 it continued to be imported[4].

Following the stagnation of domestic production and low grain prices in the international market, an increase in maize imports was recorded. The crop was affected not only by the North American Free Trade Agreement (NAFTA), but also by internal structural factors such as lack of access to credit for producers of this crop, limited irrigation infrastructure to raise yields, market concentration in a few private companies, limited scientific research in this field and limited subsidies granted by the Government in this agricultural sector compared to those who are given to producers in other countries (CEFP, 2007).

By 2006 the price of imported maize was low, however, from that year onwards it increased significantly due to increasing demand for grain ethanol production in the United States. Hence, in early 2007 the problem of the maize market in Mexico sharply increased because on the one hand there had been a fall in domestic production, and on the other, decreased imports. Coupled with hoarding by only three companies (Maseca, Cargill and MoH), upward pressure was generated on the price of the product and consequently an increase in the price of tortillas- the final product of the chain (CEFP, 2007).

With NAFTA, Mexican farmers first had to cope with cheap corn from the United States, and because of its low price there was

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[4] In 1996 maize imports increased atypically in the first years of NAFTA due to that the government of the United States gave a billion dollar loan through the Commodity Credit Corporation (CCC) to buy the surplus of corn in the United States. Starting in 1997 and until 2002, the CCC provided financing through the GSM-102 program, which among food grain included exports of maize. Between 1997 and 2002 ASERCA reported an accumulated financing of total food grains of 1,439,000,000 dollars (from Ita and Lopez, 2003, p. 25)

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

16

in increase in imports that covered the consumption needs that domestic production did not satisfy. Farmland was abandoned, and the planting of corn was substituted by other products. In many cases farmers were migrants to the United States. Later, when prices rose, imports were revealed inelastic and corn producers were unable to increase their production of maize because of the aforementioned problems. In the case of indigenous agriculture, due to that fact that in times of low prices (1997-2005, see Figure 2) corn was bought, this also affected the farmers by them neglecting their production and, in many cases, totally abandoning their culture.

Figure 2. International price of yellow corn U.S. $ / ton
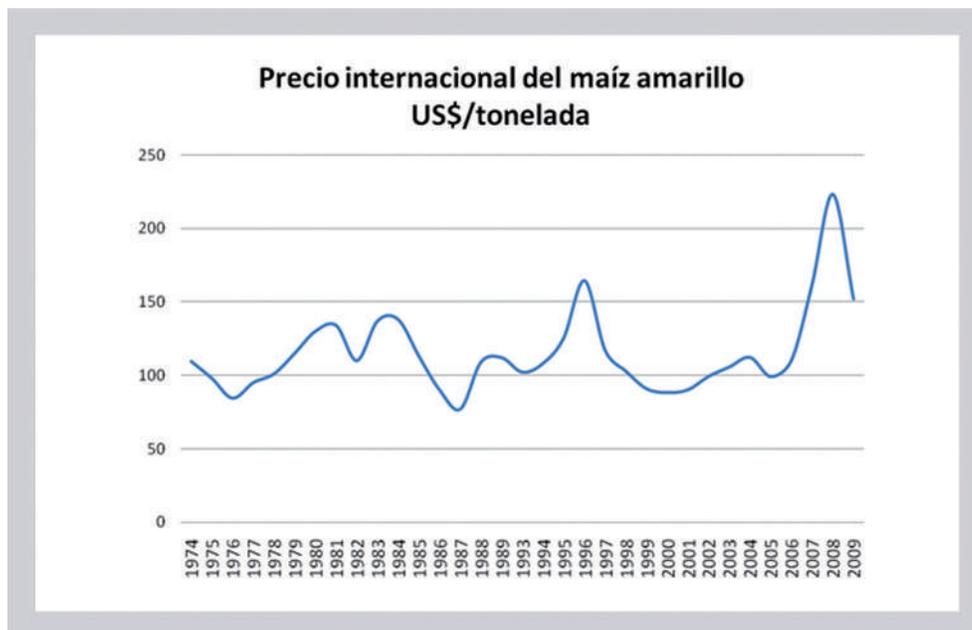
Fuente: Source: Own design based on USDA data
<http://www.ers.usda.gov/Browse/view.aspx?subject=Crops>
Note: FOB (free on board before freight) prices in the Gulf of Mexico

Despite this, according to Barkin, it must be recognized that although the panorama of farming has been desolate there were some indigenous peasant segments that have developed survival strategies by diversifying their productive activities, "the Mexican

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

17

peasantry (including indigenous groups) is reorienting itself and the rural economy in response to declining opportunities in urban industrial society. These communities have diversified their economies, developing specialized high quality products, such as organic or fair trade (*fair trade*) products, exotic fruits, free range chicken and certified timber production, ecotourism, and even environmental services like carbon sequestration and the restoration of aquifers "(Barkin, 2006: p.150).

Baskin's analysis is interesting because it shows how the indigenous peasant agriculture and corn production tries to regroup against the threats of globalization and economic liberalization. However we have seen that NAFTA adversely affected corn growers by their low productivity compared to large producers in the north. While the first could not cope with the initial reduction of prices, the most affected small producers in the most marginalized areas succeeded in placing their surplus on the local market and then they began to migrate en masse, as has been the case with producers from the Frailesca region of Chiapas (Ballinas, 2011).

In agriculture, asymmetries between Mexico and the United States are enormous. If in 1990 the US agricultural productivity per worker was 8.5 times higher than Mexico, in 2006 it exceeded 11.5 times (Puyana and Romero, 2008). The asymmetries are also important within Mexico, as national productivity per agricultural worker is 2.6 times greater than that of Chiapas, while Sonora is 8.3 times higher (Lopez, Martinez Pelaez, 2011). It should be noted that these differences would be even larger if instead of averages a comparison between mechanized farming entities and the poorest population, indigenous groups, were taken.

That is why in the most backward regions, where the weight of the pre-capitalist relations of production is very high (in terms of population), NAFTA accentuated the decomposition of these productive ways. In Chiapas, the situation was further complicated when considering the coexistence of pre-capitalists with backward capitalist segments. In these sectors a process of disin-

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

18

tegration of the old and traditional forms of organization of pro-
duction (indigenous communities, indigenous peasant economy,
etc.) is observed and, therefore, the corresponding expulsion or
lack of absorption of manpower that worked there. Faced with
this situation, above the worst of all possible worlds is presented:
on the one hand, pre-capitalist sectors that are not able to retain
their workforce and, on the other, a capitalist sector that cannot
absorb these expelled sectors nor its own labor. Subsequently,
stagnation of the capitalist sector and non-capitalist decomposi-
tion is reached (Valenzuela, 2011).

It is for that reason that we maintain that NAFTA threatened
the indigenous peasant agriculture since it has low productivity
and is unable to face competition. For this reason in the nine-
ties the challenges and demands of ethnic groups increased and
became more visible in the public space, and so in some countries
in the region there emerged new social actors and in some cases
new political actors that challenged traditional ways of doing
politics (Bello, 2006).

CHANGES IN RELATIVE PRICES IN THE WHITE-CORN
TORTILLAS PRODUCTION CHAIN

The previous section discussed how NAFTA involved a process:
first, low prices for corn imports effected producers and later,
when prices rose, producers were not able to respond with more
production due to the structural damages to the maize subsector.

However, in Mexico the increase in tortilla prices in recent
years has been attributed to rising international corn prices.
While this is the basic input for producing tortillas, its price has
increased less than the price of tortilla and was even slightly
less than the increase in CPI (inflation). Here it should be noted
that basically yellow corn is imported and tortillas are made
mainly with white corn. It should also be noted that sometimes

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

19

yellow corn for making tortillas is used, even though the latter being primarily for animal consumption it is also used for human consumption. Is required to clarify that if yellow and white corn were fully differentiated products, it would mean that the first would follow the price in the US, while the price of white maize would be determined by the conditions of supply and demand in Mexico. However, while they are not perfect substitutes, both markets are linked to a certain point by supply (for their production requirements are very similar) and demand (through substitutability as food livestock) (World Bank, IMCO, 2007).

Below we present how inflation has evolved by the national index of consumer prices, the rate of the increase of corn prices, corn flour, tortillas and minimum wages after the enforcement of the free trade agreement with North America (NAFTA).

Table 1. Change in the national consumer price index,
tortillas and salary

PERIOD	NICP	Tortillas	Minimum wage	Corn	Flour
1994-2008	500.6	945.3	368.5	491.6	697.8
Tortilla difference	88.8	---	156.5	92.3	35.5

Source: Bank of Mexico and CNSM

As shown in Table 1, the increase in the price of tortillas has been 92.3 percent higher than corn, 156.5 percent compared to the variation of wages, 88.8 percent to the increase in inflation measured by the NICP (National Index of Consumer Prices / *Indice Nacional de Precios al Consumidor- INPC*) and just 35.5 percent from corn flour in a period of operation of NAFTA (1994-2008). You can also see that in recent years the rising price of tortillas has always been superior to changes in minimum wages and in-

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

20

flation, which intensified during the administration of President Vicente Fox (2000-2006) (see chart 3).

This means that in the production chain for white corn to tortilla, increasing the price of imported maize increased benefits which were not intended for corn growers but were concentrated and distributed in successive phases in the tansformation of maize flour and in the final product represented by the tortilla. If the price of tortillas grows more than the minimum wage, there is no doubt that real wages of urban and rural poor are experiencing a decline in terms of tortilla (see Table 1). Moreover, if the price of corn rises at a smaller scale than the tortilla and corn flour, then it means that their relative price has deteriorated despite price increases in the international market.

Graph 3. (salaries, corn, corn flour, tortilla, NICP)
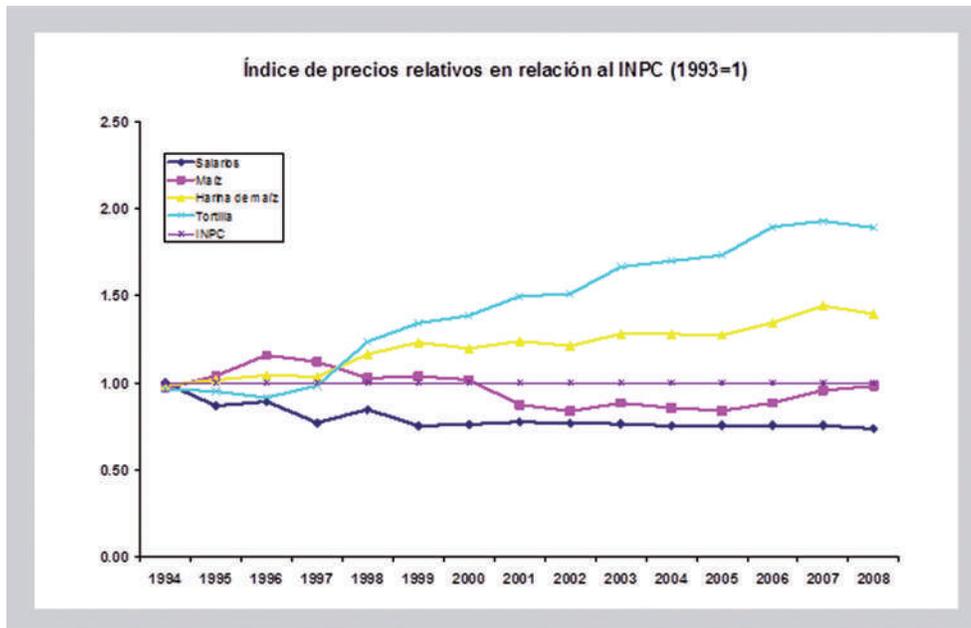
Source: Authors' calculations based on data from the Banco de Mexico

From December 2000 to December 2008, the cumulative price increases have been 98.41 percent in the case of tortillas, 69.29

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

21

percent for cornmeal and 41.03 percent in maize (Banco de Mexico)[5] conditions with a decline in real wages. That situation was in itself an outrage for the economy of the poorest regions of Mexico such as Chiapas, specifically for family economies of the poorest urban and rural sectors whose alimentation is largely based on the consumption of tortilla. It was therefore revealed that this situation also benefitted the company Maseca which is monopolizing much of tortilla dough production (the other company is Minsa and the third is Cargill - one of the worlds oligopolies), while there was a change in relative prices in the increase in the price of tortillas during the last federal adminis-tration of 62.17 percent higher than that of cornmeal and 476.61 more than corn. Therefore, the price of maize flour has increased 255.56 percent more than corn, even if it serves as raw material for the flour industry. Hence, there is a significant change in relative prices favoring the flour and tortilla vendors and hurting consumers and producers of corn. In other words, in the chain of corn prices (raw material) -flour corn (industrial inputs) tor-tilla (final product), economic inequality is set since the most adversely affected on the supply side are corn producers and on the demand side, mainly low-income tortilla consumers due to the reduction in real minimum wages in terms of tortilla (see chart 3).

In the case of Chiapas 271.581 corn producers are considered sub-subsistence (92.2 percent)[6] , 21,245 medium and surplus (7.2) [7] , 1600 large and transition (0.5) and only 42 very large or capitalists (0.01) (SAGARPA, cited by Miranda and Espinosa, 2007). From these production figures, one can deduce that the

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[5] <http://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?accion=consultarCuadro&idC
uadro=CP185&sector=8&locale=es> [consulted on June 15, 2010]

[6] It is considered that each producer has a family composed of 5 members; there is an average of 1.35 million
buyers of tortilla or corn among the producers of the grain.

[7] If it considered that a family of 5 is the equivalent of 106, 225, which are medium and surplus but who even-
tually buy corn and tortillas.

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

22

large or capitalists surplus sellers are those who lose because they are the ones who mostly attend the market as sellers of maize (22,887 corn producers), while sub-subsistence farmers who constitute the vast majority of most producers simply do not achieve or produce enough for their own consumption. Hence the sub-subsistence producers have become buyers of maize and could theoretically be the ones to benefit from the decline in the relative price, however, most of them appear in the market as buyers tortilla or flour tortilla corn, not corn grain, and consequently their capacity as consumers is affected in order to buy tortillas at relatively high prices.

Another seriously affected sector is the urban and rural poor, given that the increase in minimum wages represented less than half of the increase in the price of tortillas. In relative terms, the increase in minimum wages has been lower compared to the growth of inflation and even more in relation to the price of the tortilla itself. (See Table 1 and Figure 3).

Therefore the following question emerges: In what hands in concentrated the increased value added in tortilla production? The response is that the producers of corn flour and tortillas win and the consumers of tortillas lose, especially the urban poor and those rural populations that have stopped producing corn and attend the market as buyers. It should be noted that the increase in corn prices in recent years has been the result of dependence on US corn. However, the rising price of corn was lower than the increase of cornmeal, whose producers, as oligopolies, still enjoy the use of a non-competitive market and the tortilla producers incur costs, not only for flour but other inputs to final consumer.

The increase in the value added chain in corn-tortillas tends to focus on corn flour and tortilla, the first being an oligopolistic market and secondly a relatively competitive market (see Table 1). Thus, it is confirmed that the liberalization of corn trade under NAFTA was an accentuated poverty and inequality trap for the urban poor and indigenous communities of Chiapas.

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

23

TORTILLA AND *GIFFEN GOODS*

In 1890 Alfred Marshall observed a common behavior in the society to which he called the *law of demand*, which established the inverse relationship that occurs between price and quantity demand of a good. But in 1895, Robert Giffen[8] heralded a possible exception to this law which is that before a price increase of a good the population reacts by increasing their consumption of that good, well away from what the law of demand prescribes.

Jensen and Miller (2002), starting from rice and noodles market in some regions of the south and north of China, show empirical evidence of a Giffen behavior. According to these authors, in a family a Giffen behavior can be detected when being in a state of poverty, their consumption is based predominantly on a low cost product but has a high caloric content[9].

Mckenzie (2002) based on data from the National Survey of Income and Expenditure (ENIGH) in Mexico, says there is no evidence of Giffen behavior in this country in the case of the tortilla. Accroding to that study the tortilla would be an inferior good but not a Giffen good. The main reason according to the author,would be "*Mexican Consumers may have a wider array of available substitutes than do Chinese consumers, So that tortillas do not play quite the same role as rice does in China*" (2002, 17). Considering that the price effect can be deconstructed into the sum of a substitution effect and an income effect ,and assuming that the tortilla (as the author himself confirms) is an inferior good, this conclusion would imply that an increase in

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[8] Although it seems that the first to declare this exception was Simon Gray (Stigler 1947 and Masuda & Newman 1981).

[9] The Giffen behavior cannot happen in homes in extreme poverty, where only one product is consumed since in this case an increase in price obliges a reduction in consumption. It requires that the home has a minimum diversified consumption, in this sense its level of poverty cannot be extreme.

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

24

tortilla prices would give a place to a significant substitution ef-
fect in absolute values that exceeds the income effect.

We will try to understand if in the case of tortillas there may
be evidence of Giffen behavior among the urban poor sector of
the population. If so, the rising price of tortillas bring deeper
redistributive consequences of what at first glance it might seem,
since the mentioned social group would be greatly prejudiced in
favor of the tortilla vendors.

The aforementioned assumption is that if the price of this
staple food (tortilla) increases, poor consumers cannot hope to
acquire other alternative foods. However, as a cultural good,
there is a tendency to increase basic consumption. But insofar as
the consumer's income grows, there are new satisfactions, and
consequently there unfolds purchasing impulses that were not
possible when income was lower.

Undoubtedly, the increase in tortilla prices reduces the pur-
chasing power of the household due to the nonexistence of a
compensative increase in nominal income. If the strength of the
"income effect" is less than the "substitution effect", the tradi-
tional law of demand remains valid: product price increases and
demand decreases; while the Giffen paradox arises when the
income effect is opposed to the substitution effect as with infe-
rior goods, and that in absolute terms is higher: in this case as
the product price increases the demand grows. Goods showing
such a demand curve are a subset of inferior goods or goods of
the poor; meaning that the Giffen goods are necessarily inferior,
but not all inferior goods are Giffen.

Our hypothesis is that in the poorest sectors of society, the
tortilla is assumed as a Giffen good- in other words its consump-
tion increases as the product price increases unlike beef, milk,
fruit or beer, whose consumption increases as family income
increases and decreases when the level of income decreases. In
the case of tortillas, if household income increases there is a
decrease in the consumption of this product-replaced by other

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

25

satisfactions. And on the contrary, if you lower the household income consumption tends to increase. Hence, one could say that the tortilla becomes a good "safe haven" for the poor allowing them to "kill hunger".

This can be illustrated with an example involving tortilla demand. It is known as a product of high consumption in Mexico among the poorest sectors. Under the assumption that a family is composed of father, mother and three young children, where the only person that brings money to the house is the family head who earns $ 200 a month working in low-skilled occupations, the consumption of tortillas and beans will be high, because their alimentation largely depends on these products which are the staple food of the poor in Mexico. Each month this household consumes 30 kilos of tortillas, 25 kilos of beans, and 3 kilos of meat. Now suppose this person finds a permanent, quite well paid job earning a salary equivalent to $ 500 a month, plus $ 100 that he continues to earn with an eventual weekend job. Household income is now $ 600 per month and the consumption pattern changes; In other words, they begin to eat 5 kilos of meat per month, 50 eggs, and 5kg. of sweet bread. The consumption of tortillas and beans decreased and is now 25 kg. of tortilla and 20 Kg of beans, because the consumption of novel foods modified the amounts of consumption of beans and tortillas. The result is that income is 3 times higher, but bean consumption is reduced by 20.0 percent, and the tortilla 16.7 percent. In microeconomic language, tortilla and beans, in this case, are inferior goods- in other words, demand increases as the income of consumers decreases.

In the opposite situation, where a poor salary is present and under the assumption that the price of tortillas rise from 60 cents to 85 cents a kg, or an increase of 42.0 percent, under the Giffen assumption this family is expected to react by eliminating meat consumption and buying more tortillas and beans. So the end result is a denial of the law of demand: the price of tortillas increases and tortilla consumption also increased relative to the

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

26

incomes of the impoverished sectors. If we represent a graph with this result, we should see the demand for tortilla curve slope upward , which shows a clear exception to the traditional law of demand, which is a negative slope.

In more technical language, we can say that if you increase the price of tortillas and beans, their consumption should decrease by the substitution effect, but grows by the income effect. Every time the price of a product increases, consumers are looking for a replacement and this trend would apparently not have exceptions. However the substitution effect in the case of tortilla consumption by the poor does not operate, because for cultural reasons they do not conceive the use of alternative assets to the tortilla, such as white bread.

TORTILLA: POPULAR RESPONSES TO THE PRICE INCREASE[10]

This section shows the results obtained from the survey of 150 questionnaires applied to socially differentiated households in the city of San Cristobal de Las Casas, Chiapas, Mexico. Based on the analysis of social indicators of basic geostatistical areas (BGA) of the National Institute of Geography and Statistics (INEGI, 2005) Two colonies with lower rates of welfare and two upper class subdivisions were selected. For the application of the questionnaire the whole household of four selected areas were considered. Of the total number of questionnaires, 100 were for households in economically emarginated areas of

[9] Those that participated in the registering of field information, Juan Santiz Giron, technician at El Colegio de Frontera Sur, and the students from the Faculty of Social Sciences of the Autonomous University of Chiapas: Fernando Balboa Cruz; Claudia Guadalupe Sánchez Santiz; Emmanuel Arrazola Ovando; Bibiana Alejandra Kánter Gutiérrez; Miriam Citlaly Vázquez Sánchez and Segundo Gregorio Ballinas Cano. Juan Sántiz Girón, who captured and processed the 150 interview questionnaires.

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

27

the city whose names are: Plan de Ayala and Primero de Enero, while the remaining 50 questionnaires were applied in homes of two of the wealthiest colonies city: Bismark and Villa Mayor. In the first two colonies indigenous populations were identified- the Tzeltal and Tzotzil ethnic groups whose residence in the city is explained by the phenomenon of immigration, particularly from the political events of 1994 in the state; while in the second two there were mainly wealthy families the majority of which were originally from the town in question. A single question- naire with modules on housing conditions, demographic char- acteristics of family and household behavior against increases in the price of tortillas and their level of consumption was applied.

SOCIOECONOMIC DIFFERENTIATION

Despite the obvious about social inequality can be assumed be- tween these two populations, some indicators of social differen- tiation should be mentioned in order to present the final trends in the consumption of tortillas. First, 86.0 percent of wealthy families have an income amounting to more than 10,000 pesos a month, while the remaining 14.0 percent said their income is between 5 and 10 thousand pesos. In this sector, one hundred percent of households reported having all the electro-domes- tic appliances than any middle class household has (computer, stove, refrigerator, washing machine, blender, television, radio, stereo, video player). Meanwhile, in the homes of the two mar- ginal urban settlements, variation of income was higher, because the result gives a percentage of 31.0 percent of those households whose income lies between 500 and 1,000 pesos a month ; 43.0 percent are located in the range of revenues from 1001 to 2500 pesos- a range in which the bulk of this subset of the population is located; and finally, there is the range of 2501-5000 pesos where 26.0 percent of that population is located. Within the sub-

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

28

set of poor urban households, the segment of households whose income is 500-1000 pesos and, as stated above, constitutes 31.0 percent with a total lack of any type of electro-appliance in the home, that is, apart from cooking with natural elements such as coal and wood, neither have the means to preserve food and much less other devices of entertainment and distraction. The most telling indicator of the level and socioeconomic differentiation is related to vehicle ownership such as in the marginal urban household sector of the first two income groups (500-1000; 1001-2500) where all lack of any type of vehicle. But in the next group (2501-5000) 25.0 percent of households have a car , besides having some entertainment devices; while in the last two income groups (5001-10000; 10001 and more) all households have at least one vehicle.

Based on the above, the data allow the differentiation of the entire study population into three social strata, the first two that are integrated into the urban-marginal population, and those who are socially differentiated by the level of income: Low income that is in a situation of *extreme poverty* whose income range is from 500 to 1000 pesos a month, and added another of *half poverty* that is comprised of income whose ranges are: 1001-2500 and 2501-5000. The third group is made up the ranks of middle to high income ranging from 5000 to 10000 and 10001 pesos and more, which for purposes of this study will be called *upper middle class*.

Regarding family size, we find that the range of 3-5 members is covering the highest percentage in all surveyed households in the area, regardless of social status. That is for example for both households poor sectors as well as middle class and above, in most of them there is a greater presence of a household size from 3-5 members; while the difference make larger homes because they are concentrated in the poorest households whose income is from 500 to 1000 pesos and 1001-2500 pesos where the largest family size prevails (6 members and more), this accounts

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

29

for 25.0 and 41.3 percent respectively. By contrast, in the case of upper-middle class sector, the largest family size drops to 2.6 percent of total revenue for the range of 5 to 10 thousand pesos, and 0.0 percent higher in the range of 10000 and more.

Within the group of extreme poverty, 80.6 percent said they have a daily intake of food once a day, 9.6 percent twice a day and an identical percentage three times a day, while in the two subgroups of average poverty as well as the two subgroups of the third sector (upper middle class) even though each bear a considerable social distance, have expressed an intake of three times a day. However, it is clear that while the first two layers (extreme poverty and poverty) there is a difference in relation to the number of times a day food is eaten (once vs three times), there is another relation to the food quality, since in both groups, although the staple diet is based on the tortilla and beans, complements of these products are different because in the first layer (extreme poverty), tortillas and beans become the only means of food, accompanied only by chili and salt; while in the second tier (average poverty), the tortilla and beans are complemented at times with small portions of meat, vegetables and eggs (Table 3). In that sense, the social union can be seen through both sectors for tortillas and beans , but there are socially differentiated by the number of times per day that they consume the products, as well as the role that they products have in this differentiation which are complements. Moreover, the difference between these first two subsets of urban-marginal sector with the third (upper middle class) sector constituting the wealthy population of the study, lies not only in relation to the number of times per day that food ingested, but also the quality and variety of the food because in the latter sector, tortillas and beans go from being a staple to being a supplement , while consumption of meat, eggs, sausages, dairy products, bread , pastas, vegetables, grains and fruits are part of the staple diet of daily consumption (see Tables 2 and 3).

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

30

Table 2

FRECUENCIA DE CONSUMO DE ALIMENTOS, SEGÚN INGRESOS Y NÚM. VECES AL DÍA

Alimentos Consumidos	500-1000						1001-2500						2501-5000						5001-10000						10000						Total	
	1	%	2	%	3	%	1	%	2	%	3	%	1	%	2	%	3	%	1	%	2	%	3	%	1	%	2	%	3	%		%
Tortillas	25	16.7	3	2.0	3	2.0			2	1.3	41	27.3					26	17.3					7	4.7					43	28.7	150	100
Frijol	26	17.3	3	2.0	2	1.3			2	1.3	41	27.3					26	17.3					7	4.7					43	28.7	150	100
Huevos							33	30.3					26	23.9					7	6.4					43	39.4					109	100
Leche							15	39.5					9	23.7							7	18.4					7	18.4			38	100
O/prod. Lácteos																			7	50							7	50.0			14	100
Cereales																			7	50							7	50.0			14	100
Chile																	43	51.8	26	31.3			7	8.4	7	8.4					83	100
Sal													31	100.0																	31	100
Verduras							14	32.6					15	34.9					7	16					7	16.3					43	100
Frutas							10	29.4					10	29.4					7	21					7	20.6					34	100
Carne																			7	50							7	50.0			14	100

Fuente: Elaboración propia con base en el censo de sobre consumo de tortillas en San Cristóbal de Las Casas.

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

31

Table 3

CONSUMO DE ALIMENTOS, SEGÚN SUBSECTOR E INGRESOS Y NÚM. DE HOGARES

Alimentos consumidos	Pobreza extrema		Pobreza media						Clase media-Alta		Total	
	500-1000	%	1001-2500	%	2501-5000	%	5001-10000	%	+10000	%	Total	%
Tortillas	31	20.67	43	28.67	26	17.33	7	4.67	43	28.67	150	100.00
Frijol	31	20.67	43	28.67	26	17.33	7	4.67	43	28.67	150	100.00
Huevo			20	23.26	16	18.60	7	8.14	43	50.00	86	100.00
Leche			20	23.26	16	18.60	7	8.14	43	50.00	86	100.00
Otros productos lácteos							7	14.00	43	86.00	50	100.00
Cereal							7	14.00	43	86.00	50	100.00
Chile	31	20.67	43	28.67	26	17.33	7	4.67	43	28.67	150	100.00
Sal	31	20.67	43	28.67	26	17.33	7	4.67	43	28.67	150	100.00
Verduras			20	23.53	15	17.65	7	8.24	43	50.59	85	100.00
Frutas			15	18.75	15	18.75	7	8.75	43	53.75	80	100.00
Carne			10	13.16	16	21.05	7	9.21	43	56.58	76	100.00

Fuente: Elaboración propia con base en el censo de sobre consumo de tortillas en San Cristóbal de Las Casas.

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

32

Based on these results, it should be noted that in Chiapas, as in most of the country, the consumption of tortillas and beans even though widespread have different roles and contributions according to the social sector in question, because for some it is the only food source; elementary, basic and every day, and for others consumption will also be everyday, but as a dietary supplement. Hence tortillas and beans are formed as the cement of a culture like Mexico for its widespread use, but according to their nutritional character it simultaneously becomes the medium that segments society, without ceasing to be the two most popular consumer products across the country.

CONSUMPTION 4.2 TIMES TORTILLA PRICE INCREASE

When asked how often tortillas were bought before experiencing increases in the price, responses were varied depending on the amount of income. It is also worth noting that in order to avoid distortion would mean taking the absolute consumption data in kilograms by family income, we proceeded to generate a more accurate indicator which was to divide the purchase of tortilla in kilograms between the number of working household members thus resulting in consistent data on consumption *per capita* in grams of tortilla. On this basis, the following results were obtained:

According to Table (4) , it can been seen that before the rising price of tortillas, the whole study population had a different behavior with each other with respect to the volume of consumption of tortilla. For example in the stratum of extreme poverty, it is seen that the majority consumption stood in the range of 401-800 grams. with 56.2 percent of total households, without underestimating 31.3 percent consuming 301 to 400 g, *per capita*; as in the same income group, a percentage of 12.5 percent of households had a consumption *per capita* located in

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

33

the following range is 801-1500 g. which reveals that along with the first data from the first consumer range a high intake tortilla in that social stratum.

Moreover, in the first group of income that forms the average poverty of 1001-2500 pesos per month, tortilla consumption tends to concentrate in the consumption range from 401 to 800 grams. whereas in that range is located 45.1 percent, preceded by a 29.1 percent is in a lower range is 301-400 grams. and 25.8 percent in the range of 201-300 grams.

Table 4

	Consumo de tortilla antes y después del incremento del precio									
	Pobreza extrema		Pobreza media				Clase media-Alta			
	500-1000		1001-2500		2501-5000		5000-10000		1000 y +	
Gramos	Antes	Después	Antes	Después	Antes	Después	Antes	Después	Antes	Después
125-200							61.1	67.5	71.4	85.7
201-300			25.8	21	20.8		30.9	32.5	28.6	14.3
301-400	31.3	8.6	29.1	22	33.3	45.9	8.0			
401-800	56.2	81.2	45.1	57	33.3	44.1				
801-1500	12.5	10.2			12.6	10.0				
	100	100	100	100	100	100	100	100	100	100

Fuente: Elaboración propia con base en el censo de sobre consumo de tortillas en San Cristóbal de Las Casas.

In the next group of the same sector of extreme poverty, which corresponds to income range of 2501-5000, the trend is more dispersed, because they basically are distributed almost evenly into three ranges of consumption per capita : 201-300 grams. 301-400 grams. and 401-800 grams. whose percentages are 20.8, 33.3 and 33.3 respectively. According to the information, it seems that in this social stratum there were no clearly defined patterns in the consumption of tortillas and tends to vary depending on other factors in this study given the available information and are not possible to identify.

Finally, there are the two income groups of wealthy conditions (upper middle class section), whose behavior together is

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

34

quite similar. In the first group whose income is 5,000 to 10,000, 61.1 percent of the households surveyed are located in the lower range of established tortilla consumption of 125-200 grams. while the remaining 38.9 percent is distributed in the two subsequent consumption ranges (201-300 grams. 301-400 g.). With regard to the higher income group, 71.4 percent of cases are located in the first range of consumption; 28.6 percent in the second range, and the remaining 14.3 percent in the third (Table 3).

These findings about the previous consumption of tortillas offer us a differentiated picture while we see the existence of a trend towards increased consumption of tortillas when it comes to the poorest households, and their opposite trend, that is, the existence of a minor amount of said product when the social sector is assumed to be comfortable.

After having experienced the rise in the price of tortillas, according to the same table 4, we have the following results: more families in extreme poverty (500 -1000) that previously placed in the consumption *per capita* of 401-800 grams . rose from 56.2 to 81.2 percent at the expense of a previous smaller range (301-400 g.) and the last range (801-1500 g.), which indicates a strong increase in tortilla consumption in the population of that highest poverty stratum. In the next layer that sits in revenue 1001-2500 pesos a month (average poverty) also it increases the number of families that consume 401-800 grams settling at 57.0 percent in this range, whereas it previously consisted of 45.1 percent; this increase was at the expense of the lower ranges already mentioned, suggesting a transfer of homes from one range to another higher consumption as indicated. In these first two layers (extreme poverty and first average poverty group) made mention that the increase in the consumption of tortillas, has happened by sacrificing other products that are eventually consumed such as vegetables, eggs and cookies.

In the next layer of income that is at 2501-5000 pesos a month (second group of average poverty), had shown the impor-

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

35

tance of the second consumption range (201-300) disappears to later increase in the second (301-400) with 45.9 percent and in the third (401-800 g.) valued at 44.1 per cent, while it had previously been 33.3 percent, which again we see that a greater number of families in that stratum increased their consumption of tortillas. However, it should be noted that this layer of additional food consumption persists, what is why it isconsidered to be in this group of average poverty where there could be a real increase in household budget for food.

Finally, as regards to both higher income strata which in the case of this investigation represents the wealthy group, the non-indigenous sector, not marginal and high income in the village, we see that in the first group (5000-10000) the tendency is to keep the amount of consumption, reaching the minimum range of 125-200 g. *per capita* number of households which reaches a rate of 67.5 percent, similar to previous consumption (61.1%) figure; the rest (32.5%) is occupied by the consumption range of 201-300 grams of tortilla. With regards to the second wealthi-est stratum, the first range of consumption is 85.7 percent, 71.4 percent higher than the amount that occupied this range before rising price of tortillas; in this social stratum, only 14.3 percent of households consume 201-300 g .; indicating that in both groups whose common characteristic is to show conditions of economic well-being exhibited almost the same tortilla consumption be-havior with a an inclusive tendency to reduce consumption at its maximum expression.

EVALUATION OF RESULTS

According to information available, we can say that in the case of this study carried out in a socially differentiated city, two es-sential conditions are set:

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

36

1) With regard to the consumption of tortillas in the absence of sharp increases in the price of the same, it is observed that in extreme poverty consumption *per capita* of tortilla is considerable, since this product is conceived as on almost a sole basis along with beans in the diet, whereas in other strata, including poverty, having a small increase in household income, consumption *per capita* tends to diminish and encouraged the consumption of other products in addition to tortillas and beans . At the other extreme, in the case of wealthy sector, tortilla consumption is complementary to a variety of products that are ingested due to the economic possibilities that facilitate the diversification of the diet, but, still, it's worth taking into account there were no households where tortilla consumption was omitted.

2) In terms of an increase in the price of tortillas, it conclusively shows that in the lowest rung of the local society, there is a reaction to considerably increase the consumption of tortillas, and to cancel the consumption of other complementary products, because the family budget is aimed at strengthening the cultural consumption of more accessible products, which continues to be the tortilla, and cancel other products whose cost is impossible to bear. Hence you have a registered increase of 25.0 percent of households that increased their consumption of tortillas, while the next stratum (1001-2500) did it at 11.9 percent; and the subsequent (25001-5000) 11.2 percent. [11]

3) Furthermore, there exists certain segments that still being poor, but that enjoy a greater margin of income and can support increased tortilla prices without reducing or omitting the use of other complementary products; hence it is they who face increased tortilla prices that represent increased spending to maintain the profile of food consumption.

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[11] These data refer to the variations in the percentage of greater increase that the range experiences (from 401 to 800 grs.)

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

37

4) In the case of upper-middle class , it is concluded that due to the complementary nature that the tortilla has, consumption remains almost intact like that of other products in the daily diet, while noting that interestingly in both groups in this sector the trend is to an insignificant decrease in consumption of the product, which as a hypothesis can be advanced that in these socioeconomic groups is where the same expenditure on the purchase of the product is maintained, regardless of the number of kilograms of tortilla that proportionally suffers a decline, and consequently a lower per capita consumption.

In short, the consequences of inflation are relevant: the rising price of tortillas means not only a redistribution of income in favor of intermediaries benefiting from an oligopolistic market, it also implies a consistent loss of purchasing power in poor households, accented by Giffen behavior. That is, in the absence of cultural substitutes for the tortilla, and the income effect that is typical of the lower goods determines in the case of the urban poor, an increase in tortilla consumption as a result of the price increase.

FINAL THOUGHTS

With the enforcement of NAFTA, the Mexican agricultural sector has had to face competition with producers from the north in terms of technological inferiority and low levels of relative productivity. This has been very evident in maize production. US imports have been increasing and domestic production has remained stagnant. Besides the price variations of the grain, there have been a number of important implications which require going beyond a summary analysis which we have tried to clarify in this article.

For example, in the production of tortillas there is a change in relative prices that occurs with a transfer that goes from corn growers to corn flour producers, and of these tortilla vendors

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

38

there is an accentuation of the accumulation in flour produc-
ers that win from the favorable evolution of the aforementioned
prices.

To illustrate this, you can then point out that on average, in
1973 with a minimum wage one could buy 28 kilograms of torti-
llas, and in 2000 only 9 12 , and in 2007 only 5.7 (INEGI-CNSM).
This gives us a measure of the actual deterioration of wages, es-
pecially if we consider that the poor spend a large part of thier
salary on the consumption of tortillas, which obviously implies a
negative impact on the poor and so on the poorest entities such
as is the case of Chiapas. If the increase in tortilla prices hurts
consumers in general, the most affected within them happen to
be the urban extremely poor, whose consumption increases since
tortillas are a Giffen good.

Therefore, the increase in international prices of corn has
been used as a pretext 13 as a product based on the increased
use of bio-fuels, especially for the main producer and exporter:
The United States, to justify the higher price of tortillas regard-
less of the increase in corn prices that are passed on directly to
consumers. Before the atomization of producers and consumers it
is difficult to exercise market power, so certainly those price dif-
ferentials are leading industrialists and mass marketers (Maseca,
MINSA, Cargill), which have an oligopolistic market and ma-
nipulate prices in their favor. It would mean that the so-called
"industrial tortilla" should be benefited by the price differential,
however, while there are an estimated 65,000 tortilla producers
around the country, then the national market is divided among
this large number of tortilla outlets.. Also, as the number of torti-
lla producers nearly doubled in a few years (from 35,000 in 1999
to 65,000 in 2007) with deregulation, a decrease of revenues oc-
cured, then consumption did not increases in the same proportion
because as we have seen the demand for tortillas is quite inelas-
tic. 14 . Thus, there are only three companies that monopolize
the market (Maseca, MoH and Cargill); while among industrial

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

39

tortilla sellers there are some that have a single establishment and others have several, but one alone has the ability to affect the market, so it follows that this is a market that is quite about perfect competition. In the case of flour, the situation is different because their small number makes it easier to reach agreements and establish oligopolistic prices, in addition to controlling the marketing of maize and imports.

It is noteworthy to mention that the increase in international maize prices have benefited producers while imports have become more expensive, so they may be functioning as a barrier to trade liberalization agreed on January 1, 2008, however, despite the recent price increase it is still importing corn which reveals that this maize is still cheaper than that produced in the country.

THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
DIFFERENTIATION IN URBAN AREA OF SAN CRISTOBAL DE LAS CASAS, CHIAPAS

40

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THE CORN TORTILLA: A NATIONAL PRICE INCREASE AND ITS SYMBOLISM IN THE CONTEXT OF SOCIAL
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