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Wasteful Consumption of Bread: Its Levels, Sources, and Possible Solutions. (A Case Study of Jordan)

Zaid Obeidat [1*] Mohammad Obeidat [2] Ahmad Obeidat [3]

1. Faculty of business Administration , The University of Jordan , POBox 926692 Amman 11190 Jordan
2. The Jordanian Senate, POBox 926692 Amman 11190 Jordan
3. Faculty of business Administration , the University of Jordan, POBox 926692 Amman 11190 Jordan

* E-mail of the corresponding author: zaid.obeidat@gmail.com

Abstract

On the basis of a study of 1644 Jordanian consumers', this study addresses the topic of the governmental bread subsidy policy in addition to the waste in the Jordanian's bread consumption. The findings of this study identified a large percentage of waste in bread consumption. Additionally, this study identified the financial repercussions due to this waste in consumption and the subsidy policy. This research is one of the first to empirically study the topic of waste in bread consumption in Jordan and in the world.

Keywords: Social Responsibility, Waste, Bread, Prices, Subsidy

1. Introduction

As commonly known, for the majority of consumers in the world and in Jordan, bread is a basic nutrition material that cannot be replaced by any other food resource and is the only food eaten by people from different race, culture, religion (O'Connor, 2012). The popularity of bread as a food resource can be noticed when looking at consumption pattern of bread from around the world. For example, in the UK the average person consumes 2-3 slices a day (O'Connor, 2012). Additionally, although, there hasn't been any empirical work that examines bread consumption in the middle east, evidence shows that the consumption level of bread and its related products is very high. For example, in Egypt, from 1271 new product releases, 251 were grain and wheat based products, while in Saudi Arabia, 166 of products released in 2010 were also grain or wheat based (Market Analysis Report, 2011). Gellynck, Kuhne, Van Bockstaele, Van de Walle, and Dewettinck, (2008) cite that this popularity is due to the fact that bread contributes to a person health because of the large amount of nutritional components it contains. O'Connor, (2012) also cites that bread contributes more than 10% of our daily intake of protein, magnesium, iron and copper among other nutrients.

Due to the importance of bread to the Jordanian consumer, governmental policies continue to support the purchase of bread and selling it to the Jordanian consumer at very low prices. In 1996 the prices of bread increased to 16 cent per kilogram (Jordantimes, 2013). However, in the past 10 years the costs of importing, producing, storing, and transporting wheat and bread increased dramatically to reach 35-40 cents for each kilogram (Jordantimes, 2013). Furthermore, the increasing number of Iraqi's, Syrians, and Egyptians in Jordan has lead to an increase in the demand and consumption of the governmentally supported bread and placed a heavy pressure on the Jordanian infra-structure (Abu Zeina, 2014; Buryan, 2012). This placed further pressure on the government financial situation and led to extra funds being used to support the importation of bread and wheat and to the general subsidy of bread. Right now, this subsidy is rumored to cost the government 320 million dollars annually with the one ton of wheat costing them 465.3 dollars (Al-Brmawy, 2014). Then, to maintain the current prices of bread, the government sells it to bread manufacturers at 42.3 dollars per each to. Other reports say that the actual cost of this subsidy is 265 million Jd's annually (Jordantimes, 2013), in which the subsided flour is sold at 35 Jd per ton to Jordanians while its actual costs is almost 300 Jd per ton. Nevertheless, despite the subsidy provided by the Jordanian government, a serious waste in the consumption of bread exists. For example, during the last snow storm that hit Jordan in early February 2015, 100 million slice of bread was sold during the four day snow storm (Ammonnews, 2015), 40 million of which were wasted and thrown after the storm ended (Ammonnews, 2015). This reflects a serious waste issue that exists in the country. Therefore, this study aims to achieve three main objectives: First, to empirically identify the amount of financial resources lost by the government due to support of bread with the current circumstances, that is, 800.000 Egyptians, 500.000 Iraqi's. and 1.5 million Syrians currently in Jordan along with its 7 million population (Abu Zeina, 2014; DOS, 2013). Second, this study aims to identify the amount of waste in the Jordanian families' bread consumption using a national Jordanian sample. Finally, this study aims to provide a number of solutions in the shape of four scenarios the government and the decision makers in Jordan can use to solve this problem.

2. Theoretical Background

The majority of studies that focused on examining bread have mainly focused on examining the consumption of bread. For example, in the United States of America a report profiling the food consumption patterns in America found that the American consumer demand for bread and bakery products exceeds the food pyramid recommendation for grain products intake (Agriculture Factbook, 2000). Another study by Foster, Green, Bleda, Dewick, Evans, Flynn, and Mylan, (2006) examined the bread production cycle and also found that bread in the united kingdom of Britain is consumed by 96% of the population on a frequent basis. A different study by the food statistics pocketbook, (2012) found a 29% increase in the bread prices 2007-2012 in the UK. This study also found a 32% of waste in bread consumption. However, in Scotland, a study by Wrieden, Barton, Armstrong and McNeill, (2006) found no change in the consumption patterns of bread and wheat related products since 1996, and that each consumer consumes an average of 154 grams of bread each day. Another study by Delisle, (1990) examined the patterns of food consumption in urban countries and found that the consumption of bread increased with income. This study also found that bread was more expensive in lower income areas. A study by the African development plan, (2012) also examined product prices in Africa and showed that bread prices are higher in lower income countries and lower in high income countries because in high income countries expenditures are higher for luxury products. Similarly in Nigeria, the study of Kilby, (1965) examined the bread industry and the consumption patterns of bread there. This study found that Nigerian consumers had a low consumption level of bread due to the low income levels of its inhabitants.

Although food waste is a major world issue costing households between 250-400 dollars each year (Wilson, 2009), it remains a relatively unexplored issue in the Middle East and particularly Jordan. As seen by the previous studies examining the topic of bread, a trend exists for examining the consumption levels of bread among other food categories without any focus on the waste in this consumption. Therefore, this study aims to identify the waste in bread consumption, the level of this waste if it exists, and the cost of this waste in Jordan. Additionally, this study aims to calculate the amount of bread used by foreigners in Jordan.

3. Methodology

Since the goal of this research is to identify the waste in the consumption of bread in Jordan, the levels of this waste, in addition to the annual loss suffered by Jordan due to its policy to support the production of bread, this study uses a quantitative approach using a nationwide administered survey. Quantitative research is more suitable to deal with descriptive research and when the aim is to collect data from a larger number of people while still maintaining the anonymity of the respondents (Matthews and Ross, 2010; Sekaran, 2003). Saunders, Lewis, and Thornhill, (2007) also cite that this approach is more appropriate when the researcher is aiming to identify general patterns. Furthermore, the questionnaires were distributed to a national purposive sample of 3000 Jordanian consumers from the major cities of Amman, Zarqa, Irbid, Karak, and Al-Salt, Jerash, Al Mufraq, Ajloun, Maan, and Madaba with 75.9% of the responses from people living in the three major cities of Amman, Irbid, and Zarqa. A 54.2% response rate was achieved, which is normal with these type of interviews (Saunders et al, 2007). However, with regards to the questions dealing with waste in bread consumption only, a response rate of 45.2% was finally achieved. Table (3-1) summarize the percentage of answers received from each city.

Table (3-1): *Sample distribution*

City	Frequency	Percentage
Amman	688	41.9%
Irbid	228	13.9%
Al Salt	79	4.8%
Al Zarqa	332	20.1%
Jerash	67	4.1%
Al Mufraq	68	4.1%
Maan	24	1.5%
Ajloun	44	2.7%
Madaba	59	3.5%
Other	55	3.4%
Total	1644	100%

As generally recommended by Mathews and Ross, (2011), the survey distributors (staff of the national society of consumer protection) provided participants with the aims and objectives of the study in addition to assurances that their answerers will be used only for the purposes of scientific research. Before that the questionnaire was pilot tested and all of the scales had a Chronbach alpha above .82% which is considerably higher than the acceptable amount of .60% (Palant, 2010). Moreover, the questionnaire consisted of two main sections. The first section dealt with demographic information and the second section dealt with questions concerning the variables of the study. The second section included questions such as "*What is the quantity of bread you don't consume after purchase?*, and *"what is the frequency of you bread purchase?*. Afterwards, a screening question was asked, asking respondents if there was any waste in their bread consumption in addition to the level of this waste. From the participants who responded to this question, 87.4 admitted to an existing waste. The data collection process lasted for 18 months before the analysis of the data began. As previously mentioned the sample of the study was chosen to represent different segments of the Jordanian population. 56.2% of the population were less than 38 years old, 33.5% were from 38 to 55 years old, and 10.2% older than 55. Additionally, 32.4% of the respondents held a full time Job in the public sector, 11.7% held a full time Job in the private sector, 28.4% were unemployed, 10% were retired, and 17.5% of the population had a private business as seen in table (3-2).

Table (3-2): *Employment status*

Employment status	Frequency	Percentage
Full time in the public sector	532	32.4%
Full time in the private sector	192	11.7%
Private business	288	17.5%
Unemployed	468	38.4%
Retired	164	10%
Total	1644	100%

Moreover, as seen in Tables (3-3) and (3-4) 67.6% of the sample had an income level below 750 Jd's (Jordanian dinar), 20% were between 750-1500 Jd's, 9.5% were higher than 1500 and 2.9% didn't answer this question. Whereby, with regards to the family size of the participants, including the husband and wife, 62.1% had a family size above 5 as seen in table (3-4):

Table (3-3): *Income level*

Income level	Frequency	Percentage
Below 500	632	38.5%
500-750	480	29.1%
750-1000	236	14.4%
1000-1500	92	5.6%
1500-2000	28	1.7%
2000-2500	72	4.4%
2500-3000	8	0.5%
3000 & above	48	2.9%
Didn't answer	48	2.9%
Total	1644	100%

Table (3-4): *Family size*

Family size	Frequency	Percentage
2	72	4.4%
3	168	10.2%
4	376	22.9%
5	312	19%
6	384	23.4%
7 and above	332	20.1%
Total	1644	100%

Finally, as suggested by Saunders et al, (2007), a back translation was conducted because it will eliminate any bias in translation and ensures the best possible translation from Arabic to English. the researchers first translated the survey and the answers themselves. After that, an independent interpreter (A management professor in the University of Jordan) translated them back into Arabic. A meeting was held afterwards with all three and no issues were raised.

4. Findings

4.1. Does Waste exist:

With regards to the first objective of this study which was to identify whether or not a waste existed in the consumption of bread, the findings of this study showed that when respondents were asked if there was waste in their families' consumption of bread, 87.4% of the study sample admitted that there was waste. Furthermore, regarding the levels of this waste in consumption of bread, 57.4% cited that level of waste was approximately 250 grams, 18% cited it was 500 grams, 11.7% cited 750 grams, 4.3% of the sample who admitted to bread consumption waste reported over 1 kilogram of waste, and 8.6% refused to answer this question. Concerning the annual quantity of waste bread, for 250 gram level, the amount of wasted bread annual was 53655 kilograms and was calculated through the following equation (588 x ¼ kilogram x 365). For the 500 grams or ½ kilogram group, the amount of the annual waste was 33680 kilograms. For the 750 grams and 1 kilogram groups, the level of waste annually was 32950 and 16060 respectively. This contributes to a total amount of waste of 136.345 kilograms annually as seen in the following table (4-1) :

Table (4-1): Bread waste level (note: *588 equal the frequency in the sample which is 57.4%*)

Bread Waste level	Percentage %
250 grams	57.4%
500 grams	18%
750 grams	11.7%
over 1 kilogram	4.3%
Didn't answer	8.6%
Total	100%

4.2. The amount of Monetary Loss:

*:*When comparing the annual amount of the wasted bread for the sample to the total number of Jordanian families which according to recent reports is 1.600.000 in 2013 (DOS, 2014), and for a more accurate calculation, we accounted that the sample size of 3000 only equals 25% of the total families population (Sekaran, 2003). Therefore, 136345x400.000= 55.536,000 million kilogram of wasted bread annually. Additionally, when calculating the cost of this wasted bread on the government, for the cost of producing one kilogram of bread at 38 cents, 55 million x 38 cents =210 million loss for this level of waste (250 grams), when calculating this cost based on the price sold to the consumer, 55 million x 16 cent= 88 million. Therefore, the annual loss suffered by the government due to its subsidy policy is 210 million- 88 million = 122 million for a 250 grams waste level as seen in table (4-2).

Table (4-2): The Cost of bread waste

Price	The cost of bread waste
At 38 cents (actual bread price)	210 million
At 16 cents (supported bread price)	122 million

With regards to the cost of bread sold to foreigners, 1.5 million Syrians, 400 thousand Iraqi's, 600 thousand Egyptians and from other nationalities (Abu Zeina, 2014; DOS, 2013), a total of 2.5 million buy Jordanian supported bread. Therefore, by proposing that these foreigners consume the lowest amount of bread (i.e. 250 grams), these foreign consumers consume daily 600.000 kilograms (i.e. 2.5 million x ¼ kilograms x 365). Moreover, these 600.000 kilograms would therefore be 228 million kilograms consumed annually. At 38 cents, the actual cost would be 87 million and at 16 cents it would cost 36 million annually. This led us to estimate the difference between supported price and the actual cost to be 51 million JD (87-36=51). This finding illustrates that the Jordanian government loses 51 million JD as a result of its subsidy policy and its support ofthe production and sales of bread to foreigners in Jordan. Consequently, the amount of loss suffered by the governmental support of bread is, 122 million + 51 million = 173 million JD. However, this number does not include the losses and waste in the transportation, storage, and smuggling processes, in addition to assuming that these local and foreigners have a higher level of bread waste, which could further increase this number.

Table (4-3): Total annual loss due to the support of bread

At 250 grams for waste	*loss due to the support of bread*
At 16 cents for Locals	122 million
At 16 cents for foreigners	51 million
Total Annual loss	173 million

5. Recommendations

Therefore, this study has identified a large percentage of waste in the Jordanian consumer consumption of bread. Moreover, this waste in consumption was identified at four levels (¼, ½, 750 grams, and 1 kilogram). Additionally, this study identified an annual loss of 173 million Jd's due to the governmental subsidy of bread. Although the surrounding environment and the state of unrest in these surroundings will influence the degree to which these proposed solutions can be adopted, efficient and graduate execution of these solutions will most certainly solve or minimize the annual loss suffered by the governmental subsidy of bread in Jordan. Therefore, this study provides a number of recommendations in addition to presenting four scenarios the decision makers in Jordan can adopt gradually in four years.

As seen in the findings of this study, a very large number of waste exist in the Jordanian consumer consumption of bread. Additionally, the majority of the sample in this study had a below 750 Jd's income. Therefore, a serious poor attitude towards waste exists in Jordan. Consequently, the government in addition to the related Ngo's in Jordan (e.g. consumer protection agencies) should devise serious and practical plans to educate consumers about correct behavior patterns especially in the consumption of bread. Additionally, the government and the consumer protections agencies should also design plans and strategies to eliminate the waste in the bread consumption on one hand, and preserve the public resources on the other.

With regards to the first solution or scenario in eliminating the loss suffered by the subsidy of bread, this study proposes that price of bread should be increased to 20 cents instead of 16 for all of its inhabitants (Jordanians & foreigners) in the first step. This scenario would decrease the loss suffered by the Jordanian government budget. First, the 300 million kilograms of bread X 20 cents would equal 60 million Jd in revenue. This 300 million multiplied by 38 cents (i.e the cost price) equals a 114 million total cost. Consequently, this will cut done the loss to 54 million. (i.e. 114 million cost – 60 million in revenue = 54). Second, the decision makers in Jordan can increase the price of bread to 24 cents for all inhabitants in the second year. This decision would increase the revenues to 72 million Jd (300 million x 24 cents = 72 million). The 72 million subtracted from the total costs of 114 million equals a loss of 42 million instead of 54 million (114 million – 72 million = 42 million. This second step would therefore decrease the loss suffered by the government from 54 million Jd's to 42 million Jd's. Furthermore, in the third scenario or the third step in solving this problem, the price of one kilogram of bread is increased to 30 cents for all the inhabitants in Jordan. Thus, the total revenue is increased to 90 million Jd's (i.e. 300 million X 30 cents), and in this situation the total loss is decreased 24 million Jd's in the third year (i.e. 114 million – 90 million). Finally, in the fourth and final step, the price of bread is increased to its actual production and supported cost (i.e. 38 cents). In this situation, the state budget will not suffer any losses. However, this situation would require the government to compensate the groups suffering from this decision (i.e. those whose monthly income is lower than 1000 jd's) in a suitable way.

Table (5-1): possible solutions

Steps	Policy suggestion	Expected effect
Year 1	Price increased to 20 instead of 16 cents	Decrease annual loss to 54 million
Year 2	Price increased to 24 instead of 20	Decrease annual loss to 42 million
Year 3	Price increased to 30 instead of 24	Decrease annual loss to 24 million
Year 4	Price increased to 38 instead of 30	Decrease annual loss to zero

Thus, this study has also presented four solutions to the issue of bread in Jordan. These solutions or series of steps can decrease the losses suffered by the government in four years to zero. Finally, as with all research focusing on human dynamics, a number of limitations exist concerning the findings of this study. Despite that, it presents a solid base for future research. Furthermore, future research can use a similar design to examine the loss due to the theft, storage, smuggling, and transportation processes which also could affect the monetary losses suffered by the government in Jordan. Additionally, the amount of waste mentioned in this study relates to the subsided bread and does not include or examine other types of bread, future research could therefore examine

the waste in other types of bread. Future research could also focus on examining the influence of the foreign labour and the refugees in Jordan on the monetary loss suffered by the government due to its support of bread. This approach would allow for a better and more accurate calculation and thus, more accurate solutions. Moreover, to avoid confusion and provide an idea of this problem in Jordan, this study measured the results based only on the lowest level of waste (i.e. 250 grams), therefore, future research based on the results of this study could come up with an even higher level of annual loss with different levels of waste in the bread consumption.

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