An investigation of a price increase effect on the staple-food basket composition for low-income South African consumers

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Abstract

The South African consumers' staple-food basket has over recent years come under pressure with unforeseen events having a detrimental impact on supply and consequently on food prices. These events have had a destabilising effect on the composition of South African staple-food baskets over the last few years. These events have been shown to have an unfavourable effect on the supply of food and consequently on the price of food. This study investigates the price-based product-switching that lower-income South Africans practice when prices increase in their staple-food basket.

Retailers and manufacturers are all reliant on a stable and predictable demand for staple foods; retailers face a missed opportunity in terms of revenue if consumers are unable to purchase a product due to it being out of stock. Manufacturers face potential monetary fines if they are unable to meet the expectations of retailers and could lose consumers and consequently revenue to competitor brands if their products are unavailable on retail shelves.

Consumer-panel data from Nielsen South Africa is incorporated into the research to determine shifting in the lower-income South Africans staple-food basket consisting of maize meal, potatoes, bread and rice. The researcher assisted in the acquisition of the data, completing the entire process from the collection of raw purchase data to the development of a final data set. Due to the continuous tracking of the panel, historical trends and shifts are available to identify shifting between staple goods at times of significance. The researcher assumed a positivist paradigm and followed a quantitative approach when the panel data was analysed to determine which products households shifted from and to during times of price increases. The results and conclusions clearly define the impacts that price increases have on sales of certain products. A clear assessment was also made on the relationship between staple-food basket products, as well as consumers' tendency to switch between products in their staple-food basket. These insights enable retailers and manufacturers to efficiently plan for consumer demand before and during times of price increases in a staple-food basket.

Keywords: staple-food basket, price-based product-switching, low income, South Africa.

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Chapter 1: Introduction

1.1 Introduction

This study examines the effect of a price increase on the staple-food-basket composition for low-income South Africans. Staple foods are the food groups comprising the majority of consumers' nutritional intake and are maize meal, bread, rice and potatoes (Davids *et al.*, 2016). Little research has been completed on price-based product-switching occurring in a staple-food basket as prices increases for low-income South Africans. Liang *et al*. (2022), Blaauw *et al.* (2016) and De Cock *et al.* (2013) have investigated consumer-purchasing decisions in a staple-food basket; this was focused on smaller rural areas. This research examines purchasing shifts resulting from price-based product-switching and uses a nationally representative sample of the lower-income South African consumer.

The output of white maize meal has decreased by 25% in South Africa from before the 2015/2016 drought (Bahta *et al.* 2018) and consequently the price increased by more than 50% since 2015 (Chisanga *et al.*, 2017) (Davids *et al.*, 2016). The drought had negative impacts on output across crop types, with the cost of a typical staple basket, as determined by Davids *et al.* (2016) for low-income households, increasing by approximately 29 percentage points year-on-year.

Prior to the drought in South Africa, there have been two recent global food crises leading to social unrest and food riots (Hellegers, 2022; Bellemare, 2014; Chen & Mersereau, 2015). The first crisis occurred during 2007-2008, when food prices increased by as much as 51 percentage points (Hellegers, 2022; Bellemare, 2014). This was followed in 2010 and 2011 by food prices in South Africa increasing by 41 percentage points in the space of 13 months (Hellegers, 2022; Bellemare, 2014). This research investigates the impact of rising food prices on sales of specific products and to quantify the resultant product-switching within the staple-food basket by lower-income consumers.

A complete and quantifiable understanding of the impact of food insecurity on retailers is challenging to attain, as retailers rely on demand planning to forecast and plan for sales (Sakoda *et al.*, 2019; Chen & Mersereau, 2015). This reliance on demand to forecast sales can lead to out-of-stock situations, which are a lost opportunity for retailers and could also create a perception of being unreliable with consumers (Sakoda *et al.*, 2019; Chen & Mersereau, 2015). Christensen *et al.*, (2023) and Alftan *et al.* (2015) also found that factors such as seasonal trends, price volatility and promotional campaigns have significant impacts on demand, which retailers find challenging to incorporate into planning efficient stock levels.

Food security forms an integral part of the establishment of a stable and burgeoning society, with healthy and productive participants (Ahmed *et al.,* 2023; Butler, 2015). A lack of this security has a direct relationship with conflict and a lack of governance; thus, it can be deemed to be a necessity for a state to function as a sovereign nation (Fraundorfer, 2022; Staples, 2003).

1.2 Background to the study

The focus population of the study was low-income South African households, as these are the consumers most adversely impacted by any external factors and is the segment of the population most susceptible to food insecurity (Madlala, 2023; Drimie & Faber, 2016). Food insecurity can be described as the lack of "access to sufficient, safe and nutritious food" (Broussard, 2019:180) and is measured regularly by organisations such as the United Nations and the World Bank Group.

The global food crisis during 2007 and 2008 had a significant impact on world food security, with prices of maize and wheat doubling and the price of rice tripling, over a period of a few months (Osendarp *et al.*, 2022; Heady, 2011).

The average low-income South African consumer purchases a staple-food basket comprising four products (Davids *et al.*, 2016). Maize is the staple (Beukes *et al.*, 2017), followed by bread (Beukes *et al.*, 2017), rice (Rinaldi, 2023; Makgetla & Watkinson, 2002) and potatoes (Siddiqui *et al*., 2023; Ronquest-Ross *et al.*, 2015). The supply of these products was negatively impacted by a time of drought in South Africa during 2015 and 2016. This shortage in supply led to an increase in prices, with maize being impacted the most significantly.

When consumers are faced with rising prices of staple-food products, switching can occur in the consumer's product-purchase decision. There are multiple factors that affect a consumer's product-purchase decision and in this research the focus is on price, as this was the variable with the highest degree of change during the 2015 and 2016 drought in South Africa.

1.3 Problem statement

With rapid urbanisation, low-income households are often left with no choice but to live on the outskirts of cities where jobs, infrastructure, services and shopping destinations are limited, which in turn can lead to food insecurity (Mpungose, 2023; Kotze, Rogerson & Rogerson, 2014). Combining the lack of infrastructure with a congested and unreliable transport network (Donaldson *et al*., 2023; Campbell, 2016), consumers can be left with few options and limited assortment in terms of a source of food to purchase from.

During times of high price inflation, low-income consumers are more susceptible to fluctuations and are therefore more prone to adapt their purchasing behaviour to maintain their purchasing power at as high a level as possible (Bloem *et al*., 2022; Berhane *et al.*, 2014). These adaptations could result in consumers shifting from one staple food source to another or purchasing less of the same source (Martin *et al*., 2022; Minot, 2011). To adequately provide alternative sources of food to consumers, the stakeholders (government, retailers and suppliers) are required to understand the shift between staple foods. With current projections of a surplus maize crop, South African producers are looking to export more maize (Stoddard, 2017). The government is investigating whether to establish a grain reserve but cannot provide a solution yet, while South Africa's largest grain-producing group, Grain SA, does not agree with this proposal (Stoddard, 2017).

Mourtzis (2020) and Ramanathan (2014) states that, should manufacturers not meet the demand of retailers or do not adhere to a specified production schedule, they will be liable to pay penalty costs to retailers. Hubner and Schaal (2017) found that, between 45% and 84% of the time that a particular product is out stock, it can be substituted immediately with another product. This proves that, should their product be out of stock, manufacturers face a significant risk of consumers shifting to other brands.

Although research has been conducted at local levels in places like Runnymede Village (Blaauw *et al.*, 2016) and the Limpopo province (De Cock *et al.*, 2013), the relationship of shifting between staple foods is as yet unexplored in the general context of low-income South African residents. Haggblade, Me-Nsope and Staatz (2017) state that, with a significant price increase in one staple food, the prices of the rest of the basket also increase, as consumers shift to substitutes. The authors mention the price increases that other products experienced as a result of one staple price increase but do not measure which products experience the most significant increase in demand. The ability of various stakeholders to effectively prepare stock levels and substitute products in cases of a shift in one major staple's price is compromised by the lack of insight on this subject. This is specifically true in countries like South Africa, with such a large low-income population.

1.4 Research question and objectives

The primary research question for this study is as follows:

- What effect does a price increase have on the entire staple-food basket consumption patterns among low-income South Africans?

A secondary research question that is also answered is as follows:

- When the price of maize increases, what other staple food experiences a change in consumption?

The primary objectives of the study are:

- To examine the effect of a price increase on the staple-food basket composition for low-income South Africans.
- To examine the impact of rising food prices on the purchase of specific staple-food products.

1.5 Conceptual Framework

A conceptual framework provides a basis of previous research from which certain assumptions can be extracted and aspects can be incorporated into the current study, with this research also contributing to the framework and the current literature around the subject.

The conceptual framework to be incorporated into the study is based on research by Zhang *et al*., (2021) and Chiang, Malhotra, Wirtz and Xiao (2014), who identified that price is one of the key factors that impact switching behaviour (Zhang *et al*., (2021) and Chiang *et al.*, 2014). The original framework was designed to study switching between cellphone providers but can be incorporated into this study, as it identifies the marketing mix as a variable in switching behaviour. For the purposes of this study, the pricing impact is followed with secondary input from demographics leading to switching behaviour. Figure 1 illustrates Chiang *et al.*'s framework, with the two variables, pricing and demographics, highlighted in green. The other variables of satisfaction, switching costs, advertising, distribution, product usage, product involvement, product knowledge and specific events have been excluded from this research, as they do not explain price-based switching behaviour.

Figure 4.1: Switching Behaviour Framework. Source: Adapted from Chiang *et al.* (2014)

In addition, while Chiang *et al.* (2014) used a panel survey with data collected every four months by means of a survey, this study is far greater in scope by using a panel of monthly data collection by means of a financial diary. This method will be summarised in the next section.

1.6 Research method

This section will outline the research method to be implemented with the research study. Further details for the methodology are explained in Chapter 4.

1.6.1 Research paradigm

A research paradigm is defined as a conceptual framework agreed upon by researchers to provide a model for examining problems (Kankam, 2019; Antwi & Hamza, 2015). This framework can also be referred to as a pattern or structure with a system of values and assumptions (Kankam, 2019; Antwi & Hamza, 2015). A positivist approach is utilised for this study, as the results are based on an objective reality, with data gathered from a natural setting producing an accurate understanding of reality (Garcia, 2017). The positivist researcher believes that truth and reality is independent of the observer and viewer and tends to place more emphasis on measurement and impartiality by utilising quantitative analysis (Kankam, 2019; Aliyu *et al.*, 2014). Access to big data has enabled positivistic researchers to develop a more complex model of human life (Kitchin, 2014).

1.6.2 Research design

The structure and method of the research are based on the chosen research design, while also ensuring that the evidence obtained answers the question posed as clearly as possible (De Vaus, 2005). Research design should be viewed as looking at the question posed and determining what type of evidence is required to answer the question in the best manner possible (De Vaus, 2005).

The research design follows a descriptive longitudinal approach, as the nature of the data available allows for the research to accurately measure the impact of change in certain variables on the control group over an extended period. The drought South Africa experienced in 2015, recorded as the year with the lowest rainfall since 1904 (South Africa recorded the driest year in over a century, 2016), has been identified as the period with the most significant impact on food prices and data surrounding this period is the focus. Panel data from January 2015 has been identified as the period before price inflation came into effect.

Some of the disadvantages of using the longitudinal approach are changes in data collection, maintaining the integrity of the sample, difficulty in showing more than one variable and the need to have a large sample to accurately draw conclusions (Mohajan, 2020; Rajulton, 2001). In the next section, it will be shown that drawbacks have been accounted for in the method of data collection.

1.6.3 Research methodology

This research will be based on consumer/household panel data sourced from Homepanel® data supplied by Nielsen South Africa.

Nielsen household panel data has been used by other researchers across disciplines, such as medicine (Andreyeva *et al.*, 2021), marketing (Auchincloss *et al.*, 2021) and public policy studies (Guilkey *et al.*, 2022).

The panel is representative of South African citizens and participants are categorised by five dimensions: number of people permanently part of household, age of main purchaser in household, location of household (provincial), race and the Living Standard Measure (LSM) level the household is regarded as being in. The aforementioned five dimensions will establish the demographics portion for the customer background data, as stipulated in the conceptual model. As the panel is continuously monitored and tracked over time, it is possible to assign trends to certain portions of the population. The panel consists of 3600 households, whose purchases are tracked on a monthly (rural) or fortnightly (urban) basis. Households track purchases in a diary and are required to keep all receipts and packaging material for fieldworkers to be able to cross-check entries in the diary. Data has been collected across households for several years, enabling this research to identify and track trends over time and, due to the fact that each household is identifiable (yet anonymous), trends can be attributed to specific segments of the population. This historical data results in the researcher being able to identify which products a household purchased before a price increase and to which product they shifted if there was any movement. In some instances, it is also possible to investigate whether households returned to their original products if prices returned to normal.

1.6.4 Target population and sampling

The target population has been identified as low-income South African residents. The average living wage for a family was set at R9690.00 per month (Trading Economics, 2018) and based on Living Standard Measures (LSM), households categorised as LSM 6 have an average household income of R7876.00 (Mathebula, 2016). For this reason, households categorised between LSM 1 and LSM 6 are defined as low-income households.

The sampling methodology follows a random stratified probability sample approach. The universe is segmented into strata (Chuvieco, Padilla & Stehman, 2014) and each household has an equal chance of being selected from within its strata (Johnson, 2020; Marshall, 1996). This stratification of the population allows the sample to be representative of the South African population in terms of LSM, household size, provincial location, race and age of the main purchaser. The households included in the sample were recruited by field representatives by means of interviews to determine eligibility based on the main population identifiers.

Based on Statistics South Africa (2023), there are 18 477 000 households in South Africa, which requires a sample size of 384 at a 95% confidence level and a confidence interval of 5

(Sample Size Calculator, 2017). Based on these figures, the panel of 3600 households available is sufficient to represent low-income households.

1.6.5 Data analysis and presentation

With the household purchase data available, the study determines the composition of the various staple foods at a household level. Having determined the period at which price increases came into effect, the composition of the household's staple foods will be analysed after the price increase has come into effect.

The researcher is able to determine if households purchasing different combinations of staple food reacted differently to the price increases. The analysis will be completed by investigating the change in composition of the staple-food basket from before the price increases to after the price increases.

1.7 Contributions of the study

This research assists in developing a better understanding around the lower-income consumer's staple foods basket. As lower-income consumers and households are the most vulnerable to external shocks within modern society, the need for support is greatest in these households. The conclusions drawn enables stakeholders to provide more relevant and useful solutions to lower-income households when times of high price inflation adversely affect lower-income consumers' food security. Graphs, tables and charts are utilised depending on which is the most relevant method to convey the results. This research broadens the understanding of staple-food baskets for lower-income South Africans on a national level.

There is a contrast in South Africa, as it has a significant agricultural sector that should be able to ensure food security, while 52% of households experienced hunger in 2005 (Battersby, 2022; Kirsten, 2015). Battersby (2022) and Kirsten (2015) also notes that it is important to take a long-term view when analysing inflation, which is why the longitudinal approach followed by this research is very relevant.

Ngumbela *et al.* (2020) and Altman *et al.* (2009) called for studies to provide a better understanding of the causes and implications of household food insecurity at various levels. Both Ngumbela *et al.* (2020) and Altman *et al.* (2009) also states that the availability of these conclusions and insights will enable evidence-based decisions to be made on how best to address food security.

In their research on staple-food markets in Africa, Bellemare *et al.* (2022) and Rashid and Minot (2010) concluded that more research needs to be conducted, focused on granular data at a regional or national level. This research takes a further step by analysing price data and the effect that had on South African consumers.

Ngema *et al.* (2018) conducted research on household food insecurity in the Maphumulo Local Municipality, South Africa. They called for further research into coping measures households undertake to maintain food security and the effect of household income on food security.

1.8 Limitations of the study

This research only measures the interaction between an exclusive five categories: maize meal, rice, bread, pasta and potatoes. Should households shift to another good, this research does not perceive the shift. With the data that is available, all five categories can be investigated and provides a more complete view of the consumer's basket. One of the common complications with consumer-panel data is the issue around retaining participants and the effect that different types of rewards have on their purchasing behaviour. Dolnicar, Polonksy and Vocino (2015) stated that rewards, whether monetary or some other benefit, increased the response rate of participants. The panel relies on participants to diarise each shopping trip and retain all packaging materials until a fieldworker has recorded their behaviour. This places significant responsibility and pressure on the participants to uphold the integrity of the panel.

1.9 Conclusion

This research adds to the current literature on South Africa's low-income consumer purchasing behaviour focused on a staple foods basket with external shocks of high price inflation. Clearly defined relationships are drawn between foods certain consumers prefer and the substitutes they turn to once their first choice surpasses a certain price barrier.

The current research does not provide a nationally relevant investigation into the purchase decisions of low-income South Africans who have been defined as some of the most vulnerable to food insecurity. This knowledge enables the government, retailers and manufacturers to plan and prepare during times of high inflation for the needs of these consumers.

Chapter 2: Low-income consumer food consumption

2.1. Introduction

The literature review will examine academic work that has relevance to this research dissertation. The four main segments to the study are food security, a staple-food basket, low-income households and the impact of rising food prices. The first three segments are discussed in this chapter, while the impact of rising food prices will be discussed in the next chapter.

2.2. Food security

This section will firstly define food security as put forward by various researchers and the most significant contributors to food insecurity. Second, the impact of the global food crisis on consumers is briefly examined, followed by an analysis of food insecurity in South Africa. Finally, food-aid efficacy will be examined as a sustainable measure of improving food security. The role that retailers and manufacturers perform in food consumption will also be briefly examined in this section.

2.2.1 What is food security

The Food and Agriculture Organisation of the United Nations (FAO) has defined food security to "exist when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (Broussard, 2019:180). Economic accessibility to food is linked to the price of a product and is impacted during times of high price inflation, such as the 2007-2008 food price increases, which resulted in 105 million people moving into extreme levels of poverty (World Bank Group, 2019).

Food security is measured in four dimensions: availability, access, utilisation and stability (Pingali *et al.,* 2022; FAO, 2006). Food availability refers to satisfactory quantities and suitable quality of food being supplied. Access requires individuals to have the right to resources to produce their own supply of food or to have the economic resources to purchase food. Utilisation refers to non-food inputs into food security, such as clean water, sanitation and health care to reach the state of nutritional satisfaction (Pingali *et al.,* 2022; FAO, 2006). To achieve food stability, individuals cannot lose access to food at any time through external shocks or cyclical shortages (Pingali *et al.*, 2022; FAO, 2006). More recent research (Liu *et al*., 2021; Huchet-Bourdon & Laroche-Dupraz, 2016) supports and acknowledges the four dimensions identified by the FAO.

Over the last 50 years, food production has seen a marked increase, reducing the proportion of people living in hunger despite the population having doubled (Potapov *et al.*, 2022; Beddington *et al.*, 2010). However, the number of undernourished people in the world has remained above 800 million since 1990, which is still a significant segment of the global population (Zhuang *et al.*, 2022; FAO, 2009).

Bai, Chen, Fu, Gu, and Zhang (2019) states that urbanisation is contributing to a decrease in food security through two drivers: lost production and increasing consumption. In their research on the Indian city of Delhi's land use, Ahmad, Avtar, Sethi and Surjan (2016) discovered that, over ten years starting in 2001, Delhi had lost 11 percentage points or just less than 50 square kilometres of agricultural land. The Chinese city of Zhengzhou, known as the breadbasket of China, has increased fourfold in size since 1990, decreasing the amount of arable land (Bai *et al.*, 2019). The Chinese government has taken steps to reclaim agricultural lands with one method of paying workers migrating to cities to demolish their rural houses for this land to be used for agricultural production (Bai *et al.*, 2019). There have been adverse effects of the Chinese government intervening, with some cities converting wetlands into residential-use areas (Zhang *et al.*, 2022; Bai *et al.*, 2014).

Bai *et al.* (2019) also emphasise increasing food consumption as having a significant impact on decreasing food security and more specifically the shift to protein-rich diets. Clark and Tilman's (2014) research into various diets and the sustainability and health implications of the diets discovered that it requires four times more cropland to produce meat of the same nutritional value as a vegetarian diet and was affirmed by He *et al*. (2020).

2.2.2 Major contributors to food insecurity

The food insecurity that certain markets entered recently was because of two phenomena, namely, a global food crisis and increased demand for biofuels. These two phenomena will be explained in more detail in the next two sections.

2.2.2.1 Global food crisis

During 2007 and 2008, a global food crisis occurred in which the prices of maize and wheat doubled, while rice prices tripled over a few months (Osendarp *et al.*, 2022; Heady, 2011). There are two main drivers of the price increases: poor crop outputs in three key markets (as defined by the Food and Agriculture Organisation of the United Nations) and increased demand for biofuels (Geletu *et al*., 2019; FAO, 2008). There are four key markets that experienced poor crop production during this period, namely, the European Union, Australia, Canada and South Africa. Each of these is briefly discussed below, with Australia and Canada grouped together.

First, the European Union produced 21 million tonnes less wheat and coarse grains in 2007 than in 2005, equivalent to 8 percentage points less output (FAO, 2008). The lower output in the EU was mainly a result of a decrease in area harvested, which decreased by 6 million hectares or a reduction of 9 percentage points (FAO, 2008).

The second set of markets to have impacted global prices is the combination of Australia and Canada. The total production in these markets was 20 million tonnes lower in 2007 than in 2005, a reduction of 22 percentage points (FAO, 2008). The crop yield in these markets decreased by 0.5, the equivalent of a 21 percentage point decrease in 2007 compared to 2005 (FAO, 2008). While the weather is the main cause of the lower yields, Canada did experience atypically high yields in 2004 and 2005, resulting in a higher-than-normal base for comparison (FAO, 2008). The poor yield in Australia is a direct consequence of the drought the country has been experiencing, which has resulted in the yield being negative in several years (FAO, 2008).

South Africa is the final market to have adversely affected the global prices of wheat and coarse grains. Total production in South Africa decreased by 5 million tonnes, 32 percentage points less in 2007 than in 2005 (FAO, 2008). The total area harvested decreased by 1 million hectares, a reduction of 13 percentage points (FAO, 2008). The South African crop yield also decreased by 22 percentage points (FAO, 2008). Across all three measures of area harvested, yield and production, South Africa experienced the worst percentage decline across all markets measured and reported on by the FAO (FAO, 2008).

2.2.2.2 Increased demand of biofuel

During 2001 to 2008, the production of biofuels produced from food crops grew severalfold, when global ethanol production from maize and sugar nearly doubled from 30 to 50 hm^3 (Fróna *et al.*, 2019; Hochman, Rajagopal, Timilsina & Zilberman, 2014). This increase in production stemmed from an increased demand driven by a response to government mandates and subsidies in the United States and the European Union (Fróna *et al.*, 2019; Hochman *et al.*, 2014).

First-generation biofuels are produced primarily from corn and sugarcane and compete directly with food and feed, which results in a higher demand for agricultural commodities and consequently higher prices (Dong *et al.*, 2019; Hochman, Rajagopal & Zilberman, 2010). While an increase in biofuel production will have the effect of decreasing fuel prices, during 2008 biofuels only made-up 3% of global fuel markets (Hochman *et al.*, 2010). The impact of the biofuel production spike led to OPEC reducing oil production, which in turn mostly offset the price reduction effect that biofuel had on global fuel markets (Dong *et al.*, 2019; Hochman *et al.*, 2010). Bureau and Swinnen (2018) have gone as far as stating that EU bioenergy policy has increased production of palm oil in Southeast Asia at the cost of an increase in deforestation, with all the added adverse consequences that stem from deforestation.

Londono-Pulgarin *et al.* (2021) and Koizumi (2015) defines five stages in the relationship between biofuels and food security. The first stage is competition between biofuels and food crops, which occurs in each country and region. The second stage is the price reaction in agricultural commodities, but it has to be noted that not all commodities will increase in price. During the third stage, the competition effect is transferred to food prices. The fourth stage shows the price reaction in food because of the competition-effect transfer. The final stage demonstrates the effect of increasing food prices on food security (Londono-Pulgarin *et al.*, 2021; Koizumi, 2015).

2.2.3 Impact of global food crisis on consumers

While there were some parties that gained during the global food crisis, the wins are offset by the losses sustained by the poorest population. Farm sectors in some developing countries have extracted value from the crisis while most of the benefits can be attributed to developed countries' exporters and sizeable agribusinesses (Oxfam briefing paper, 2008). Vietnam and Peru are some of the few developing nations that experienced a reduction in poverty rates during the crisis as a result of the increase in prices stimulating crop producers' wealth (Oxfam briefing paper, 2008).

Cohen and Garrett (2010) noted that urban dwellers were the most vulnerable during the food crisis as they relied on purchases for their food and spent a disproportionate amount of their expenditure on food. While there is a significant number of poor people in rural settings, a significant portion of them are net food producers and may have their own crops to provide a buffer (Cohen & Garrett, 2010).

In Bangladesh, poor people had cut one daily meal and had stopped eating meat, fish and eggs and were unable to save money (Cohen & Garrett, 2010). During 2007, 5 million Haitians lived on less than a dollar a day and almost half of the population was undernourished (Oxfam report: 'world must learn lessons from food price crisis', 2010). In poor Guatemalan households, where close to 70% of all spending is on food, the price of yellow maize increased by 34 percentage points in the crisis (Oxfam briefing paper, 2008).

Oxfam states that, during 2007 and 2008, the number of malnourished people in the world rose to 119 million, bringing the total number to 967 million. In addition to this, 290 million people living in the most vulnerable countries during the crisis were at risk of falling into poverty. While developed countries pledged $12.3bn to alleviate the impact of the food crisis on poor people, it was significantly less than the UN's estimate of $25bn-$40bn needed to increase agricultural production and provide the necessary social protection (Oxfam briefing paper, 2008).

The World Bank estimates that, with the food crisis, another 100 million people were pushed into poverty, which effectively puts the world seven years back in the fight to eradicate poverty (Oxfam briefing paper, 2008). In addition to this, De Hoyos and Medvedev (2009) found that, during the food crisis, an additional 68 million individuals became food insecure over a two-year period as a result of food inflation.

2.2.4 Food insecurity in South Africa

Ngumbela *et al.* (2020) and Altman *et al.* (2009), states that South Africa as a country is perceived as a food-secure nation but this does not transfer to all South African households being food secure. While research has been completed on food insecurity in South Africa, the results vary significantly and therefore a conclusive result or baseline indicator cannot be agreed upon (Ngumbela *et al.*, 2020; Altman *et al.*, 2009). What researchers can agree upon is that the proportion of food-insecure South African households is significant enough to warrant further research in the field (Ngumbela *et al.*, 2020).

Research indicates that the prevalence of hunger decreased between 1998 and 2007 but the number of households experiencing under-nutrition has remained constant (Ngumbela *et al.*, 2020; Altman *et al.*, 2009). In 2005, only 20% of South African households could afford to buy a basic nutritional food basket at an average cost of R262 per person per month (Altman *et al.*, 2009), which leaves a significant proportion of the citizens under-nourished.

It is important to note that food insecurity can be chronic or transitory, with households marginally food insecure being pushed into chronic food insecurity during an event like the global food crisis (Ngumbela *et al.*, 2020).

In research on food security in the Free State, Van Rooyen and Walsh (2015) highlight three factors affecting food security globally: population growth, climate change, and environmental degradation which was also confirmed by Van den Berg *et al.* (2023). The research notes that this is different in developing nations, with the major challenges being human immunodeficiency virus infections; poverty and unemployment; and poor access to food at a household level (Van den Berg *et al.*, 2023; Van Rooyen & Walsh, 2015).

Boyden (2016) states that communities relying on one or two staple-food sources are more susceptible to malnutrition, as well as famine and ultimately starvation, which is why this study examines a basket of four staple foods. Potter (2015) also found that, over time, humans tend to crowd together and form an agricultural economy, which has drawbacks in the form of a lack of variety in diet. The possibility of multi-year crop failures is also concerning for an economy reliant on agriculture to sustain its food supply.

2.2.5 Food aid efficacy

Food aid can be defined as the transfer of food to specific groups of people, via food provided for free or in exchange for work or transferred in cash, in which case it can be procured locally or purchased overseas (Cassimon *et al*., 2023; Ferrierre & Suwa-Eisenmann, 2015). While there are obvious advantages, such as the prevention of starvation, the downsides also must be understood (Cassimon *et al*., 2023; Ferrierre & Suwa-Eisenmann, 2015).

In the process of addressing food insecurity in Africa, food aid is one of the most used methods of reducing food insecurity but comes with its own disadvantages (Devereux, 2016). According to Devereux (2016), the delivery of food aid has contributed little to alleviating chronic food insecurity in Africa but has several benefits. The first and foremost advantage is that food aid retains the commodity value of food, whereas monetary aid will be impacted by price fluctuations in food prices., with Devereux (2016:54) stating that ‘a kilogram of wheat in the granary is always a kilogram of wheat’.

Little (2008) researched aid dependency in South Wollo Ethiopia, where during the 2000 drought half of residents received multiple food allocations per month. The results of Little’s research concluded that few residents adjusted their lifestyle to become dependent on the amount of poor people delivery of food aid, due to its uncertain, insufficient and poorly timed deliveries (Carruth *et al*., 2021; Little, 2008). These findings directly disprove one of the common misconceptions, that food aid creates a dependency on the continued delivery of said aid (Devereux, 2016). Increasing food security has been a focus of numerous policies, with varying levels of success, with some stating that developing nations should be the focus of global food security policies (Liu *et al*., 2021; Huchet-Bourdon & Laroche-Dupraz, 2016). Social grant transfers of currency or food have not been responsive to volatility in food prices or seasonal fluctuations, with Malawi being one of the few nations to successfully execute social transfers (Devereux, 2012). The scheme in place transferred cash to needy households as the price of maize increased to maintain their purchasing power until the price of maize decreased. While this worked in Malawi, the level of administrative efficiency and budget flexibility is not possible for most nations (Balana *et al*., 2023; Devereux, 2012).

Altman, Hart and Jacobs (2009) took the research further by examining the cost of a nutritious basket of goods and concluded that 80% of South African consumers are food insecure. These findings are drawn from the fact that a basket with the appropriate nutritional value costs R262 per month per person (in 2005), which only 20% of the population could afford (Altman *et al.*, 2009). Considering that a lack of food security and malnutrition has detrimental effects on not only childhood survival (Islam *et al*., 2020; Frongillo & Pelletier, 2003) but also on adult productivity (Black *et al.,* 2022; Behrman *et al.*, 2008), this issue deserves focus and commitment to resolving. During times of high price inflation, poorer consumers often spend between 50% and 90% of their income on food (Grote *et al*., 2021; Grote, 2014), which could result in reduced spend on other essential segments (Martin *et al*., 2022; Minot, 2011). This illustrates the value that this consumer segment places on the acquisition of products to form the ideal staple food, which was described in previous sections and will now be discussed in more detail.

2.3 Household of low-income South African consumers

The highest prevalence of being at risk of hunger occurs in urban informal areas with 36.1% of this population being food insecure, while the lowest prevalence of being at risk of hunger occurs in urban formal areas, at 19.0% (Omotoso *et al*., 2021; Shisana *et al.* 2013). This divide between wealthy and poor is also reflected in South Africa having the highest Gini coefficient of the 75 countries measured in 2011 (The World Bank, TWB, n.d.). In a Haggard and Hendrix

(2015:144) study, they indicated that, while food security is often a more pressing issue for rural consumers, there are good reasons to focus on urban dwellers as they are "more concentrated, are more likely to engage in collective action and more likely to garner the attention of political elites." While households in rural areas tend to spend more money on food than their urban counterparts, urban households tend to spend 15 percentage points more per person on food (Altman, Hart & Jacobs, 2009:359). This misalignment could be because of the transport costs rural households need to incur should they travel to a supermarket outside their own town. Another reason relates to the possibility that rural households purchase less nutritious baskets, which will inevitably reduce the cost of their total food expenditure (Omotoso *et al.*, 2021; Altman, Hart & Jacobs, 2009).

Shannon (2012) and Caspi *et al.* (2017) discovered that smaller-format stores in the United States of America were more expensive than supermarkets across 14 of 15 products in a food basket. They also investigated price differentials between various small-format stores, with one set situated close to large supermarkets and the other set being more isolated from large supermarkets and found that the isolated set was more expensive across 12 of 15 products in a basket. Considering that there are 134 000 informal stores and only 7400 formal retailers in South Africa and the fact that there are 55% more informal traders in urban than rural areas, the premium that consumers are paying at informal stores is significant (Nielsen, 2016).

2.4 The South African staple-food basket for low-income consumers

The next section will firstly identify the major staple foods in South Africa and secondly highlight the importance of these staple foods in low-income consumers' food baskets.

2.4.1 Staple foods in South Africa

The staple foods of maize meal, bread, rice and potatoes, as stated by Davids *et al.* (2016) and Rinaldi (2023), is used as the basket investigated in the study. It will be shown that previous research has identified these four products as having the highest penetration among South African households and, as a result, are connected with food security (Rinaldi, 2023; Beukes *et al.*, 2017; Makgetla & Watkinson, 2002; Ronquest-Ross, Sigge & Vink, 2015; Ardington, Leibbrandt & Thornton, 2016).

According to Beukes *et al.* (2017), maize is the staple for the majority of South Africans, with approximately 2 656 500 ha under cultivation for human consumption. After maize, bread is the next most prevalent staple food, with more money being spent annually on bread than maize

(Beukes *et al.*, 2017). Makgetla and Watkinson (2002) stated that rice is among the most consumed grain products in South Africa in line with global trends (Sen *et al*., 2020), second only to maize and bread variants. Also among one of the most consumed foods in South Africa and the vegetable with the highest consumption rate per capita that is gradually increasing are potatoes, which warrants inclusion in the staple-food basket (Siddiqui *et al*., 2023; Ronquest-Ross, Sigge & Vink, 2015).

Ardington, Leibbrandt and Thornton (2016) discovered that more than 80% of the South African population consumed maize meal, potatoes, bread or rice within a 30-day period during their study. Ardington *et al.* (2016) recognised that they also noted that the traditional samp and beans meal had been surpassed by maize meal, which indicates the shifting in purchasing patterns of consumers.

2.4.2 Low-income staple-food consumption

Poorer households will adjust their basket of goods to purchase less nutritious foods during times of high food price inflation (Murungani *et al*., 2019; Drimie & Faber, 2016). Higher consumption of vegetables, fruits and legumes are associated with higher costs and some South African consumers are purchasing less healthy portions of meat with more fat that comes at a lower price (Murungani *et al*., 2019; Drimie & Faber, 2016). This decrease in the intake of healthy nutrients invariably leads to a higher rate of chronic diseases among affected households (Murungani *et al*., 2019; Drimie & Faber, 2016). This form of adjustment in the staple-food basket will be investigated in low-income South African consumer households.

2.5 Conclusion

In conclusion, the food security of a nation has a direct correlation with the development of said nation, as well as political unrest (Soffiantini, 2020). Significant financial and human resources are dedicated to reducing food insecurity, which further emphasises the need to understand the issue completely. For this reason, it should be the main focal point for public- and private-sphere market participants, especially given the long-term unsustainability of food aid.

The South African staple-food basket of maize meal, bread, rice and potatoes comprises a significant portion of the average South African's nutritional intake. When focusing on low-income households, the effect of this staple basket becoming unattainably expensive has far-reaching effects on not only individual households but also the economy and society.

Chapter 3: Consumer switching and the impact of price

3.1 Introduction

This chapter will focus on the underpinning theoretical framework. The important factors that are discussed include the consumer decision-making process, consumer purchase decisions, product-switching and the conceptual framework relevant to this study. This foundation provides an understanding of the key factors that drive a consumer to switch between products, as well as providing insights into the research already conducted in this field. Various conceptual frameworks are investigated with benefits and gaps in the literature, with drawbacks being highlighted and addressed to support the final framework arrived at. Finally, the food crisis and the impact of rising of food prices in South Africa is also examined.

3.2 Consumer product-purchase decisions

This section will focus on the concept of the consumer's purchasing decisions and various factors influencing the consumer. Consumer decisions and consumer decision-making regarding product purchases have been researched by multiple authors (Engel, Blackwell & Kollat, 1995; Nicosia, 1966; Schiffman & Kanuk, 2010; Hirschman, 1985; Kotler, 1965). This study will consider the consumer decision-making investigated in the study of Hoang, Hun, Phuong and Van (2015).

Hoang *et al.* (2015) found that consumers purchasing decisions are affected by social factors like a reference group, family or status. This is important to note when investigating South African consumers, as the country has a multitude of diverse and embedded cultures within its borders, which can influence the South African consumer's decision-making (Sisk, 1995).

Price expectation also forms a key part of the purchasing decision. Purchasing decision, however, had a smaller effect than that of promotion in a Hoang *et al.* (2015) study on the factors affecting Vietnamese consumers' purchasing decisions. While Hoang *et al.* (2015) focused their study on Vietnamese consumers, the purpose of the study was to understand the behaviour around the food purchases of urban-dwelling consumers. The focus on urban consumers' decisions around food purchases provides the relevance and link to this study, as it has been established that urban consumers are more at risk of food insecurity in South Africa. Gu, Rasch and Wentzel (2016) note that there are two important factors affecting consumer demand: price and the match between the product and the consumer. They state that, even if two items are priced identically, consumers will choose the product that suits their needs better

(Gu *et al.*, 2014). To further their study, they made a distinction between the cost of the item and the transportation cost, effectively looking at the availability of products in close proximity to consumers (Gu *et al.*, 2014).

Grewal, Nordfalt and Roggeveen (2014) state that consumers are becoming more educated about pricing and have the technology available, via the internet and pricing applications, to efficiently compare prices between retailers. Grewal *et al.* (2014) have also identified four other non-price-related factors that could influence a consumer's decision: private label, brand familiarity, consumer ratings and the creativity of advertisements. Retailers must remain aware of the fact that, while price does have a significant impact on a consumer's purchasing decision, consumers do not view price in isolation and take numerous other factors into account before deciding (Grewal *et al.*, 2014).

Ahmad and Ali (2012) discovered three main factors affecting a consumer's decision to purchase a product: brand name, price and quality. They do, however, claim that the most important factor consumers consider is the quality of the product and how well it executes its purpose. Kankanhalli and Kim (2016) explained that consumer decisions are affected by two types of utility measures: acquisition and transaction. Acquisition utility describes the value of the good purchased versus the price of the good, meaning that, if the price outweighs the value, a consumer will cease purchasing the good. Transaction utility refers to the "perceived merits of a transaction", which effectively relates to the uncertainty and risk consumers face when deciding to purchase a product. For the purposes of this research, the focus is placed on the price at which low-income consumers stop purchasing a product, as well as the switching that occurs. This enables the researcher to draw conclusions on low-income South Africans' staple-food-basket purchasing decisions and answer the research question.

Jansen and Olbrich (2014) state that consumers use price as an indicator of quality, with higher-priced products being expected to be of higher quality and lower-priced products of lower quality. The main reason for this perception is that consumers expect prices to mirror production costs, meaning high-quality products that are more expensive to produce will be more expensive (Jansen & Olbrich, 2014). Where previous studies found low correlations between price and quality, Jansen and Olbrich (2014) narrow their research to distinguish between food and non-food products. The results from their study confirm that there is a low correlation between the price and quality of a food product and, as such, consumers should not use price as a measure of quality (Jansen & Olbrich, 2014). This conclusion should be concerning when linking to the findings of Gijsbrechts *et al.* (2015), who state that, while determining price strategies, retailers tend to focus more on competitors than on the consumer. The findings above emphasise that retailers need to understand the impact that price increases have on consumers' purchasing decisions. Van Ewijk *et al.* (2022) expanded on this by explaining that often the price instrument is utilised as it is fairly easy and rapid to use although the impact is more complex and differs between brands and can increase a brand's vulnerability.

Dost *et al.* (2016) investigated price fairness perceptions during times of price changes depending on one of two motives: a cost-justified price increase or a profit-driven price increase. They found that cost-justified price increases had a positive effect on perceived price fairness, while profit-driven price increases had an adverse effect on price fairness perceptions (Dost *et al.*, 2016).

3.3 Product-switching

This section will investigate research already conducted on product-switching and explain the behavioural framework that provided guidance for this study.

3.3.1 Product-switching research

Product-switching occurs when consumers deviate from buying the same brand or product (Jiang *et al.*, 2014). Some of the most researched factors influencing product-switching are price discounts, retail promotion and advertising exposure (Jiang *et al.*, 2014).

Ahmed *et al.* (2015) state that firms recognise switching behaviour as one of the most significant factors in a firm's long-term viability and customer retention. This results in firms placing a high importance on determining the factors that cause switching and implement strategies that decrease consumers switching from their product or increase switching from competitors (Ahmed *et al.*, 2015).

Switching is a dynamic process that develops over a period and results in the relationship between a firm and consumer ending (Bejou & Palmer, 1998). Huang *et al.* (2017) state that retailers' bottom lines are adversely impacted when a shopper switches to a competitor but can be minimised if the shopper can find an alternative brand in-store.

Gupta *et al.* (2004) discusses customer retention in two classes, "lost for good" and "always a share", first introduced by Barbara Jackson in 'Winning and Keeping Industrial Customers' (1985). Customers who are seen as lost for good had removed the product completely from their repertoire, whereas always a share customers would move between different products, not necessarily shifting their entire spend (Beeser, Haenlein & Kaplan, 2007).

Ahearne *et al.* (2010) introduced another cause of brand switching as market disruption, which does not occur at the individual level. Some examples are product recalls, negative publicity and industry crises (Ahearne *et al.*, 2010). The last-mentioned example of an industry crisis is relevant to this research as it is focused on the result on staple-food products after the drought period in South Africa.

Dawes *et al.* (2015) investigated brand loyalty in the US and UK with a longitudinal approach and focus on how loyalty has evolved over time. Dawes *et al.* (2015) state that price promotions and brand discounting have become endemic in grocery retail, with evidence that consumers purchase from deal to deal. They also mention that, during times of financial crisis, consumers tend to switch between brands or products to take advantage of temporary price reductions (Dawes *et al.*, 2015).

Lamey (2014) investigated the performance of discount-format retailers versus traditional retailers during financial crises, when consumers tend to rationalise their spending. He stated that, even though consumers might be loyal to certain brands or products, times of financial hardship can change their habitual decision-making (Lamey, 2014). The findings of Lamey's study make it clear that, when consumers are under pressure financially, they step outside of their normal purchase patterns and often do not return to their original purchases when they are no longer under financial pressure (Lamey, 2014).

As previously discussed in Chapter 2, South African low-income consumers allocate a significant portion of their dietary spend to the staple foods mentioned and, as such, switching between products will have a measurable impact on retailers and manufacturers.

3.3.2 Switching behaviour framework

A conceptual framework provides a basis of previous research from which certain assumptions can be extracted and aspects can be incorporated into the current study, with this research also contributing to the framework and the current literature around the subject.

The conceptual framework to be incorporated into the study is based on research by Chiang *et al.* (2014). This framework has been selected as the researchers have identified that price is one of the factors that impacts switching behaviour the most (Chiang *et al.*, 2014), which is aligned with the purpose of this study. The original framework was designed to study switching between cellphone providers but can be incorporated into this study, as it identifies the marketing mix as a variable in switching behaviour. For the purposes of this study, the pricing impact will be followed with secondary input from demographics leading to switching behaviour. Figure 3.1 illustrates Chiang *et al.*'s framework with the two variables, pricing and demographics, highlighted in green. The other variables of satisfaction, switching costs, advertising, distribution, product usage, product involvement, product knowledge and specific events have been excluded from this research.

Figure 3.1: Switching Behaviour Framework (Source: Adapted from Chiang, Malhotra, Wirtz & Xiao (2014)

The aforementioned variables have been excluded, as they will not assist with explaining price-based switching behaviour.

Based on the above findings from the aforementioned researchers, it was deemed necessary to adjust the framework put forward by Chiang *et al.* (2014). In Figure 3.1, the two factors to be examined in this body of research, namely, 'Pricing of primary staple product' and 'Income level of household', are isolated to determine the 'Switching behaviour to other staple products'.

3.4 The role of price in switching behaviour

The Switching Path Analysis Technique (SPAT) developed by Roos (1999) provides a clear framework to conduct switching-behaviour research should the respondents be interviewed. Roos distinguishes between three switching determinants: pushing determinants, a swayer and pulling determinant (Roos, 1999). Pushing determinants are perceived as the reason for switching by the respondent, with four types appearing the most frequently: price, range of goods, location and variation (Roos, 1999). A swayer does not cause switching on its own but can either delay or mitigate the process, with personnel being the most cited reason (Roos, 1999). The pulling determinant is defined as the reason consumers switch back to the original option and the three most common reasons were location, variation and range of goods (Roos, 1999). While SPAT does provide a framework to analyse switching behaviour, the interviewing of respondents is a critical part of the framework, which is not the method followed in this research. Gauri *et al.* (2010) researched the behaviour of what is referred to as the cherry-picking behaviour of consumers. The conceptual framework their research was based on clearly states the importance of the age, household size and household income of the consumer or household they were tracking (Gauri *et al.*, 2010). In their research on the effect of promotions on profitability, Ailawadi *et al.* (2006) discusses the impact of household income and size of household. They find that lower-income homes are more likely to purchase products on promotion and households with more workers are less likely to purchase on promotion (Ailawadi *et al.* 2006).

Keaveney (1995) established a model of consumers' service-switching behaviour during the research on factors affecting consumers' switching between service providers. The result of the research was the identification of eight categories affecting switching behaviour: pricing, inconvenience, core service failure, service encounter failure, response to service failure, competition, ethical problems and involuntary switching (Keaveney, 1995). While this research is mentioned by some as the introduction to client switching behaviour (Ugwuanyi, 2017; Kumasi, 2012), the lack of a demographic focus has led this researcher to base the study on another framework. The importance of the demographic aspect is emphasised in the title, focusing on lower-income consumers.

3.5 Food crisis and the impact of rising prices in South Africa

In a previous section, it was explained that consumer purchasing decisions is the focus of this study, with this section outlining the impact that rising food prices have. During 2015 and 2016, South Africa was impacted by a drought that resulted in significant decreases in crop production. This shortage in available crops led to price increases, which had the most pronounced impact on lower-income consumers. The output of white maize meal decreased by 25 percentage points from before the drought and consequently the price increased by more than 60 percentage points (Davids *et al.*, 2016). The drought had negative impacts on output across crop types, with the cost of a typical staple basket for low-income households, consisting of maize meal, bread, rice and potatoes, increasing by approximately 29 percentage points year-on-year (Davids *et al.*, 2016).

Prior to the above-mentioned occurrence, there were two recent global food crises leading to social unrest and food riots. The first instance occurred during 2007-2008, when food prices increased by as much as 51 percentage points. This was followed in 2010 and 2011 by food prices increasing by 41 percentage points in the space of 13 months (Bellemare, 2014). Haggard and Hendrix (2015) took Bellemare's research a step further by stating that higher food prices can also be a result of social unrest or anti-government protests. It is important to note that consumers' feelings of deprivation can also stem from comparisons of their own welfare currently to the historical state they were in, not only from comparing with other consumers (Haggard & Hendrix, 2015).

Significant research has been conducted into the causes of the 2007-2008 and 2010-2011 global food price increases, namely, biofuel demand, rapid growth in developing countries, money supply shocks, stockpiling and trade restrictions (Bhattacharya & Gupta, 2015). The increased demand for biofuel has been associated with two-thirds of the contribution to price increases as subsidy programmes encouraged grains to be redirected to biofuel use to decrease the reliance on fossil fuels (Bhattacharya & Gupta, 2015). High growth in China and in India also added to the demand for more food, as the populations in both nations demanded more than could be supplied. Many grain-exporting countries implemented restrictive trade policies to ensure their own food security, which in turn increased global prices (Bhattacharya & Gupta, 2015).

Grabowski and Self (2016) studied the impact of staple-food price volatility on Indonesian agricultural structures and state that poorer households are more likely to fall into poverty during times of price volatility. The impact of price volatility has such a significant impact on the greater economic and political situation that in some instances price variation can be attributed to price regulation implemented by governments (Grabowski & Self, 2016). This was supported by research conducted by Dawe and Timmer (2012) into the price stability of staple foods in Asia, where they found that 90% of price variations for rice were attributed to government intervention. They stated that staple-food price stability has the most significant impact on the economy, as staple foods are consumed by the largest and most vulnerable segment of the population (Dawe & Timmer, 2012).

3.6 Conclusion

This section investigated the consumer decision-making process, as well as the existing research on product-switching. An amended theoretical framework was identified and two factors highlighted as the variables for this study.

Chapter 4: Methodology

4.1 Introduction

In this chapter, the research methodology is presented. The previous chapters outlined the key components of the study, detailed the existing literature pertaining to the subject of this study and outlined the theory on which the study is based.

The research methodology chapter provides a clear explanation of the methods applied in collecting, organising, and analysing the data. The first section looks at the different research paradigms and analyses the aspects of each one based on the same framework. The next section covers the theory of the research paradigm followed by the researcher. The fourth section looks at the methodology section of the panel of households and how it was created. The next section analyses the research tools utilised in the collection of data. The sixth section looks at the data-collection process and how the data used in this study was collected from the households that form part of the panel, also referred to as the panellists. The seventh section explains how the raw data was managed and organised into a format that could be analysed and interpreted with ease in the next chapter. The final section explains what tool will be used to analyse the data and how the data was incorporated into the tool.

4.2 Research paradigm

A paradigm refers to the common set of beliefs or frameworks shared by researchers and guides how problems are solved (Khaldi, 2017). Oppenheimer *et al.* (2015) summarised the two ways in which the term *paradigm* was used by Thomas Kuhn in 1962:

- Representing a particular way of thinking that is shared by a community of scientists in solving problems in their field
- To represent the 'commitments, beliefs, values, methods, outlooks and so forth shared across a discipline'

A researcher's paradigm is shaped by his or her ontology, epistemology, and axiology and ultimately results in a methodology (Bryman & Bell, 2014). Ontology refers to the philosophical assumptions made about the nature of social reality and can be phrased as 'what do we believe about the nature of reality' (Bryman & Bell, 2014). It also relates to whether the researcher believes there is one verifiable reality or that there exist multiple socially constructed realities. Epistemology refers to the ways of knowing or 'how do we know what we know' (Bryman & Bell, 2014). It makes enquiries into the nature of knowledge and truth and asks some of the following questions: what the sources of knowledge are; how reliable these sources are; what one can know; how one knows if something is true. Axiology refers to the ethics and value systems of the researcher or phrased as ‘what do we believe is true’ (Bryman & Bell, 2014).

Some of the most frequently utilised paradigms that were considered for this research are realism, pragmatism and positivism. In the below three sections, a brief outline will be provided on each of the paradigms. Realism as a paradigm also relates to scientific enquiry and essentially states that what our senses observe as reality is the truth. Realism is similar to positivism in that it follows a scientific approach to the development of knowledge through data collection and the interpretation of that data. There are two types of realism: direct and critical. Direct realism states that what we experience through our senses portrays the world as it is. Critical realists, however, argue that we experience sensations or images of the things in the real world, not the actual object itself. An important difference between direct and critical realism is that the direct realism perspective suggests the world is relatively unchanging and operates at one level in a business context, while critical realism recognises that there are various levels, and the various parties act differently (Saunders, Lewis & Thornhill, 2009). Pragmatism states that the actual research question is more important than the theory to be followed and more focus should be placed on epistemology, ontology and axiology. The pragmatist’s view is that, if the research question does not explicitly indicate one of the other paradigms, it is acceptable to work with variations between research methods (Saunders, Lewis & Thornhill, 2009). The positivism paradigm will likely mean the researcher adopts the approach of the natural scientist. The preference of this paradigm is to work with a social reality that is observable and the result of the research should be a generalisation. The researcher will likely use an existing theory to develop a hypothesis which will be tested and confirmed either fully or partially, which then creates hypotheses for future research to test. Being a value-free or impartial researcher is an important component of the positivist paradigm and the researcher is likely to adopt a highly structured methodology to ensure ease of replication (Saunders, Lewis & Thornhill, 2009).

The table below explores the philosophical assumptions about the perception of reality, what counts as truth and the value systems paired with each of these paradigms.

	Realism	**Pragmatism**	**Positivism**
Ontology: *the researcher's view of the nature of reality or being*	Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist)	External, multiple, view chosen to best enable answering of research question	External, objective and independent of social actors
Epistemology: *the researcher's view regarding what constitutes acceptable knowledge*	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspectives to help interpret the data	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, reducing phenomena to simplest elements
Axiology: *the researcher's view of the role of values in research*	Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact the research.	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view	Research is undertaken in a value-free way; the researcher is independent of the data and maintains an objective stance
Data collection techniques most often used	Methods chosen must fit the subject matter, quantitative or qualitative	Mixed or multiple method designs, quantitative and qualitative	Highly structured, large samples, measurement, quantitative, but can use qualitative

Table 4.1: Research Paradigms (Saunders, Lewis & Thornhill, 2009)

For this study, the positivist paradigm was selected, as it allows a hypothesis to be tested and confirmed while also allowing future research to add to or amend the hypothesis.

4.3 Research design

The approach to research design can be classified as either quantitative or qualitative. There are three main differences between the two approaches, explained below.

Qualitative research focuses on explanation as a purpose of the enquiry; the researcher takes a more personal role in the study and knowledge is discovered. In contrast to this, quantitative research follows understanding as the purpose of enquiry; the researcher assumes an impersonal role and knowledge is constructed (Stake, 1995). This research follows a quantitative design as it allows for a more systematic and statistical approach and analysis of larger raw data sets. Chang *et al.* (2017) found that a quantitative research design was well suited to developing a narrative when using a panel to collect data. Chang *et al.* (2017) was working with a panel of 6857 respondents, which would have produced a large dataset and ratifies the quantitative approach to the research.

The primary data utilised in this research is based on data collected by the market research firm Nielsen. Established in 1923, Nielsen collects and analyses data to understand consumer behaviour, with a presence in over 100 countries, covering more than 90% of the world's population (Nielsen, n.d.). Academic works have incorporated Nielsen data since 1945 (Nielsen, 1945), with a prevalence in the marketing industry. Einav, Leibtag and Nevo (2008) analysed the accuracy of Nielsen Homescan data in the United States of America and found that, although there were errors, the accuracy was in line with other commonly used economic data sets. To determine the accuracy, the researchers compared records from the panel participants to the relevant store on the day of the purchase. This meant the researchers could essentially cross-check the participant's record with the actual purchase they made at a store level.

Barrett, Kaiser, Zhao and Zheng (2022) used Nielsen Homescan data to analyse how grocery taxes are passed on to consumers through retail food prices over a period from 2010 to 2019. Barrett *et al.* referred to the work done by Harding, Leibtag and Lovenheim (2012) to affirm the accuracy and value of Nielsen Homescan data as a longitudinal study tool. Nielsen data has also been used by Bhawra *et al.* (2022) in qualitative research to understand consumers' awareness and use of nutritional information on packaging in the consumer goods industry in America. Bablani *et al.* (2022) followed a quantitative approach with Nielsen data in a similar study in New Zealand by analysing the effect of a voluntary label on healthier foods.

Ellithorpe *et al.* (2022) used advertising expenditure data collected by Nielsen to understand why sports and energy drinks are growing in popularity among adolescents while other sugar-sweetened beverages are experiencing declines. The study found that the link between advertising expenditure and advertising recall was stronger in consumers who had an athletic identity. Nielsen's advertising data has also been used in South Africa by Stacey *et al.* (2017)

to also understand the link between energy-drink consumption in younger males and energy-drink advertising.

4.4 Methodology

The methodology this research follows is aligned with a quantitative approach, as it attempts to attach a statistical and numerical standard to the results. The following section defines what panel data is and outline the specific panel used for this research.

4.4.1 Household panel data

The next section outlines what panel data is, with a brief exploration of the benefits of panel data and how the data can be used in academic research.

Wooldridge (2010:6) explains panel data as consisting of "repeated observations on the same cross section of, say, individuals, households, firms, or cities, over time". Panel data can also sometimes be referred to as *longitudinal data*, as it implies that data is collected methodically over time. The participants in a panel should be selected to statistically represent the larger population set, which allows the researcher to draw generalisations about the broader population from the findings, following the positivism paradigm.

While the criterion for random selection in the observed sample may be restrictive, correlations may be made among the indicators describing individuals over time (Balan, Jaba & Robu, 2017). According to Balan *et al.* (2017), panel data can be either balanced or unbalanced:

- **Balanced**: individuals are observed over equal periods of time
- **Unbalanced**: individuals are observed over different periods of time

In terms of the selection method of individuals, a panel data set may be classified as continuous or rotative (Balan *et al.*, 2017):

- **Continuous**: individuals selected in the sample remain unchanged during recording observations
- **Rotative**: a series of individuals are observed during a number of specified periods, then these may be eliminated from the sample, being replaced by other individuals for whom new observations will be recorded

De Jager (2008:5) lists four additional benefits to using panel data:

- Provides more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency
- Better able to study the dynamics of adjustment
- Better able to identify and measure effects that are simply not detectable in pure cross-section or pure time-series data
- Allow for the construction and testing of more complicated behavioural models than purely cross-section or time-series data. Using panel data may eliminate biases resulting from the aggregation of firms or individuals.

Yoon, Park and Kim (2022) used panel data to test the user experience of smart speaker users. The panel data was sourced from online reviews of the products included in the study and a total of 46 715 reviews from October 2017 to November 2020. One of the limitations of the study identified by the researchers is the static nature of the data collected and that it could not track individual users through their life cycles.

A study by Huang and Trusov (2020) investigated the relation between customer satisfaction and CEO compensation. Combining three data sources, the researchers analysed 166 firms during 1994-2004. This panel is an example of respondents being involuntarily included in a panel through participation with another agency.

The link between public service motivation, perceived reward equity and pro-social impact on employee engagement was studied by Bashir, Hassan and Wright in Pakistan (2022). Of the 366 surveys sent out, 251 were answered over seven biweekly sessions to enable a longitudinal comparison between data points.

Koskarovska (2021) utilised Nielsen panel data in the United States to explore wine purchasing behaviour and loyalty while also combining data on wine prices and rankings of wine reviews. The main shortcoming identified by the researcher was that the period of data (2004-2007) accessible to them was relatively aged. As they were not investigating a specific phenomenon that occurred at a point in time, more recent data would benefit their research.

4.4.2 Selecting a panel in South Africa

While the previous section outlined what a panel is, the benefits of using a panel and some of its uses, this section investigates panels available in South Africa, the selection process and why the Nielsen panel was selected.

There are numerous panels in South Africa that are managed by global research agencies like Kantar, Ipsos and GfK. These panels were designed with specific solutions in mind, such as a representative panel to complete surveys or to test new product concepts.[1] Nielsen manages a panel of households in South Africa with the purpose of tracking spending behaviour over time. Data is collected from the panel even though there is not always a study commissioned on the data, as it provides historical data to compare to for a multitude of questions.

Nielsen is the panel selected for this research for three main reasons: the longitudinal nature of the panel, all products are tracked regardless of current interest in it and the researcher had access to the Nielsen data as he was an employee of Nielsen at the time.

The longitudinal nature of the panel allows the researcher to determine spending behaviour at a fixed time in history to create a benchmark. The researcher is also able to measure changes in spending on a monthly level, during the time of change and after the market has normalised again, to determine changes.

The completeness of the products tracked in the panel allows the researcher freedom to not have to theorise about which products to select. The researcher can analyse the full universe of products after the fact and determine which products were impacted the most.

The researcher was an employee of Nielsen South African during most of this study, which enabled ease of access to data. The research proposal was presented to the Managing Director of Nielsen South Africa at that time, Mr Bryan Sun, who approved the researcher's access to the data (Appendix A). Once access had been signed off, the researcher approached the Nielsen Homepanel team responsible for managing the data in the raw format. The specifications were provided in terms of periods, products and households to include. There were several months of iterations to ensure the correct data was provided, with numerous checks being performed.

The next section investigates the sampling methodology selected for this study and looks into the target population and sampling methodology as well as panel data in South Africa.

[1] Kantar, Ipsos and GfK are large research companies that operate in South Africa. Each of these companies has a panel. The companies were approached for more information on their panels but the information was deemed confidential in nature.

4.5 Sampling methodology

The sampling methodology followed attempts to provide the most representative view of the South African population based on three segmentations: LSM (Living Standard Measure), region (province) and race (Black urban, Black rural, White, Coloured, Indian). The three segmentations are explained in greater detail in Section 4.5.3. The total population group is determined by the most recent statistics provided by the government department, Statistics South Africa.

The sections to follow will define the target population, sampling in panel studies and looks at the criteria for representation of the population group in the selected Nielsen panel.

4.5.1 Target population

The target population refers to the broader set of individuals from whom the research aims to draw conclusions. In the case of this research, the target population is any South African citizen living within South African borders consuming a staple food as defined in earlier chapters.

As Ardington *et al.* (2016) discovered, more than 80% of the South African population consumed maize meal, potatoes, bread or rice within a 30-day period during their study. It is a reasonable assumption that, if the 30-day period was expanded, the 80% portion would be increased even further. For this reason, the research was approached with the assumption that virtually all South Africans consumer staple foods and therefore the sample has to represent the entire South African population. According to Statistics South Africa's latest General Household Survey conducted in 2021 (Statistics South Africa, 2021), South Africa had a total population of 60 482 000 in 2021 and 17 947 000 households. At the time that the Nielsen panel data was extracted in 2017, the household count in South Africa was 16 199 000.

In terms of being the highest population, the provinces are from most to least: Gauteng (15 888 000), KwaZulu-Natal (11 682 000), Western Cape (7 091 000), Eastern Cape (6 542 000), Limpopo (6 102 000), Mpumalanga (4 776 000), North West (4 146 000), Free State (2 973 000) and Northern Cape (1 280 000). The ranking for provinces with the most households are Gauteng (5 384 000), KwaZulu-Natal (3 111 000), Western Cape (2 021 000), Eastern Cape (1 725 000), Limpopo (1 684 000), Mpumalanga (1 399 000), North West (1 308 000), Free State (952 000) and Northern Cape (363 000).

The target population has been identified as low-income South African residents. The average living wage for a family was set at R9690.00 per month (Trading Economics, 2018) and, based on Living Standard Measures (LSM), households categorised as LSM 6 have an average household income of R7876.00 (Mathebula, 2016). For this reason, households categorised between LSM 1 and LSM 6 is defined as low-income households. This aligns closely with Chigada *et al.* (2019), who consider household income below R6000.00 per month to be either poor or working poor taking into account the impact of inflation over time.

4.5.2 Sampling in panel studies

The sampling methodology follows a random stratified probability sample approach. The universe is segmented into strata (Chuvieco, Padilla & Stehman, 2014) and each household has an equal chance of being selected from within its strata (Johnson, 2020; Marshall, 1996). This stratification of the population allows the sample to be representative of the South African population in terms of LSM, household size, provincial location, race and age of the main purchaser.

Based on Statistics South Africa (2015), there are 16 122 000 households in South Africa, which requires a sample size of 384 at a 95% confidence level and a confidence interval of 5% (Sample Size Calculator, 2017). Based on these figures, the panel of 3600 households available is sufficient to represent low-income households.

4.5.3 Criteria for representation of the population group

The next section will analyse in more detail what representative data means and look at the three metrics of importance in this study, namely, LSM, race and province.

4.5.3.1 What is representative data

A representative data set is a sample from a larger population group that accurately represents the characteristics of the larger population. The answers obtained from the sample set will accurately reflect the results that would be achieved from the total population (Qualtrics, 2022).

Creating a sample that is representative of the population group is critical to the ability to draw accurate conclusions and generalisations from the results of the study. The sample also needs to be representative at each cross-sectional level that the analysis will be drilled down to. This adds complexity, as the permutations of representativeness increase with each cross-sectional level that is added. In a longitudinal study, the sample is revised regularly against the population group to ensure the sample is still a fair representation of the total group.

4.5.3.2 LSM

The LSM tool was developed by the South African Audience Research Foundation (SAARF) as a means of segmenting the population into ten groups, 1 being the lowest and 10 being the highest. It attempts to move away from outdated methods of segmenting the population by race and moves towards living standards taking into account the degree of urbanisation and access to services and durables.

LSM has been replaced by Socio-Economic Measure (SEM) as the market segmentation tool but at the time of the time period in question LSM was still the preferred method which is why it will be used (Maposa, 2022).

To determine the LSM category of a respondent, a set of 29 questions are posed to the respondent, each to be answered as yes or no and each with a weight. The sum of all the results will determine in which LSM group the respondent is categorised. The latest available set of criteria is illustrated in Figure 1.

The households in the panel are segmented into four groups, LSM 1-4, 5-6, 7-8 and 9-10. This broader scope of segmentation allows for more robust data and more granular insights into either products or demographics.

Var. No.	Attribute
1.	Hot running water from a geyser
2.	Computer - Desktop/Laptop
3.	Electric Stove
4.	No domestic workers or household helpers in household (this includes live-in and part time domestics and gardeners)
5.	0 or 1 radio set in household
6.	Flush toilet in/outside house
7.	Motor vehicle in household
8.	Washing machine
9.	Refrigerator of combined fridge/freezer
10.	Vacuum cleaner/floor polisher
11.	Pay TV (M-Net/DStv/TopTV) subscription
12.	Dishwashing machine
13.	3 or more cellphones in household
14.	2 cellphones in household
15.	Home security service
16.	Deep freezer – free standing
17.	Microwave oven
18.	Rural rest (excl. W. Cape & Gauteng rural)
19.	House/cluster house/town house
20.	DVD player/Blu Ray Player
21.	Tumble dryer
22.	Home theatre system
23.	Home telephone (excl. cellphone)
24.	Swimming Pool
25.	Tap water in house/on plot
26.	Built-in kitchen sink
27.	TV set
28.	Air conditioner (excl. fans)
29.	Metropolitan dweller (250 000+)

Figure 4.1. Criteria to segment by LSM (SAARF, 2018)

4.5.3.3 Race

The composition of the race of the respondent or household, also referred to as the *population group* by some, is determined by Statistics South Africa in its mid-year population estimates. Discrimination based on race has a long history in South Africa and the policies implemented during Apartheid still has an impact on current South Africa which is why analysis has to include a race segment (Bell *et al*., 2022).

Respondents can be classified into one of four population groups: Black African, Coloured, Indian/Asian or White (Statistics South Africa, 2022). During the census or data collection, the population group is a required question for fieldworkers to complete to ensure the universe is accurately counted and representative samples can be constructed.

Population group	Male		Female		Total	
	Number	% distribution of males	Number	% distribution of females	Number	% distribution of total
Black African	23 985 479	81,0	25 085 330	81,0	49 070 809	81,0
Coloured	2 601 932	8,8	2 737 987	8,8	5 339 919	8,8
Indian/Asian	794 882	2,7	760 114	2,5	1 554 996	2,6
White	2 242 589	7,6	2 396 679	7,7	4 639 268	7,7
Total	**29 624 882**	**100,0**	**30 980 110**	**100,0**	**60 604 992**	**100,0**

Figure 4.2. South African population group contribution. Source: Statistics South Africa (2022)

4.5.3.4 Province

Statistics South Africa (Statistics South Africa, 2021) defined the composition of the national household data at a regionally representative level as well following the South African national province borders.

During the data-collection phase for the General Household Survey, fieldworkers are directed to each province and ensure that the respondents are representative at the enumerated area (EA) level in South Africa. The EAs are collated to represent suburbs and districts up the hierarchy until a provincial level is reached. This data informs researchers about the contribution of each province to the national household count and is also the basis to ensure accurate representation in this study (Statistics South Africa, 2021).

	Total households (Thousands)									
	WC	EC	NC	FS	KZN	NW	GP	MP	LP	RSA
2002	1 217	1 506	247	679	2 070	767	2 785	801	1 121	**11 194**
2003	1 251	1 518	252	692	2 105	789	2 882	827	1 144	**11 459**
2004	1 287	1 526	257	703	2 137	812	2 982	851	1 164	**11 718**
2005	1 323	1 530	261	715	2 168	834	3 088	876	1 181	**11 977**
2006	1 360	1 532	266	726	2 198	858	3 202	902	1 199	**12 243**
2007	1 396	1 541	272	738	2 240	881	3 305	929	1 222	**12 522**
2008	1 432	1 551	277	751	2 284	906	3 416	956	1 247	**12 819**
2009	1 469	1 561	282	763	2 331	930	3 537	984	1 272	**13 128**
2010	1 507	1 571	287	775	2 382	956	3 668	1 013	1 298	**13 456**
2011	1 547	1 580	293	787	2 434	982	3 807	1 043	1 324	**13 797**
2012	1 585	1 596	299	801	2 495	1 008	3 938	1 074	1 357	**14 152**
2013	1 626	1 611	305	815	2 556	1 037	4 075	1 105	1 390	**14 521**
2014	1 670	1 624	311	830	2 619	1 067	4 220	1 138	1 424	**14 904**
2015	1 718	1 636	318	845	2 683	1 099	4 377	1 172	1 459	**15 307**
2016	1 771	1 648	325	862	2 752	1 135	4 546	1 208	1 495	**15 744**

Figure 4.3. Number of households by province. Source: Statistics South Africa 2020

4.6. Research instruments

The following section defines what research instruments are and outline the three research instruments used in this research by the Nielsen panel. A research instrument is a tool used to collect, measure and analyse data related to your research interests. The research instrument usually is determined by the researcher and is aligned with the research methodology (Teachers College, Columbia University. 2022).

The characteristics of a good research instrument are (Teachers College, Columbia University. 2022) valid and reliable in terms of the output, based on a conceptual framework, gathers data suitable and relevant to the research topic, able to test hypotheses and answer a research question, and unbiased, as well as having clear and unambiguous instructions to use the instrument.

4.6.1 Research instruments in panel data collection

The research instruments used in panel data can vary from ad hoc surveys to detailed self-complete financial diaries, depending on the needs and resources available to the researcher. Kim *et al.* (2022) utilised reviews that were already completed and publicly available online on ecommerce-platform websites. In this instance, the research instrument existed prior to the research being conducted and was potentially not created with academic research in mind. Nielsen panel data used by Koskarovska (2021) was collected using a self-complete financial diary in the United States. This tool was created to answer business questions for consumer-packaged goods companies and the data can be used in an academic research framework as well. Huang and Trusov (2020) utilised data collected through interviews conducted by the American Customer Satisfaction Index (Anderson *et al.* 1996). The interview consisted of 17 structured questions and 8 demographic questions.

4.6.2 Research instruments for this study

There are three separate research instruments providing independent sources of data to confirm the validity of the panellist's inputs. These can be defined as a self-complete financial diary, till slip cataloguing and product-packaging collection. These research instruments are explained further in the next three sections.

4.6.2.1 Self-complete financial diary

A self-complete financial diary requires participants in the panel to keep a record of their expenditures for a given period (Chigada, Lappeman & Pillay. 2019). The diary is collected from the respondents on a regular schedule and the data collected, verified and transferred to databases. Financial diaries are a familiar research instrument and are a well-cited methodology (Koskarovska, 2021; Chigada, Lappeman & Pillay, 2019; Morduch & Schneider, 2017; Babin & Zikmund, 2015).

The households are required to itemise and specify their purchases in a Nielsen financial diary (Figure 4.4). The below information must be recorded for each individual item purchased:

1. European Article Numbers (EAN) / barcode
2. Item description
3. Store/chain that item was purchased from
4. Date of purchase
5. Price

The financial diary allows Nielsen to collate the information more efficiently by providing a basic reference data service. The households are required to assign a set of codes to the site they purchased from (for example, 0001 for Checkers, 0002 for Shoprite). All products in the household are also required to be linked to the financial diary with a unique code by placing a sticker on the product or its packaging while leaving a second matching number in the financial

diary. This provides a quick and easy reference point for the fieldworkers to verify that all products are present and have been accounted for correctly.

Figure 4.4. Nielsen financial diary (Source: Nielsen Homepanel Level 1 Training: 2017)

4.6.2.2 Product packaging collection

All products that the households have receipts for and are captured in the Nielsen financial diary must be physically present in the household. Products that have not been completely used can be found in the pantry, cupboards, fridge, freezer, or other storage spaces in the house. If a household has exhausted a product before the fieldworker has completed their visit, the household is required to retain the packaging in a separate bin. Once the fieldworker arrives for their visit, they then compare the data on the receipts to the products they can find in the household or the packaging in the bin.

4.6.2.3 Till slip cataloguing

Panel households are required to retain the original copy of all till slips or receipts that they received with their purchase since the last visit from the field worker. The till slip is the source of the financial diary and is critical as a verification tool to ensure data has been captured accurately in the financial diary. The field worker cross-references between the financial diary and the till slips, so the till slips can be classified as a secondary data source.

4.7 Data collection

The following sections outline panel recruitment, supervision, fieldwork, challenges in data collection, triangulation, data structure and preparation, followed by data-analysis tools and limitations.

4.7.1 Panel recruitment

Recruitment and retention of households are critical to maintaining a stable and representative sample. The ideal panel composition is determined by analysing the cross-sections in Statistics South Africa's household survey. Following statistical requirements, a sample size is calculated for each cross-section to maintain at worst a 95% confidence level and a confidence interval of 5%. Extra households are recruited at each cross-section to ensure continuity should a household need to be excluded. These extra households are included in a buffer panel and only used as a secondary solution.

A new household only needs to be recruited to the panel due to changes in the population group resulting in a need for re-alignment or because a household has left the panel. Nielsen fieldworkers are informed when a new household needs to be recruited and they are sent to the field with the instruction to recruit a specific household. Fieldworkers use a questionnaire to determine a potential household's suitability according to the various cross-sections.

4.7.2 Panel supervision

Reliability and accuracy are critical to the panel and, as such, this is closely monitored and measured and remedial action taken where necessary. The fieldworkers use hand-held terminals connected to Nielsen's internal platform, which allows for real-time feedback to the fieldworker if irregularities are highlighted. The two most encountered issues with panel participants are missing data and data input errors.

4.7.2.1 Missing data

Models have been created to compare the latest month's purchases to historical purchases to determine any significant changes in data. An example of this would be if a household buys milk every month and in the latest month's purchases there are no milk purchases. The hand-held terminal notifies the fieldworker about the irregularity and prompt the fieldworker to ask the participant if the data is correct.

4.7.2.2 Data input error

The financial diaries are reliant on a large amount of manual data input, which increases the chance of input or 'finger' errors. The most frequent errors are incorrect keys typed or a decimal point being placed at the incorrect position. In practice this could be a case of a price of R10.00 being entered as R100.0 with the decimal point being moved one position to the right. Virtually all products that participants purchase will have historical data and prices to compare to, so the hand-held terminal prompts the field worker to check the price again, as it is significantly higher than previous entries.

4.7.3 Fieldwork

Nielsen fieldworkers initiate their visit with the financial diary and use this as the source of truth to be verified by the other two sources of information. The fieldworkers start by comparing the receipts of purchase to the diary to ensure that all information has been captured correctly and that all receipts are accounted for. The next step entails verifying that all products noted in the diary can be found in the household, whether they are in a state of use or exhausted and placed in the designated bin. Items are identified and cross-referenced by the numbered sticker the household places on each one.

Data is collected via a handheld terminal device (HHT) with each fieldworker being assigned one. These devices ensure that a fieldworker's trip is as efficient as possible, with the least amount of manual work possible. All barcodes available and store codes are pre-programmed into the HHT to accelerate data-capturing and minimise the possibility of error. The HHT device is GPS-enabled, which allows for a centralised verification process by providing a method for supervisors to check in real time where a fieldworker is and to confirm that they are at the correct household when entering data. This additional verification step was initiated after some fieldworkers were discovered fabricating data while in their own houses and never having visited the panel household.

4.7.4 Challenges in data collection

The most common and time-consuming obstacle in data collection occurs when an item recorded in the diary is missing from the pantry or its packaging cannot be found in the dustbin. To follow the process, the fieldworker and panellist have to search for the item through the entire household. If it cannot be discovered, an exception is logged for that item, flagging it to the supervisor. This ensures that, if an inordinate number of items cannot be discovered, an investigation takes place, and the decision can be made to include or exclude the data or potentially the household.

4.7.5 Triangulation

Data collected from the financial diaries are triangulated to verify accuracy, consistency, and reliability. The three verification steps can be described as till-slip collection, pantry inspection and dustbin inspection.

4.7.5.1 Till-slip collection

Households are required to retain all receipts of qualifying purchases, as it provides the most accurate record of purchase behaviour. Most store receipts capture the time, date, location (address), item description, EAN/barcode, quantity, and price of purchases. This enables the household to accurately record all details in the Nielsen financial diary and provides the Nielsen fieldworkers with a source to verify data entry and in some instances proves purchase behaviour to clients. Figure 4.5 is an example of a till slip collected by the panel members.

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CHOPPED MUSHROOMS 400GR	#VIT	22.95
PL SMOOTH YOGHURT 175GR	VIT	5.29
PL SMOOTH YOGHURT 175GR	VIT	5.29
CRM SPN&MUSH 4X250G		39.99
PNP PARISIENNE CARROT	#VII	9.99
AUTO FLEXIBL W/POMO 2KG		58.99
PL SMOOTH YOGHURT 175GR	VIT	5.29
COTT CHSE 1KSHAPE CHNKY	VIT	13.99
FL TUNA IN BR SW T CHIL		12.95
FL TU IN BR L&BLK P185G		12.99
FL TUNA IN BR SW T CHIL		12.99
RICE CAKES WHITE SL1/FR		16.99
NATURES BRWN BASMATI	#VIT	31.49
CARRY BAG 24L		0.39
R29 VIRTUAL RECHARGE		29.00
R110 VIRTUAL RECHARGE		110.00
DUE VAT INCL		425.20
CASH		600.00
CHANGE		174.80
ITEMS		18

Figure 4.5. Receipt of purchase example

4.7.5.2 Pantry inspection

Fieldworkers have access to a panellist's house in order to track down the actual products recorded in the financial diary. This would include looking in the refrigerator and food cupboards for food and household products and the bathroom for personal care products.

This step of the process requires high levels of trust between the panellist and fieldworker as it is arguably the most invasive, requiring panellists to allow fieldworkers access to their personal living spaces. Panellists are, however, encouraged to collect all new products that have not been recorded yet in their kitchen or area of their choosing. This facilitates a much faster auditing process and also lessens the invasion of privacy.

4.7.5.3 Dustbin inspection

The final verification step is the inspection of a dustbin provided by Nielsen for the sole purpose of depositing packaging from products used before the audit occurs. The fieldworker will expect to only find packaging for products in the financial diary in the dustbin.

The households are encouraged to clean the packaging to ensure hygiene standards are not compromised. This can become an issue for rural panellists as they might only be audited once a month which leaves a long time for residue products to become a health hazard. For some food products, panellists are allowed to discard the packaging as long as a photograph of the packaging has been sent to the fieldworker. Fresh milk packaging is an example of a product that can be discarded, as the act of cleaning a container of milk can result in water wastage and an inordinate amount of time.

4.7.6 Data management and preparation

The following section outlines how the raw data was managed and prepared for analysis.

4.7.6.1 Data structure

The nature and extent of the dataset results in a large amount of data that does not allow for all data to be readily included in one location to be analysed. For practical purposes and to ensure the data can be utilised in a timely manner, data is separated into firstly calendar year periods, then into two separate files per year and finally two files that can be used across periods. In the case of this study, the calendar year periods included are 2015 and 2016.

The database structure of Nielsen data dictates that the data be separated into two files: trip data and item-level records. In addition to the two files mentioned before, there are two files that are used across periods and contain household and item information: HH mapping and item mapping.

4.7.6.1.1 Trip data file

The trip data file contains top-line information about every unique shopping trip for each household. The information contained in this file is outlined below in twelve separate columns:

- HouseCode – unique and anonymised identifier for each household
- NoOfTrips – indicates the sequence of the trip for that household in the specific year
- DDMMYYYY – date indicator that specifies which day the trip took place
- StoreId – indicates which retail chain the trip took place at
- StoreLocation – no entries as it is not relevant to this study
- StoreName – no entries as it is not relevant to this study
- TotalAmount – Rand total spent on the entire basket for the trip
- TotalTrans – number of items that were purchased during the trip

- PurchaseTime – internal Nielsen measure, not relevant to this study
- ShopperId – internal Nielsen measure, not relevant to this study
- PurchaseReason – no entries as it is not relevant to this study
- Notes – no entries as it is not relevant to this study

4.7.6.1.2 Item-level record file

The item-level record file details each item purchased during the period in question and links that item to a specific shopping trip. There are fourteen columns in the dataset, explained below in more detail:

- ProductSequ – denotes the sequence of the item, specific to each unique household and for the relevant period of the file
- HouseCode – unique and anonymised identifier for each household
- NoOfTrips – indicates the sequence of the trip for that household in the specific year
- BarCode – a unique identifier assigned to each item that allows it to be identified and linked to additional information, such as item description, manufacturer, brand, weight, and category
- ItemCode – a duplicate of the BarCode column
- UnitValue – indicates the number of units of the item purchased in that unique trip
- Price – the price in rands that was paid for the product when it was purchased
- Promotions – internal Nielsen measure, not relevant to this study
- IntendedUse – internal Nielsen measure, not relevant to this study
- IntendedUse – internal Nielsen measure, not relevant to this study
- Notes – internal Nielsen measure, not relevant to this study
- NewItemDes – internal Nielsen measure, not relevant to this study
- Category – internal Nielsen measure, not relevant to this study
- Brand – internal Nielsen measure, not relevant to this study

4.7.6.1.3 HH mapping file

The HH mapping file contains the additional household information that allows the researcher to segment the data into geographical locations, LSM groups and race groups. There are four columns in the file explained below:

- HHID – the unique code that links a household to its demographic data while still protecting the anonymity of the household
- RACE – segments the household into one of four classifications:
    - African/Black
    - Asian/Indian
    - Coloured
    - White
- PROVINCE – identifies the government-denoted province that the household resides in
- SIZE – this column has been incorrectly labelled and should instead read LSM, as it denotes the LSM grouping that the household is assigned to, between 1 and 10. It was relabelled from this point on and is referred to as LSM from this point onwards

4.7.6.1.4 Item-mapping file

This file links a unique barcode to an item description and category as defined by Nielsen and is split into three columns:

- EAN_CODE – this is a code that is assigned to the majority of consumer goods products when they are produced for the first time and links the item to more information
- DESCRIPTION – a concise item description that normally indicates the brand, product nature and weight
- CATEGORY – indicates which one of the five categories this item is assigned to:
    - Bread
    - Maize meal
    - Pasta
    - Potatoes
    - Rice

4.7.6.2 Amending data structure into a usable format

To compare the data across periods, households and categories, the separate files had to be merged and combined into one dataset that contains all the required information and is still manageable when analysing.

4.7.6.2.1 Splitting the text files

The text files of the item-level record for each period contain over 1 600 000 lines of data while Excel worksheets only allow for 1 048 576 lines of data. To work around this limitation, the text file was split into two roughly equal documents that resulted in datasets of less than 1 million lines, which could then be utilised in Excel.

4.7.6.2.2 Combining two types of files for each period

The second phase required Microsoft Excel comma-separated values files (CSV) documents to be combined with the two text documents. The CSV file contained the trip data, while the text files contained the item-level records. The combination process occurred in Microsoft Excel (Excel) as it allows for merging different file formats.

A new workbook was opened in Excel and the trip data files imported through the Get & Transform Data function into three separate worksheets. A fourth blank worksheet was created to be used for the combined dataset.

4.7.6.2.3 Creating one dataset from item-level records

With the item-level record file split into two sheets, the two sheets had to be combined into one, but the row limit still posed a problem. To reduce the rows of data, the items were reduced by excluding all categories that did not form part of the focus for this research.

The item mapping file was incorporated to identify which category every item was coded to. In Excel, the item mapping file was imported using the Get & Transform Data function.

A VLOOKUP formula in the last column of the split worksheets used the unique barcode or product code associated to each item to link it to a category. The formula used is detailed below, with Sheet1 the location of the item mapping file:

- =VLOOKUP(D2,Sheet1!$A$2:$C$300000,3,FALSE)

This formula returned a set of results that would be either one of the five categories or #N/A, where #N/A indicates that the item is not in one of the five categories of interest to this research.

The entire dataset was selected and a filter inserted, allowing each column to be filtered and sorted. The data was then filtered on the last column to exclude any items with #N/A assigned to it. The result was that only items in one of the five categories were visible and reduced the number of rows.

This process was applied to both splits of the text document and the results were combined into one worksheet with Paste Values function. Only the values were pasted and not the underlying formulae, as the inclusion of the formulae would result in a worksheet that required more processing power and ultimately would make the document unwieldy.

The resultant worksheets had 163 006 and 158 973 respectively for the 2015 and 2016 sheets, which could be included in one worksheet according to Excel's limitations.

4.7.6.2.4 Adding trip data to the dataset

The next step required the date that the trip took place on to be added to the dataset. At this stage the base data derived from the item-level records, as well as the trip-level data, contained one column that indicated the house code and another column that indicated the number of that trip for each respective household. These two columns are used as the unique identifier to link each product that was purchased to the trip that it took place in.

A new column was inserted at the far left of both datasets and a formula inserted that would combine both the house code and trip number. The formula used is outlined below:

- =C2&"-"&D2

C2 refers to the house code column and D2 refers to the number of trips column. The result of the formula would appear as the below example:

- 1-2

"1" is the unique household identifier and "2" refers to the sequential number of the unique trip. Once this formula was applied to both the consolidated trip-level record data as well as the item-level record data, there was a unique identifier that connected both datasets.

The next step required a VLOOKUP formula to include the purchase date for each transaction into the item-level data. The below formula was inserted in column P, row 2:

- =VLOOKUP(A2,Trip data!$A$2:$M$235110,4,FALSE)

The output for this formula was a date in the following format, DD/MM/YY. The formula was dragged down for all rows of data. Once the formula had been calculated for all rows, the selection was copied and only the values were pasted over the selection area. This would simplify the worksheet and result in faster processing times.

4.7.6.2.5 Adding household data to the dataset

The next step required three pieces of household information to be added to the dataset. The common key between the datasets would be the unique and anonymised household identifier, numbers ranging from 1 to 8 089 170.

At the end of the existing dataset, three column headings were created:

- RACE
- PROVINCE
- LSM

The next step was to paste data from the HH mapping file into a new sheet in the existing worksheet. Once this was completed, VLOOKUP formulae were inserted in the 2nd row under each of the new column headings, as stipulated below:

- =VLOOKUP(B2,Sheet3!$A$2:$D$3831,2,FALSE)
- =VLOOKUP(B2,Sheet3!$A$2:$D$3831,3,FALSE)
- =VLOOKUP(B2,Sheet3!$A$2:$D$3831,4,FALSE)

The result was the addition of the household characteristic data relevant for each trip while still protecting the household identity.

4.7.6.3 Reducing the size of the data file

The final phase before analysing the data was to make the data more accessible by reducing the file complexity and size. The first step was to copy the consolidated worksheet into a new document. It is important to keep the original document and worksheet as is, should any changes be required.

Once the worksheet has been copied over, the entire data set needs to be selected, copied, and pasted in the exact same location but only as values. This removes all formulae and render the worksheet more user-friendly and ready to be incorporated into data analysis tools.

4.7.7 Data analysis tool

The next two sections briefly outline how Tableau software was utilised to analyse the data.

4.7.7.1 Tableau

Tableau was deemed to be the most suitable tool to analyse the data in. The single largest contributing factor to the selection of this tool is Tableau's ability to process large sets of data with limited delay and processing issues. When attempting to work with the data in Excel, the software would consistently stop functioning and in the process a great deal of work and time would be lost.

Tableau for Desktop was chosen above the other versions for the security it provides. Other versions like Tableau Public, while free to use, require data to be made publicly available, which would not be suitable for the nature of the data used in this research.

4.7.7.2 Importing data into Tableau

When opening Tableau for the first time, the user has multiple options to import data from various file types. As all the data up to this point had been compiled in Excel, the data was imported using the Microsoft Excel connection.

Once the correct file has been selected, the 'Combined' sheet within the Excel file is selected as the table to create the dataset from in Tableau. The table replicates the data format and layout as it was in Excel and allows the user to now work with the data in a more efficient manner.

4.7.8 Limitations

Out-of-home consumption is not tracked as part of the panel purchases, as consumers tend to discard packaging and receipts before reaching home. Examples of product categories affected by this factor are ready-to-drink beverages smaller than 500 millilitres, single-serve confectionery items and tobacco products.

Consumption of categories that evoke certain emotional reactions are also excluded from tracking as consumers have the tendency to incorrectly report their purchases of these products. Liquor products are one example of such a product category as a significant portion of consumers will not be transparent about their liquor consumption habits, to avoid possible judgement.

Some South African households display unusual purchasing behaviour due to grandparents either being the primary caregivers for their grandchildren or supporting the parents by purchasing necessities for the baby. If viewed in isolation, it will result in trends indicating that couples are having children at more advanced ages.

4.7.9 Conclusion

This chapter provided detail on the research methodology applied and proved that the processes followed would all lead to reliable data that could be used to answer the research question.

The research paradigm was introduced as a positivist approach, the research design was explained as quantitative. Following this, the research methodology was defined in detail, including what a panel is, the sampling methodology, research instrument selected and finally the data-collection methodology.

The specific data methodology was selected as it allows the researcher to compare consumers shopping behaviour over time and determine how it changes over time.

In the next chapter, the data is interpreted and analysed to draw conclusions and answer the research question.

Chapter 5: Results, findings and analysis

5.1 Introduction

The preceding chapter detailed the research methodology as quantitative and utilising longitudinal panel data. The research instrument was also described in detail and finally the method of compiling the data into an easy-to-use format was detailed.

The next chapter presents the findings, analysis and interpretation of the data collected from the Nielsen household panel described in Chapter 4. First, the demographic characteristics of the panel are described. The three characteristics that are analysed are household LSM, race and province. This is followed by a presentation of the findings of the data analysis, which answers the research questions posed in Chapter 1.

5.2 Descriptive statistics

This section describes the sample in a quantitative and visual way to make the data easily interpretable. The households are analysed by the number of households as well as the expenditure contribution to highlight the relative importance of each segment in the entire population.

The final household sample consisted of 3829 households which are described in more detail in the next three subsections.

5.2.1 Household LSM

The household LSM indicates which LSM group the household was classified into during the recruitment phase and the subsequent follow-ups to ensure the household has remained in its original classification. As discussed in previous chapters, LSM is a method of measuring households' living standards without requiring household income. In Table 5.1 below, the household count per LSM group is illustrated.

LSM	1	2	3	4	5	6	7	8	9	10	TOTAL
Distinct count	185	319	377	408	704	793	430	294	265	54	3,829
Contribution	4.8%	8.3%	9.8%	10.7%	18.4%	20.7%	11.2%	7.7%	6.9%	1.4%	100.0%

Table 5.1. Household count by LSM group

The total number of households is segmented between the LSM segments in the following descending order: six (21%), five (18%), seven (11%), four (11%), three (10%), two (8%), eight (8%), nine (7%), one (5%), ten (1%). The size distribution curve appears like a bell curve which is the normal distribution curve used across economics and financial data analysis. Figure 5.1 in Appendix B visualises the distribution of the household count across the LSM groups.

To simplify the outcomes of the research, the LSM classifications are structured into three groups that allows for a fairly even distribution of households. These groups are LSM 1-4, LSM 5-6 and LSM 7-10. These groups respectively account for 33.7%, 39.1% and 27.2% of the total number of households.

As discussed in earlier Chapters 1 and 4, LSM 1–6 is considered low-income LSMs.

LSM	1-4	5-6	7-10	TOTAL
Distinct count	1,289	1,497	1,043	3,829
Contribution	33.7%	39.1%	27.2%	100.0%

Table 5.2. Household count by LSM custom group

5.2.2 Household race

The race of the household was classified into four groups: African/Black, Asian/Indian, Coloured, and White. The race of the main purchaser was used as the race for the entire household, if there was more than one race in the household.

In Table 5.3 below, the contribution of each of the race groups is measured.

Race	African/Black	Asian/Indian	Coloured	White	TOTAL
Distinct count	2,613	194	308	714	3,829
Contribution	68.2%	5.1%	8.0%	18.6%	100.0%

Table 5.3. Household count by race group

The Black segment is the largest, with 2613 households and 68.2% of the total panel of households. White households are in second place, with 714 households or 18.6% of the total. Households with Coloured panellists are third with 308 households, 8% of total, and Asian/Indian households is the smallest segment, with 194 panellists, 5.1% of the total.

5.2.3 Household region

The regions were classified into seven groupings: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, North West/Limpopo/Mpumalanga/Northern Province (NW/L/MP/NP), Northern Cape and Western Cape. The variance to the standard nine provinces is with the grouping of the North West, Limpopo, Mpumalanga and Northern Province regions into one group. This is because the households in these four regions are geographically a viable option to group together for analysis purposes.

Province	NW/L/MP/NP	Gauteng	Kwazulu-Natal	Western Cape	Eastern Cape	Free State	Northern Cape	TOTAL
Distinct count	856	767	710	608	539	285	64	3829
Contribution	22.4%	20.0%	18.5%	15.9%	14.1%	7.4%	1.7%	100.0%

Table 5.4. Household count by region

NW/L/MP/NP has the most households at 22.4%, followed by Gauteng (20.0%), KwaZulu-Natal (18.5%), Western Cape (15.9%), Eastern Cape (14.1%), Free State (7.4%) and Northern Cape (1.7%).

5.3 Expenditure and consumption baseline analysis

The previous section outlined the descriptive statistics relating to the demographics of the households. The next section analyses the spending behaviour of the households, focusing on the rand expenditure and volume consumption across the staple categories. The baseline expenditure is established first, looking at expenditure prior to the external influence, namely, price increases.

5.3.1 Value purchases baseline

Table 5.6 below notes the rands spent on each of the five staple-food categories across all households between January 2015 and December 2015. This period is used as the baseline and referred to as *normal expenditure patterns* in the absence of disruptive external factors. In Table 5.5 below, the colour formatting is explained with examples, green being the highest and red the lowest, with a colour spectrum in between.

High value
Medium value
Low value

Table 5.5. Example of colour formatting in Chapter 5 Tables

Month	Bread	Maize	Pasta	Potatoes	Rice	Total
January	R 54,776	R 71,832	R 24,837	R 24,306	R 89,601	**R 265,352**
February	R 64,513	R 75,871	R 26,790	R 26,316	R 88,210	**R 281,701**
March	R 70,860	R 90,080	R 28,271	R 25,800	R 104,598	**R 319,609**
April	R 65,460	R 93,851	R 29,520	R 27,374	R 99,693	**R 315,897**
May	R 61,214	R 94,074	R 28,798	R 31,543	R 100,054	**R 315,683**
June	R 57,381	R 94,304	R 28,897	R 31,778	R 96,747	**R 309,108**
July	R 67,850	R 95,969	R 30,839	R 30,543	R 105,389	**R 330,590**
August	R 64,422	R 116,536	R 31,785	R 30,350	R 105,132	**R 348,226**
September	R 63,131	R 102,336	R 27,577	R 29,794	R 94,438	**R 317,275**
October	R 80,447	R 119,610	R 32,853	R 32,369	R 117,407	**R 382,686**
November	R 67,626	R 115,249	R 33,968	R 28,657	R 111,829	**R 357,329**
December	R 49,703	R 92,596	R 38,267	R 22,703	R 97,896	**R 301,165**
Average	**R 63,949**	**R 96,859**	**R 30,200**	**R 28,461**	**R 100,916**	
Total	**R 767,384**	**R1,162,308**	**R 362,402**	**R 341,535**	**R1,210,992**	**R 3,844,621**

Table 5.6. Value expenditure per category by month (2015)

Across all five categories over the 12 months of 2015, R3 844 621 was spent by the households. The highest expenditure occurred in October, with R382 686 being spent on staple foods and the lowest month was January, with R265 352 being spent, representing a 30.7% variance between the highest and the lowest.

The most money was spent on rice (R1 210 992), followed by maize (R1 162 308), bread (R767 384), pasta (R362 402) and potatoes (R341 535), also illustrated in Table 5.6 above.

The contribution in percentage terms is expressed in Table 5.7 below, as the percentage contribution is used as the benchmark before analysing the price increases at the start of 2016. In terms of rands spent per category, it is important to note January is the highest proportional spend for rice (33.8%) and February is the lowest spend for maize (26.9%). This represents a variance between the highest and lowest of 11.9% for rice and 19.5% for maize.

Month	Bread	Maize	Pasta	Potatoes	Rice	Total
January	20.6%	27.1%	9.4%	9.2%	33.8%	100%
February	22.9%	26.9%	9.5%	9.3%	31.3%	100%
March	22.2%	28.2%	8.8%	8.1%	32.7%	100%
April	20.7%	29.7%	9.3%	8.7%	31.6%	100%
May	19.4%	29.8%	9.1%	10.0%	31.7%	100%
June	18.6%	30.5%	9.3%	10.3%	31.3%	100%
July	20.5%	29.0%	9.3%	9.2%	31.9%	100%
August	18.5%	33.5%	9.1%	8.7%	30.2%	100%
September	19.9%	32.3%	8.7%	9.4%	29.8%	100%
October	21.0%	31.3%	8.6%	8.5%	30.7%	100%
November	18.9%	32.3%	9.5%	8.0%	31.3%	100%
December	16.5%	30.7%	12.7%	7.5%	32.5%	100%
Average	20.0%	30.1%	9.5%	8.9%	31.6%	

Table 5.7. Value expenditure contribution per category by month (2015)

5.3.2 Volume consumption baseline

The value expenditure per category is important, as it denotes the willingness of consumers to pay for a certain product but to understand the actual consumption trends value expenditure needs to be viewed in conjunction with volume purchases. The volume purchases indicates whether respondents consumed more of one category and also account for the inflationary effect of price increases. The data is denoted in kilogrammes to indicate weight consumption and enable cross-category comparison.

In Table 5.8 below, the consumption in grams is detailed per category by month. For all the staple categories, the highest consumption occurred in the second half of the year. Maize had the highest consumption in August, rice and bread in October, pasta in December and potatoes also in October.

The highest consumption occurred in October, with 34 135 kilogrammes in total being consumed, followed by August (32 457 kilogrammes) and November (32 155 kilogrammes). During January, the lowest consumption was noted at 24 076 kilogrammes, which means 29.5 percentage points fewer staple foods were consumed in the lowest versus the highest two months.

Maize had the highest average consumption per month at 13 631 kilogrammes, followed by rice (9332 kilogrammes), bread (3859), pasta (1210 kilogrammes) and potatoes (793 kilogrammes).

Month	Bread	Maize	Pasta	Potatoes	Rice	Total
January	3,272	10,732	1,021	670	8,382	24,076
February	4,006	10,792	1,117	706	8,281	24,903
March	4,189	13,239	1,203	712	8,468	27,809
April	3,977	13,690	1,172	745	9,254	28,836
May	3,671	13,354	1,161	873	9,079	28,137
June	3,414	13,648	1,113	902	8,936	28,012
July	4,183	13,359	1,242	889	9,957	29,630
August	3,918	16,453	1,327	876	9,882	32,457
September	3,791	14,310	1,064	838	9,150	29,152
October	4,850	16,088	1,293	911	10,994	34,135
November	4,077	15,525	1,315	790	10,449	32,155
December	2,965	12,380	1,487	605	9,157	26,594
Average	3,859	13,631	1,210	793	9,332	
Total	46,312	163,567	14,514	9,517	111,986	345,896

Table 5.8. Volume consumption per category by month (2015)

Table 5.9 below illustrates the portion each category contributes to the total monthly staple-food consumption.

Over the full 2015 year, maize contributed on average 47.2% to the total volume consumption, followed by rice at 32.4%, bread at 13.4%, pasta at 4.2% and potatoes at 2.8%.

The highest contribution months for each category were August for maize at 50.7%, January for rice at 34.8%, February for bread at 16.1%, December for pasta at 5.6% and June for potatoes at 3.2%.

5.4 Post-price-increase expenditure and consumption analysis

In this section, value expenditure and consumption is analysed for the period January to December during the year 2016. The structure of this section is like Section 5.3, with value expenditure being analysed first, followed by volume consumption.

Month	Bread	Maize	Pasta	Potatoes	Rice	Total
January	13.6%	44.6%	4.2%	2.8%	34.8%	100%
February	16.1%	43.3%	4.5%	2.8%	33.3%	100%
March	15.1%	47.6%	4.3%	2.6%	30.4%	100%
April	13.8%	47.5%	4.1%	2.6%	32.1%	100%
May	13.0%	47.5%	4.1%	3.1%	32.3%	100%
June	12.2%	48.7%	4.0%	3.2%	31.9%	100%
July	14.1%	45.1%	4.2%	3.0%	33.6%	100%
August	12.1%	50.7%	4.1%	2.7%	30.4%	100%
September	13.0%	49.1%	3.6%	2.9%	31.4%	100%
October	14.2%	47.1%	3.8%	2.7%	32.2%	100%
November	12.7%	48.3%	4.1%	2.5%	32.5%	100%
December	11.2%	46.5%	5.6%	2.3%	34.4%	100%
Average	13.4%	47.2%	4.2%	2.8%	32.4%	

Table 5.9. Volume consumption contribution per category by month (2015)

5.4.1 Value purchase analysis after price increase

The below Table 5.10 illustrates the value purchases of each category by month to the monthly total value purchases. The total staple category spend was R3 726 873 for the full 2016 year, with July the highest-spend month at R359 623. Rice had the highest spend at R1 183 542 followed by maize (R1 172 053), bread (R700 025), pasta (R366 148) and potatoes (R305 104).

Month	Bread	Maize	Pasta	Potatoes	Rice	Total
January	R 58,099	R 91,010	R 27,977	R 23,094	R 86,078	R 286,257
February	R 68,315	R 103,036	R 32,979	R 26,587	R 108,883	R 339,800
March	R 59,621	R 98,264	R 33,174	R 25,706	R 97,127	R 313,892
April	R 62,103	R 108,451	R 33,945	R 28,429	R 105,876	R 338,805
May	R 60,851	R 112,412	R 36,749	R 26,844	R 105,095	R 341,951
June	R 49,584	R 103,938	R 33,093	R 22,736	R 100,632	R 309,983
July	R 60,205	R 117,956	R 38,157	R 27,092	R 116,214	R 359,623
August	R 62,403	R 107,957	R 35,001	R 25,685	R 110,974	R 342,020
September	R 49,045	R 82,044	R 23,029	R 19,907	R 73,791	R 247,817
October	R 72,347	R 96,007	R 27,966	R 26,891	R 100,766	R 323,978
November	R 59,801	R 83,730	R 24,372	R 29,588	R 94,874	R 292,365
December	R 37,650	R 67,249	R 19,706	R 22,545	R 83,232	R 230,381
Average	R 58,335	R 97,671	R 30,512	R 25,425	R 98,629	
Total	R 700,025	R1,172,053	R 366,148	R 305,104	R1,183,542	R 3,726,873

Table 5.10. Value expenditure per category by month (2016)

The category with the single highest monthly spend was maize at R117 956 in July, followed by rice at R116 214 also in July, bread at R72 347 in October, pasta at R38 157 in July and potatoes at R29 588 in November.

Table 5.11 below illustrates the percentage contribution per month by category. In October, bread had its highest contribution of the total monthly spend of 22.3%, maize in June at 33.5%, pasta in May at 10.7%, potatoes in November at 10.1% and rice in December at 36.1%.

Month	Bread	Maize	Pasta	Potatoes	Rice	Total
January	20.3%	31.8%	9.8%	8.1%	30.1%	100%
February	20.1%	30.3%	9.7%	7.8%	32.0%	100%
March	19.0%	31.3%	10.6%	8.2%	30.9%	100%
April	18.3%	32.0%	10.0%	8.4%	31.2%	100%
May	17.8%	32.9%	10.7%	7.9%	30.7%	100%
June	16.0%	33.5%	10.7%	7.3%	32.5%	100%
July	16.7%	32.8%	10.6%	7.5%	32.3%	100%
August	18.2%	31.6%	10.2%	7.5%	32.4%	100%
September	19.8%	33.1%	9.3%	8.0%	29.8%	100%
October	22.3%	29.6%	8.6%	8.3%	31.1%	100%
November	20.5%	28.6%	8.3%	10.1%	32.5%	100%
December	16.3%	29.2%	8.6%	9.8%	36.1%	100%
Average	**18.8%**	**31.4%**	**9.8%**	**8.2%**	**31.8%**	

Table 5.11. Value expenditure contribution per category by month (2016)

5.4.2 Volume consumption after price increase

Table 5.12 below illustrates the volume consumption per month by category in kilogrammes. July had the highest consumption at 30 978 kilogrammes, while the lowest consumption was recorded in December at 20 911 kilogrammes, a 32.5 percentage point decrease from the highest consumption in July.

July was the highest consumption month for maize (15 168 kilogrammes), rice (10 299) and

Month	Bread	Maize	Pasta	Potatoes	Rice	Total
January	3,521	12,889	1,030	611	7,947	25,997
February	4,058	13,368	1,248	706	9,399	28,778
March	3,386	12,500	1,283	636	8,780	26,584
April	3,446	14,169	1,307	692	9,728	29,342
May	3,417	13,703	1,407	646	9,569	28,741
June	2,836	13,248	1,348	547	9,006	26,985
July	3,399	15,168	1,468	645	10,299	30,978
August	3,549	13,461	1,334	593	8,998	27,934
September	3,229	12,231	1,008	599	7,018	24,084
October	4,700	14,196	1,198	774	9,512	30,380
November	3,803	12,142	1,054	828	8,804	26,630
December	2,197	9,518	857	595	7,745	20,911
Average	3,462	13,049	1,212	656	8,900	
Total	41,540	156,589	14,541	7,872	106,802	327,344

Table 5.12. Volume consumption per category by month (2016)

pasta (1468). The highest consumption of bread was recorded in October (4700) and November for potatoes (828). December was the lowest recorded consumption for bread (2197), maize (9518) and pasta (857). June was the lowest month for potatoes (547) and September for rice (7018).

Table 5.13 below illustrates the percentage contribution of each category to the monthly total volume consumption. Maize accounts for 47.8% of the annual volume consumption, followed by rice (32.7%), bread (12.7%), pasta (4.4%) and potatoes (2.4%).

The highest proportional consumption months for the staple categories are October for bread at 15.5%, September for maize (50.8%), June for pasta (5.0%), November for potatoes (3.1%) and December for rice (37.0%).

Month	Bread	Maize	Pasta	Potatoes	Rice	Total
January	13.5%	49.6%	4.0%	2.4%	30.6%	100%
February	14.1%	46.5%	4.3%	2.5%	32.7%	100%
March	12.7%	47.0%	4.8%	2.4%	33.0%	100%
April	11.7%	48.3%	4.5%	2.4%	33.2%	100%
May	11.9%	47.7%	4.9%	2.2%	33.3%	100%
June	10.5%	49.1%	5.0%	2.0%	33.4%	100%
July	11.0%	49.0%	4.7%	2.1%	33.2%	100%
August	12.7%	48.2%	4.8%	2.1%	32.2%	100%
September	13.4%	50.8%	4.2%	2.5%	29.1%	100%
October	15.5%	46.7%	3.9%	2.5%	31.3%	100%
November	14.3%	45.6%	4.0%	3.1%	33.1%	100%
December	10.5%	45.5%	4.1%	2.8%	37.0%	100%
Average	**12.7%**	**47.8%**	**4.4%**	**2.4%**	**32.7%**	

Table 5.13. Volume consumption contribution per category by month (2016)

5.5 Investigation of price increases

This section investigates the price increases that were implemented on maize products and quantify the increase.

Figure 5.1 illustrates the average price per kilogramme for maize products in South Africa. The data is sourced from Nielsen's South Africa Trade Desk benchmark, which is accepted and used as a reference by South Africa's major retailers (Shoprite Holdings, 2022., Pick n Pay Stores Limited, 2014).

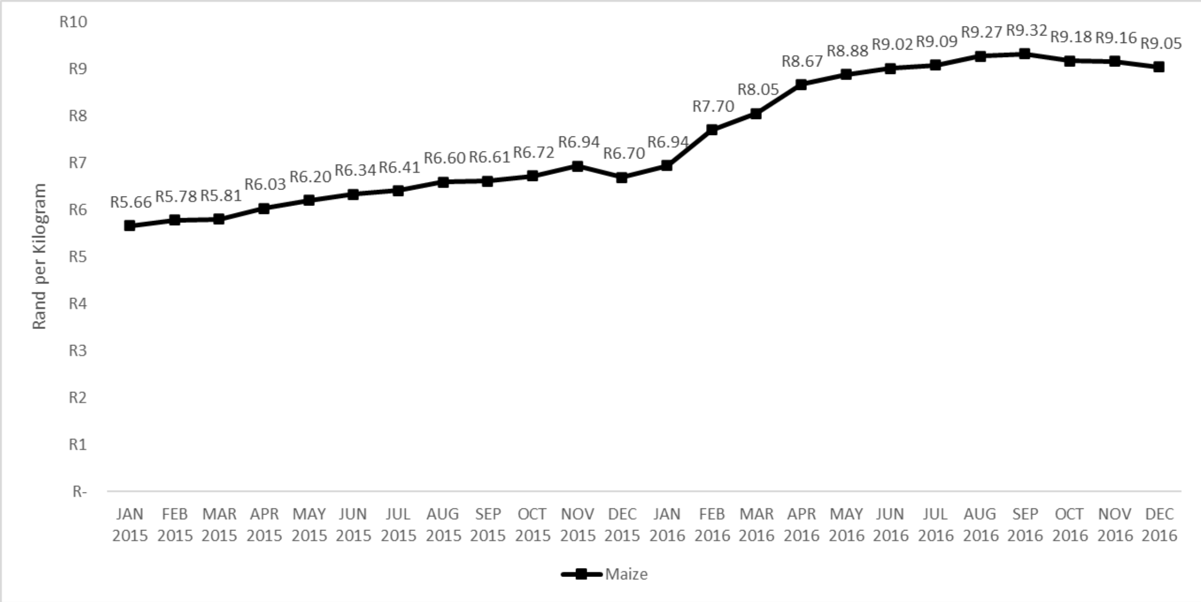

Figure 5.1. Maize price per kilogram (Source: Nielsen Trade Desk)

The figure above visually illustrates the price increases that happened in maize over 2015 and 2016. Over the 24 months from the start of 2015 to the end of 2016, the average price increased from R5.66 to R9.05 per kilogramme, which represents a 59.9 percentage point increase in price.

As the price increase did not occur in one month in a step change but manifested gradually over time, the impact of the price change is analysed over time.

5.6 Analysing the impact of price increase

The preceding sections analysed the consumption patterns in value and volume terms in 2015 and 2016 to establish the baseline and also investigate the patterns after the increase started happening. The price increase was also analysed in terms of the actual percentage increase as well as the period over which it happened.

In the final analysis section, the baseline is compared with the period after the price increase happened to establish the changes in consumption patterns between the staple categories.

5.6.1 Overall staple-basket impact

In Figure 5.2, the combination of all the staple categories' value expenditure is illustrated to understand the impact of the price increase on the total basket size. The bars represent the single monthly expenditure and the dotted trendline represents the six-period moving average to provide a longer-term view than monthly.

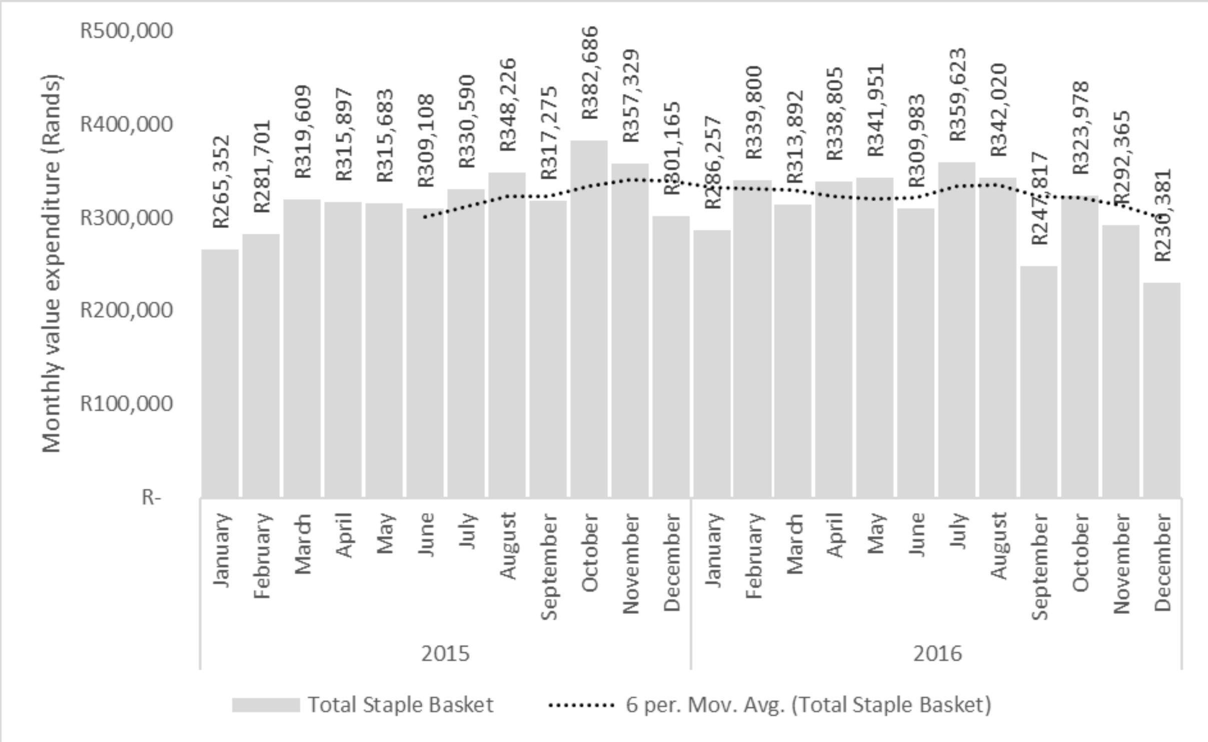

Figure 5.2. Monthly value expenditure on total staple basket

The data illustrates that households spent less money on staples when the price increases started manifesting in the market. In 2015, the households spent R3 844 621 on the staple categories combined and in 2016, R3 726 873 was spent, a decrease of 3.1 percentage points.

The monthly value expenditure decreased over time, reflecting the gradual increase in price established in Section 5.5. The trendline illustrates this decrease over time more effectively as it trends downward starting December 2015 (R2 037 271) to December 2016 (R1 796 185), a decrease of 11.8 percentage points.

Figure 5.3 illustrates the monthly volume consumption of the combined staples category and, similar to the value expenditure, shows a decrease in consumption. During 2015, 345 896 kilogrammes of staple foods were consumed and in 2016 this decreased by 5.4 percentage points to 327 344.

The trendline in volume consumption also illustrates the gradual decrease as the price increases. In the six months up to and including December 2015, 184 122 kilogrammes of staple food was consumed and this decreased by 12.6 percentage points to 160 917 in December 2016.

The value expenditure and volume consumption both decreased from 2015 to 2016, making it clear that the households spent less on staple foods but also consumed less, indicating that

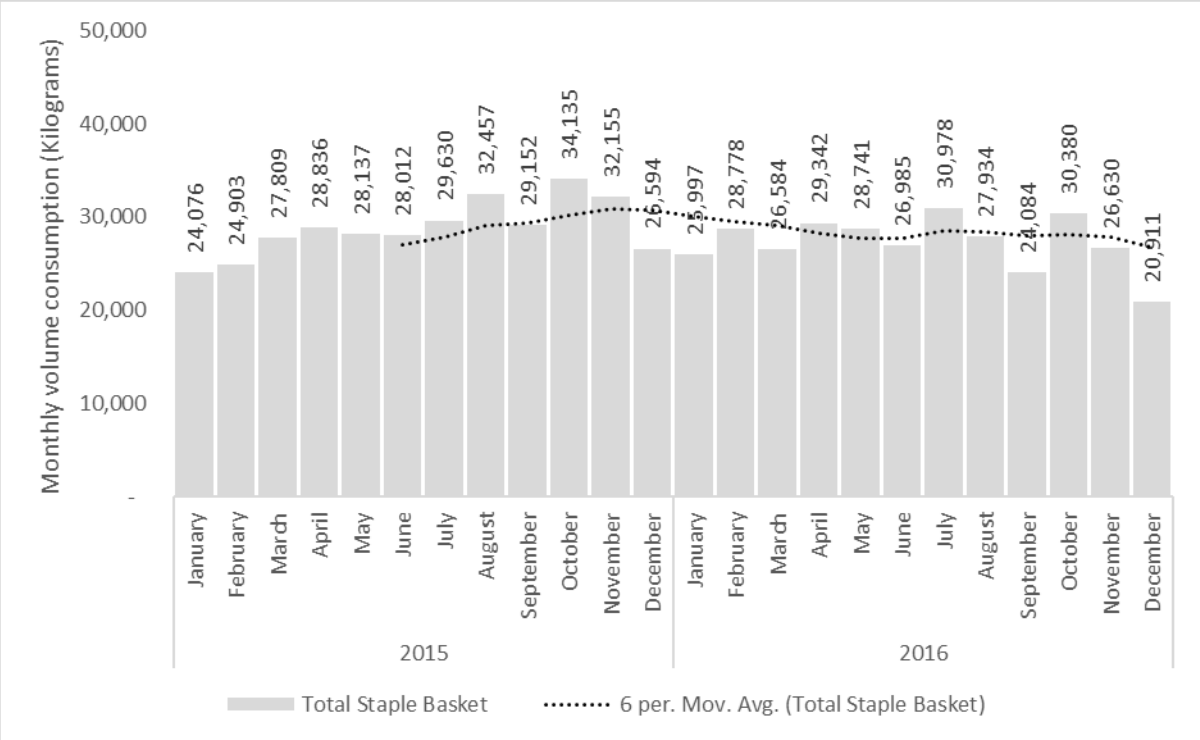

Figure 5.3. Monthly volume consumption on total staple basket

households moved their consumption to other food groups or consumed less overall. The difference between the annual value decrease (-3.1%) and volume decrease (-5.4%) can be used as an indication of the inflationary impact of 2.3%.

5.6.2 Staple-food-basket composition change

The previous section analysed the impact on the total staple basket value expenditure and volume consumption. The next section analyses the composition of the staple basket to determine if some categories have gained share of the basket relative to the other categories.

The annual composition across the staple categories is illustrated in Figure 5.4 in value expenditure to determine the shifting in share of spend. Bread has lost the highest share of spend, decreasing by 1.2 percentage points from 20.0% to 18.8%. Potatoes lost share of 0.7 percentage points, decreasing from 8.9% to 8.2%. Maize gained the most share of 1.2 percentage points, up from 30.2% to 31.4. Pasta gained the second most share of 0.4 percentage points from 9.4% to 9.8% and rice gained 0.3 percentage points share from 31.5% to 31.8%.

These changes do not necessarily indicate households shifting from one category to another. While it is possible households moved between the categories, it is also a possibility that they have not substituted their spend with another staple category.

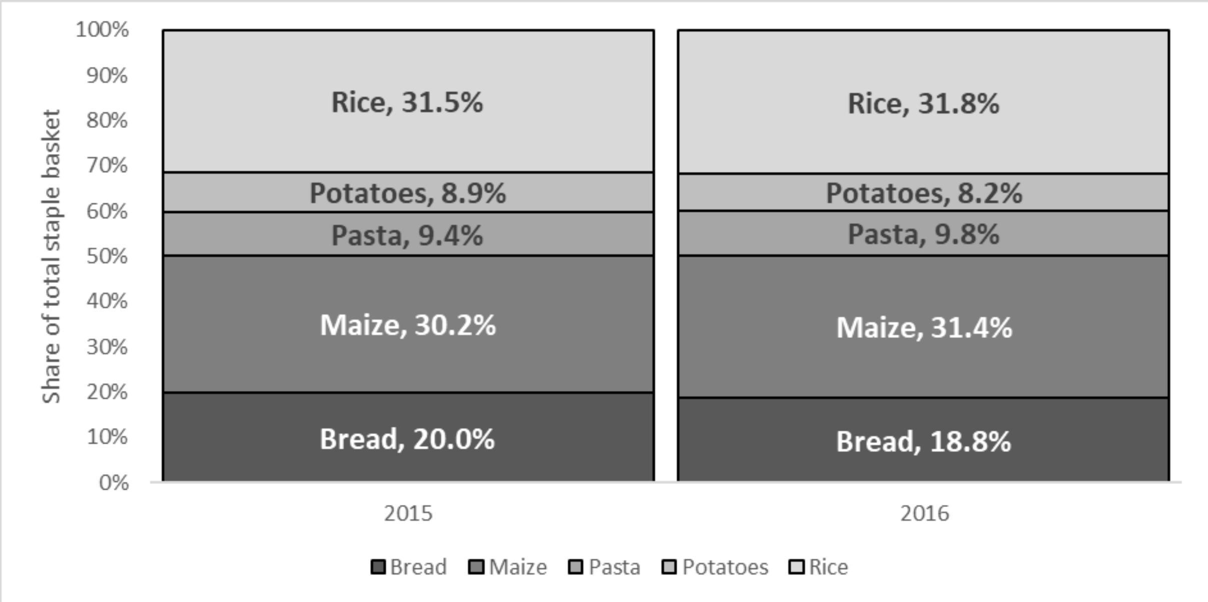

Figure 5.4. Annual composition of value expenditure in staple basket

The below Figure 5.5 illustrates the volume consumption contribution in 2015 and 2016 to determine if there has been consumption pattern changes. Maize gained the most share of 0.5 percentage points from 47.3% to 47.8%, followed by rice, up from 32.4% to 32.6%, a gain of 0.3 percentage points. Pasta also gained with share up by 0.2 percentage points from 4.2% to 4.4%. Bread lost the most share, down by 0.7 percentage points from 13.4% to 12.7% and potatoes lost 0.3 percentage points share from 2.8% to 2.4%.

5.7 Conclusion

This chapter has analysed the data collected from the households that form part of the study. The first section analysed the descriptive statistics to define the demographics of the panel.

The next section analysed the expenditure and consumption patterns of the panel during 2015 prior to the price increase. The section following on from that analysed the average price of

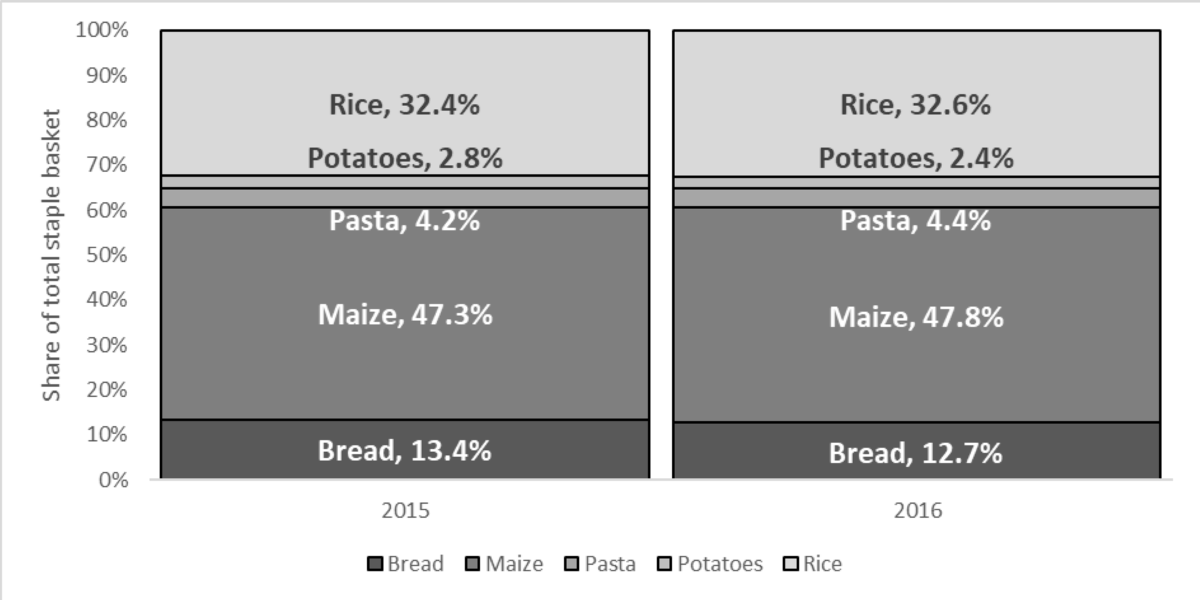

Figure 5.5. Annual composition of volume consumption in staple basket

maize over 2015 and 2016 to identify that the price increases gradually entered the market over the course of 2016.

The final section compared the staple-food basket overall magnitude and determined shifts in the composition of the staple-food basket between 2015 and 2016. The first key finding is that the total size of the staple-food basket reduced, potentially indicating that households had either consumed less or substituted products that are not included in the staple-food basket for their regular products. The second key finding is that maize gained share in both value expenditure and volume consumption, despite the price increases.

The next chapter concludes the study by synthesising the literature review, the research methodology followed and the findings from the data.

Chapter 6: Conclusion

6.1 Introduction

This chapter provides the conclusions to this research by following the process from the research objectives and question stated in Chapter 1. The available literature reviewed in chapters 2 and 3 provided the context and framework for the research and identified the need for the research question to be answered. Chapter 4 explained the research methodology which was followed to collect the data, after which it was analysed, with the findings concluded in Chapter 5.

6.2 General conclusion from the findings

This section outlines three main analysis topics that arose from the research: monthly patterns and trends, total basket size and the composition of the staple basket. The below briefly discusses these topics, before reverting to the research objectives and research questions.

6.2.1 Minimal impact on monthly patterns and trends

Prior to the price increases, consumption and expenditure on the staple-food basket was highest during the month of August, predominantly driven by high consumption in the maize category. This could be explained by August being a winter month in South Africa and the lower temperatures resulting in higher calories needed to sustain energy levels. The lowest consumption months were December to February, which tend to be warmer months and could, in contrast to the peak in August, be due to lower calory requirements. The variance between the highest (August) and lowest (January) months of consumption was 29.5%.

After the price increases in 2016, July was the month with the highest value expenditure and volume consumption through the year. Maize, pasta and rice all experienced peaks in July that, similar to 2015, could be a result of high calory requirements. December was the month with the lowest consumption, recording a variance of 32.5% between July and December. This variance between the two extremes is more significant than recorded in 2015.

The price increases did not seem to affect the monthly trends and patterns significantly, except for the slight variance between the highest and lowest months.

6.2.2 Total basket size impacted significantly

In 2015, a total of R3 844 621 was spent on staple-food categories and 345 896 kilogrammes were purchased. During 2016, the total expenditure decreased to R3 726 873 and volume purchases decreased to 327 344 kilogrammes. The change in value expenditure is a 3.1

percentage point contraction and in volume consumption a 5.4 percentage point contraction. The reduction in both value expenditure and volume consumption is a significant finding, as it indicates that there is a limit to what people can or will pay for staple foods. This is expanded on in the section addressing future research.

6.2.3 Maize has a robust position in the composition of staple basket

The changes in the composition of the staple basket is a significant portion of this research as it provides information on whether there is switching behaviour among staple categories when one or more categories experience high price increases.

In 2015, most money was being spent on rice at 31.5% of the total staple spend, followed closely by maize at 30.2% and then bread at 20.0%. When comparing this with the volume consumption, it becomes apparent there are price differentials between the staple categories. In volume terms, maize accounts for 47.3% of the consumption, followed by rice at 32.4% and bread at 13.4%. The significant variance for maize between value and volume share indicates that per kilogramme, maize is the most affordable staple category and as a result constitutes nearly half of staple-food volume consumption.

During 2016, maize gained the most share, 1.2 percentage points, from the total staple basket, followed by pasta up with 0.4 percentage points and rice up by 0.3 percentage points. The share gain maize experienced could be explained by the price increases, as it would become relatively more expensive to purchase the same amount of maize as it was in the prior year. However, when analysing the volume consumption, maize again gained the most share of 0.5 percentage points, followed by rice gaining 0.3 percentage points and pasta gaining 0.2 percentage points. Bread lost the most share of 0.7 percentage points, followed by potatoes, down by 0.3 percentage points.

The volume share gain that maize experienced would indicate that, despite its price increasing by close to 60 percentage points over 24 months, when faced with contracting purchasing power, consumers tend to invest more in maize. Linking this back to the variance between value and volume share in maize, maize is potentially the food product that offers the best solution to feed households at the best value for money.

6.3 Expanding on the research objectives

This section outlines the research objectives set in Chapter 1 and expand on how these objectives were achieved.

The first objective was to examine the effect of a price increase on the total staple-food basket consumption and expenditure patterns for low-income South Africans. The second objective was to examine the impact of price increases on specific staple-food categories among low-income South Africans.

6.3.1 Total staple-food basket patterns

As discussed in the above sections, the price increases in maize had a significant impact on the total staple-food basket in terms of value expenditure and volume consumption. The total basket size declined in both value and volume, which indicates consumers are not able or willing to absorb price increases indefinitely.

The first research question was:

- *What effect does a price increase have on the entire staple-food basket consumption patterns among low-income South Africans?*

The answer to the first research question can be phrased as:

- *There was no significant change in monthly spending patterns, although the size of the staple-food basket contracted in value expenditure and volume consumption.*

There does not appear to be a significant change in monthly consumption patterns, with only a one-month shift between the highest consumption months across 2015 and 2016. The months with the lowest consumption remain at the end and beginning of each year over December, January and February.

6.3.2 Category-specific trends

The objective to understand trends between categories was achieved, with the potential to expand on this topic in future research.

The focus of the research was primarily on maize with a secondary focus on the other staple categories as the initial and most significant price increases occurred in maize. The variance between maize's share of value expenditure (30.2%) and volume consumption (47.3%) in 2015 explains the relative affordability of maize per kilogramme.

The secondary research question was:

- *When the price of maize increases, what other staple food experiences a change in consumption?*

The answer to the second research question can be phrased as:

- *When the price of maize increased, maize gained the most share across the five categories and bread lost the most share.*

The data also illustrated that households shifted spend and consumption to maize within the basket even though the total consumption of maize contracted. This indicates that, while maize became more expensive, it was still relatively less expensive than other staple categories and fewer households moved out of the maize category as their total purchasing power declined.

In contrast to maize gaining share, bread lost the most share in terms of value expenditure and volume consumption. Also in contrast to the trend in maize, there is a significant variance between the value expenditure share (20.0%) and the volume consumption (13.4%) of bread in 2015. This variance highlights that bread is a relatively expensive staple category when measured per kilogramme against the other four staple categories.

6.4 Implications

This section outlines the key implications the results of this research have on the private sector, specifically retailers and manufacturers, as well as the public sector, comprising the government.

6.4.1 Implications for the private sector

Retailers and manufacturers comprise the majority of the value chain prior to a product reaching a shelf, available for purchase by consumers. That is why they are the most significantly impacted by price increases and why this research adds value to their understanding of their consumers.

The first indication of price increases is realised by the manufacturers or farmers that produce the staple-food product. Farmers are likely to pass the increased cost on to large-scale manufacturers, which are able to absorb some of the increases but not to the extent that was experienced in 2016. The implication of this research for this part of the chain is that maize is the product consumers will revert to if the cost of the staple-food basket increases, even if maize is the product driving the increase. This is important for manufacturers, as they cannot readily substitute maize with another staple food and expect consumers to switch consumption. Manufacturers have to take into account that maize will in most instances remain the most affordable staple food in the staple basket and as such be the default purchase for most consumers who are under financial pressure.

Retailers are the final touchpoint for consumers to purchase staple foods and are also the last segment in the chain with the ability to absorb price increases, although this can only be absorbed to a certain extent. This research advises retailers that staple foods interact between categories and do not behave in isolation. The result is that a price movement in one staple-food product affects demand for another staple food. With maize specifically, it cannot be assumed that an increase in price results in a decrease in demand. This could again be related to maize being the most affordable staple food when measured per kilogramme. In contrast to what was seen during price increases, it cannot be assumed that a decrease in the price of maize will increase demand in a linear trend. It is possible that, as consumers' purchasing power increases, they shift spend from maize to other categories that could be deemed as more luxurious, simply based on average price per kilogramme.

6.4.2 Implications for the public sector

The governmental institutions, also referred to as the *public sector*, are accountable for the welfare and well-being of their citizens, including their food security and consumption, among other aspects.

The shifting within the staple-food basket that occurs during times of price increases has to be understood by the government, especially with the focus on lower-income individuals who are more susceptible to lower purchasing power and being at risk of food insecurity. The findings from this research can be utilised by the government to prepare effectively and provide support for the consumers most severely impacted by high price inflation. The government can intervene on the supply side by either subsidising the affected food products to reduce the impact of the price increases or to acquire staple products from other markets to increase the supply and consequently decrease the price. Another option is to intervene on the demand side by providing financial assistance to the most needy consumers in the form of food stamps for staple foods or provide a quota of staple-food products to enhance their staple-food basket.

6.4.3 Theoretical implications

A significant theoretical implication of the findings is to question the concept that, if the price of one product increases, consumers move away from that particular product to a more affordable substitute.

Perhaps the most significant finding to delve into is the fact that maize meal as a staple category appears to be the product most consumers revert to when their purchasing power decreases.

Having proven that, other researchers are able to ask questions about why this is the case and test the limits of how much consumers will pay for maize meal.

This research has created a foundation for other researchers to continue the study into lower-income South Africans' consumption patterns in the staple basket. Future researchers are able to use the findings to branch out further and into more detail on specific topics that are elaborated on in the section for future research.

6.4.4 Implications for consumers

While there is no direct impact on consumers stemming from this research, the implementation of this research by the private and public sectors could have a significant positive impact on the lives of lower-income South Africans.

If the findings from this research are understood and applied by the various participants in the market, consumers should benefit, with demand being adequately met.

6.5 Limitations of the study

This section outlines the limitations of this study, which provides the introduction for recommendations for future research covered in the next section.

6.5.1 Spending outside the defined staple-food basket

The research looked at the five staple-food categories that constitute most of the staple food expenditure. There are, however, other less frequent staple categories that could account for some of the spend but were not included in this research.

Besides the omitted staple-food categories, there are other food groups that are not included in this research. It is possible that consumers moved out of the staple-food group into another group, like protein or vegetables, to substitute for the more expensive staple foods.

6.5.2 Household level shifting

Assumptions were made at an aggregated household level, which was sufficient for this research, although it would be insightful to understand individual household-level purchasing behaviour. Household-level insights would enable conclusions to be drawn about the nature of the households that shifted spend out of the staple basket and between staple-food categories.

If a household-level analysis was completed, it would be possible to understand if households shifted spend completely from one category to another or whether they expanded their repertoire of products.

It would also be possible to understand the intensity of households and how this relates to their shifting behaviour. Intensity in this case segments households by spend per category into light, medium and heavy shoppers per category. The researcher would then be able to determine which type of shopper is more likely to shift their spend at times of high price increases.

6.5.3 Nutritional information for products

This research focused on volume consumption in kilogrammes, which indirectly makes the assumption that one kilogramme of one product has the same nutritional value as one kilogramme of another product. Being able to analyse nutritional value as consumption shifts between categories would indicate whether consumers are receiving less nutritional value as price increases occur.

6.5.4 Methodological limitations

A limitation of longitudinal studies could be the influencing of the panel through the process of collecting data. In this research, it is possible that households become more aware of their spending behaviour by actively recording and reporting on it. This could in turn alter the results of the research over time, as the households become more informed about their purchasing decisions.

6.6 Recommendations for future research

As discussed in previous sections, this research focused on the five main staple-food categories and did not explore consumption outside that basket. A valuable addition to this research would be to understand the shifting between other categories and the five staple categories. A potential research question would be: if low-income South Africans eat fewer staple foods during times of price increases, are they substituting this with other products outside the staple-food basket or are they consuming less overall? The findings have far-reaching effects, particularly on the healthcare sector and public sector, as it informs researchers if consumers are trading off a nutritious meal for a meal that offers them more value for their money or if they are reducing their consumption as a whole. As discussed in the literature review, there is a significant negative impact on a country if citizens are malnourished.

Another valuable research topic would investigate the shifting behaviour of different-intensity households. As explained earlier, intensity refers to the quantity or share of income a household spends on a particular product or category, defined as light, medium or heavy shoppers. Households could be split into three segments for each category, based either on how much of their total basket spend is allocated to that category or where they rank among all households in consumption measures. This research question could be phrased as: when price increases occur in a staple-food category, which shoppers shift spend from that category the most, light, medium or heavy shoppers? The answer to this question would conclude whether consumers who are very reliant on one category will invest relatively more of their spend into that category and potentially place themselves in a position where they worsen their reducing purchasing power.

As mentioned in the previous section, the nutritional value of staple products would add another dimension to the research, going further to address the food security of households. This research utilised nutritional value based on weight of products, which could be refined by incorporating an element of nutritional value.

While South Africa is a relatively poor nation in the global context, there is a multitude of African nations with a population more reliant on staple foods and as such this research would be even more valuable to them. Expanding this research to other African countries would greatly benefit the consumers most in need of support and be a very valuable addition to the current literature.

The entrance into the beverage market of more affordable caffeinated energy drinks has raised questions around the substitutability of these products with other categories. Theories have unofficially been raised that these brands have either purposefully or accidentally been positioned as a suitable substitute for a solid meal. The question would be if consumers are using these energy drinks to replace meals and what impact this has on their total basket expenditure. The health implications of this could also be analysed in other fields.

While this research focused on the price impact on the staple basket, stock availability would be a valuable addition. It has been established how consumers act if the price of maize increases but it is not evident what the result would be if maize was not available as an option to consumers. This would be the purest form of substitutability, as consumers would be forced to move to another staple category regardless of what price they are willing to pay for maize.

6.7 Conclusion

It has been established that low-income consumers are more susceptible to price fluctuations and consequently having to adjust their purchasing behaviour (Berhane *et al.*, 2014). These shifts in behaviour could lead to food insecurity not only in terms of a lack of food but also a lack of a nutritious diet (Huchet-Bourdon & Laroche-Dupraz, 2016). In South Africa, the major staple-food products have been identified as maize meal, bread, rice and potatoes (Davids *et al.*, 2016), which, with the addition of pasta, is the main focus in this research. The drought in South Africa over 2015 and 2016 had a significant adverse effect on staple-product supply and consequently led to periods of high price inflation (Davids *et al.*, 2016).

This research focused on low-income South African consumers' purchasing behaviour within the staple basket during times of high price inflation. It was determined that there was an opportunity for research that focused on the broader staple-food basket across South Africa. Two research questions were posed to guide the research: what effect does a price increase have on staple-food-basket composition for low-income South Africans and, when the price of maize increases, what other staple food experiences an increase in consumption?

The research found that, during periods of high price inflation, the staple basket decreased in both value expenditure as well as volume consumption. This indicates either that the households consume less food overall as staple products increase in price or that consumers are switching to other food groups as substitutes for the now relatively expensive staple foods. There was no significant variance in monthly spend patterns within the staple basket.

The shift between categories was a significant finding in that, even though maize was the catalyst to trigger price inflation, consumers increased the share of their purchasing power and consumption of maize during this time. This could be a result of the position maize holds as the most affordable staple product on a per-kilogramme basis.

There are valuable future opportunities to add to the current literature by expanding the scope outside the staple basket to understand if spend is being directed elsewhere. Another topic is the behaviour of different households within each category to understand if occasional shoppers are moving out of a category or heavier shoppers are decreasing their spend. Incorporating the nutritional value of products would add another dimension that would go further to addressing food security as measured by a household's ability to maintain a balanced and nutritious diet.

In conclusion, this research has added to the existing literature by providing a better understanding of low-income South African consumers' spending behaviour on the staple basket during times of high price inflation.

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Appendix A: Permission letter from Nielsen South Africa

nielsen

25 June 2018

To whom this may concern,

This letter states to inform the recipient of Oelof Weideman's involvement and training in Nielsen's Homepanel (Consumer Panel Services) solution as well as Nielsen's agreement to him utilising Homepanel data acquired by Nielsen in his studies towards a Master's degree.

Mr Weideman has completed Level 1 and Level 2 training, equipping him with the necessary knowledge to fully understand the data collection process, sample design and fact types available in the data. Mr Weideman has also been part of two field visits, one in Soweto and the other in Cape Town, observing the data collection process. During these visits, experienced field auditors discussed the various aspects of the data collection process and provided additional training to Mr Weideman.

Hereby I provide permission for Mr Weideman to utilise Homepanel data, within the boundaries set by Nielsen policies, to complete his studies towards a Master's degree from The University of Cape Town.

Please feel free to contact me if there are any questions about Mr Weideman's role within Nielsen.

Sincerely,

Signed by candidate

Bryan Sun

Managing Director: Nielsen Sub-Saharan Africa

The Nielsen Company, ACNielsen Marketing and Media (Pty) Ltd, Nielsen Office Park, 7 Handel Road, Ormonde

Appendix B: Ethics application confirmation

Faculty of Commerce

Private Bag X3, Rondebosch, 7701
2.26 Leslie Commerce Building, Upper Campus
Tel: +27 (0) 21 650 4375/ 5748 Fax: +27 (0) 21 650 4369
E-mail: com-faculty@uct.ac.za
Internet: www.uct.ac.za
@Commerce_UCT **UCT Commerce Faculty Office**

24/07/2018

Mr Oelof Weidman

School Of Management Studies

University of Cape Town

REF: REC 2018/007/063

Dear Oelof Weidman,

An investigation of a price increase effect on the staple food basket composition for low income South African consumers.

We are pleased to inform you that your ethics application has been approved. Unless otherwise specified this ethical clearance is valid for 1 year and may be renewed upon application.

Please be aware that you need to notify the Ethics Committee immediately should any aspect of your study regarding the engagement with participants as approved in this application, change. This may include aspects such as changes to the research design, questionnaires, or choice of participants. The ongoing ethical conduct throughout the duration of the study remains the responsibility of the principal investigator.

Please be aware that your study was approved by DSA in 2017 - you may be required to reapply for the 2018 data collection. This remains your responsibility and is not covered by this approval.

We wish you well for your research.

Modie Sempu
Administrative Assistant
University of Cape Town
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"Our Mission is to be an outstanding teaching and research university, educating for life and addressing the challenges facing our society."