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Walmart, Always Low Prices?

Price Implications of Walmart's Monopolization of
Local Grocery Markets in Kansas, Nebraska and Oklahoma

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"If monopoly persists, monopoly will always sit at the helm of government. I do not see monopoly restrain itself. If there are men in this country big enough to own the government of the United States, they are going to own it"

Woodrow Wilson in *The New Freedom*, 1913

Abstract

The American retail market has undergone extreme structural changes in the last decades. Small independent retailers are shutting down and are being replaced by large warehouse-style big box stores. Especially in the grocery sector, local markets have become more and more concentrated, with large discounters like Walmart becoming the dominant players. By offering extremely low prices these big box stores gain an advantage over their smaller competitors and increase their market power. Seeing that regional monopolies have started to emerge, this paper tries to find out if big box retailers exploit their gained regional market power by raising their prices in the specific stores located within the dominated markets. The research is focused on Walmart Supercenters in the states of Kansas, Nebraska and Oklahoma, in which some of the most concentrated local markets are located. A statistical analysis is carried out to identify a potential link between price levels and the number of competitors of a big box store. An additional focus on the spatial scale at which competitors should be deemed influential for big box grocers is included into the analysis. The results show a small but highly significant negative effect of competitors on price, indicating that prices tend to be higher in markets in which consumers have less store choices available to them. Competition seems to have an influential impact within a distance of five to ten miles around the Supercenter, which is considered the general catchment area of these types of stores. Although the effects are small, the results highlight the importance of competitive local markets. Big box retailers are suspected to adapt regional pricing strategies related to the level of competition, causing more dependent consumers to pay more for the same products than others.

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1. Introduction

In the last 100 to 150 years, the retail sector has changed tremendously in the United States of America. Originally consisting of primarily local merchants, it was in the late 1800s that the first mail-order catalogues like Sears Roebuck emerged. These mail-order companies used the established rail-road system to distribute goods across the country, already capturing some of the sales of local retailers (Stone, 1997; 189). When from the 1920s and 1930s onwards the car became more readily available for consumers, it gave them the opportunity to temporarily leave a small town to go shopping in larger towns and cities. Although this already changed the retailing landscape, it was about thirty years later that the most fundamental changes in the retail sector started to take place, with the introduction of shopping malls. Usually located at the edge of the city, the shopping mall drew shoppers from downtown to the suburbs. This caused a steep decline in the number of shops located in the downtown areas, which led to a spatial concentration of the retail sector further away from the city center (Stone, 1997; 189). By placing all kinds of different stores close to each other, shopping convenience was increased by introducing consumers to a high level of so-called one-stop-shopping.

1.1 The Big Box Store

It is likely that the increasing popularity of one-stop-shopping has been a motivation for the creation of discount department stores, which started to emerge in the 1960s (Stone, 1997; 190). Currently the most dominant chain, Walmart, opened its first store in 1962 in Arkansas, and started to set up other stores soon after. These large stores were mostly located in smaller towns, where it could quickly take up a large part of the market and become a dominant store. A rapid expansion of Walmart and other discount mass merchandisers from the 1980s onwards paved the way for the domination of the retail sector by big box retailers, as these types of stores are now often referred to, resulting in a more clustered sector.

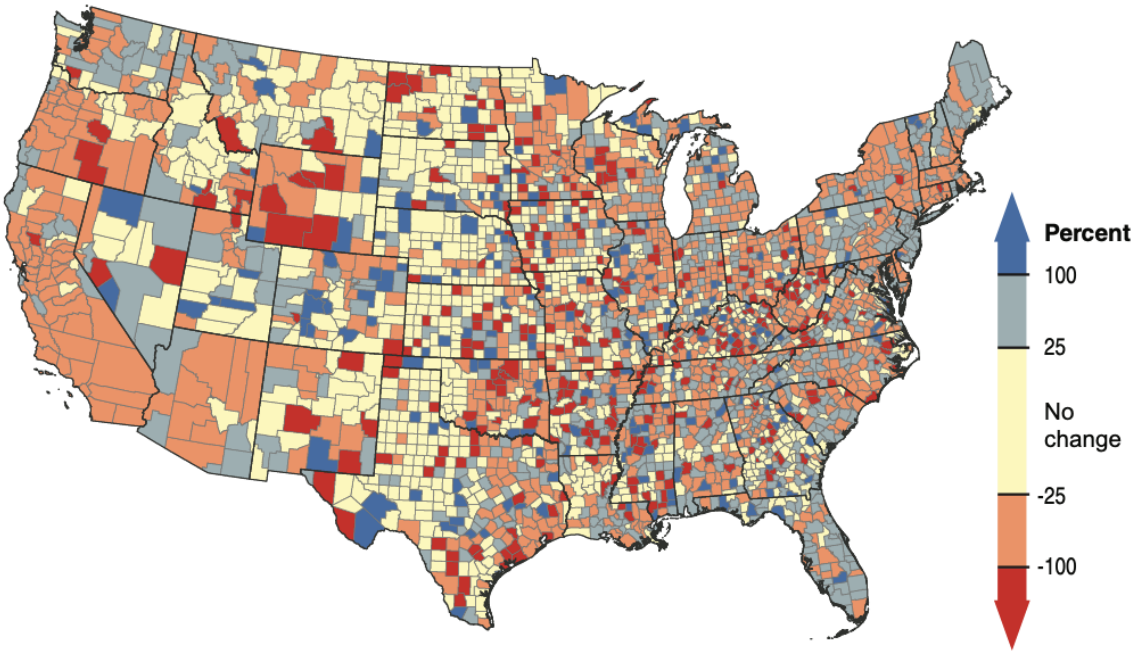
The concentration of the US retail market has increased tremendously over the last few decades. At the end of the 1970s, more than half of all consumer dollars were spent at single-store retailers, while in 2012 this number was down to less than 40% (Basker et al., 2012; 545). The increased spending at chain stores mainly went to the largest chains, the ones with more than 100 stores, as they saw their revenue share more than triple over this same period (Basker et al., 2012; 559). A large part of this increased concentration can be attributed to the

domination of big box stores, like Walmart Supercenters. Their large size, both in terms of single store size and being part of a large chain, allows them to exploit their economies of scale to gain a competitive edge over their competitors, mainly in the prices offered. Large single store size allows for a wide variety of products that can be offered, which satisfies the general demand for one-stop-shopping and likely draws more customers to the store. When this store expands and becomes a chain, the economies of scale will cause the marginal costs of the offered products to fall, which grants the possibility to offer even more products. As a result, more customers will be drawn to the store, which increases profits and will eventually lead to the opening of even more stores (Basker et al., 2012; 543), also allowing the possibility to adopt geographically diversified pricing strategies.

1.2 The U.S. Grocery Retail Market

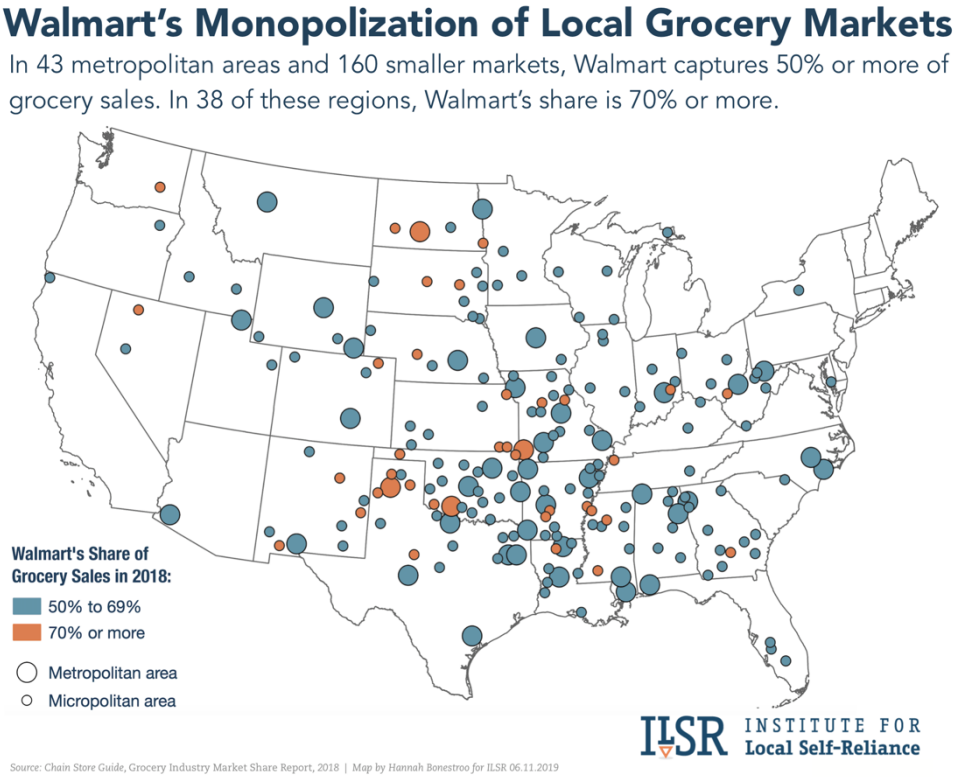
A part of the retail sector in which the concentration is especially prevalent is the grocery retail. The number of independent grocery retailers have been declining in many parts of the USA. Map 1. displays the changes in the share of independent grocery retailers of the total number of food retailers between 2005 and 2015. In many counties this share has been declining, a process that has already been going on well before 2005. The grocery market gets increasingly dominated by large chains, with Walmart being the leading one. In 2017 the discounter from Arkansas controlled 26% of the total grocery market and was far ahead of the next largest grocer, Kroger, which had a share of 10% (Statista, 2020). While Walmart is clearly a dominant chain, the state of concentration on the US grocery market is less severe than for example the Australian one, where the two biggest grocery store chains control about 80% of the entire market (Wardle and Baranovic, 2009; 477). However, when analyzing the market shares in grocery sales in local markets, it becomes clear that large regional differences exist in the dominance of Walmart. In a report by the Institute of Local Self-Reliance (ILSR), the share of grocery sales captured by Walmart has been analyzed. As can be seen in Map 2., many local markets have become dominated by Walmart since it started selling groceries in the late 1980's, especially in the middle of the country. Locally, the market share can be as high as 95%, indicating that potentially problematic market concentration is actually present in several parts of the USA (Mitchell, 2019).

Map 1. Changes in share of independent grocery retailers in the USA, per county, 2005-2015



Source: Cho and Volpe, *USDA*, 2017

Map 2. Walmart's Monopolization of Local Grocery Markets



Source: Mitchell, *Institute for Local Self-Reliance,* 2019

1.3 Risks of Market Concentration

The process through which Walmart has become the largest retailer in the world has been praised as a template for 21st century capitalism but has also been heavily criticized (Gereffi and Christian, 2009; 573). The increasing domination of the discounter from Arkansas has been sketched as an example of the proper functioning of the free market (Anderson, 2004) and is seen as being beneficial for the poor, increasing their welfare (Kenny, 2013). Others are not so positive and point out the potential dangers of such high levels of market domination. Lynn (2013), in a reaction on the article by Kenny (2013), even goes as far as to compare it to the conditions that contributed to the collapse of the Soviet Union. He explains that this collapse was attributed to the lack of competitive markets, while retail giants like Walmart create similar noncompetitive conditions in the USA and are actually praised for it. The consequences of this development are questionable, especially when it comes to prices. Walmart's traditional slogan 'Always Low Prices' and more recent 'Save Money, Live Better' capitalize on the general perception of Walmart as a discount haven (Peralta, 2016; 41), but do companies like this still uphold these promises once consumers have barely any other place to go to for their food supply?

With more and more market concentration, and the reality, or in some cases perception, of big box stores as unbeatable giants, some solid regional monopolies have emerged across the USA. Due to a limited consumer choice and the general image of big box retailers as being the cheapest stores around, an arguably perfect situation for potential price increases with limited consequences has emerged in a growing number of local markets. This is seen as a logical result once a monopoly is achieved, but whether this is actually happening has not yet been looked into extensively. The literature primarily focusses on the process through which big box retailers establish their dominant positions in local markets, but research into what happens once a local monopoly has been established is scarce. Bonanno and Goetz (2012) identify a gap in the knowledge on the long-term consequences of growing power of large retail chains and how that power influences the overall economy and the welfare of consumers. Most papers rely on the basic assumptions of monopolistic competition to explain the consequences, but empirical evidence is often lacking. Two main questions are discussed in this paper, first if price differences in groceries across Walmart Supercenters can be attributed to differences in the level of competition that these stores have to deal with, and second, at which spatial scale competitors should be deemed most influential. Following the reasoning that firms with

monopolistic power will increase prices, it is expected that Walmart engages in price flexing, charging higher prices in local markets in which they enjoy a more dominant position.

The precise distance at which a big box stores impacts competitors is not clear. It has been found that a new big box store had a clear and sustained negative effect on independent retailers in adjacent zip codes, while the effects in the same zip codes were mixed (Parachuri et al., 2009). The large big box stores with their wide variety of products seem to not only draw customers from the direct vicinity (Sciara et al., 2018; 47), but also from other nearby towns (Stainback and Ekl, 2017; 4). Their market area should be considered larger than conventional stores, but the exact distance over which they impact their competitors is unclear. This market area is important in analyzing the level of competition that a store has to deal with. An additional focus on the size of this area is needed to determine which competitors fall within the sphere of influence of the big box stores and which do not. Such an analysis provides a better image of the spatial scale at which competitive effects are at play, which is still poorly defined in existing empirical research.

While the majority of articles and this paper are focused on the functioning of Walmart in particular, the main effects that will be discussed can be expected to be applicable on other big box retailers as well. Their main characteristic is that they more or less follow the same 'big box strategy' and therefore impact local markets in a similar fashion. The research is focused on Walmart because it is the most dominant player in this category of stores, and therefore the biggest effects are expected to be found here. The potential effects that might be found in the pricing strategy of Walmart can sketch a picture of what can be expected from other dominant retail chains as well. Walmart is a market leader, and many others will try to follow their example in order to stay a successful business.

Once the literature on big box retailers is discussed and the impact of Walmart as a food retailer has been looked into, a statistical analysis of the grocery prices in different Supercenters in Kansas, Nebraska and Oklahoma is carried out. Through the use of a multiple ordinary least square regression the number of competitors within different distance radiuses and extent of market domination is regressed on the price level of a basket of goods, consisting of five frequently bought grocery items. The choice for the use of different distance radiuses stems from the lack of consensus in empirical research on the spatial scale at which competitors should be deemed influential. Analyzing different spatial scales allows for a better insight into the size of the general catchment area of a big box store.

The results show that at the spatial scales of five and ten miles some degree of price flexing related to competition can be identified, while the presence of market domination is

found to not have a very significant effect. The presence of a higher number of competing grocery stores tends to be related to cheaper grocery prices in Walmart Supercenters, especially in rural and micropolitan markets. Two main conclusions can be drawn from these results. First, it indicates that pricing is indeed used as a tool to gain a competitive edge over others in more competitive markets, which is in line with other empirical evidence. Second, and perhaps more importantly, it suggests that consumers that are limited in their choice in grocery stores, and therefore are more dependent on Walmart for their food purchases, are likely to pay more at those Supercenters. As Walmart continues to grow and force more and more competitors out of the market, it is expected that these differences become more extreme and more widespread across the USA.

This paper continues with a discussion of the literature on big box retailers and the monopolization of local grocery markets, followed by the setup of the statistical analysis. Once that has been established, the results and implications are being discussed, as well as potential measures to counter the effect. The final chapter concludes the analysis.

2. The ‘Big Box Strategy’ and Monopoly Power

This chapter deals with the process of how the big box store has become the most dominant store type in the US retail market. The general strategy is discussed, followed by the impacts of these stores on local markets. Within this discussion, the focus will be on the role of competition in this process and their expected effect on pricing, as well as the spatial scales at which this is influential. Through the use of literature, a comprehensive overview of the positive and negative effects of the presence of big box stores is given. Once this is established, the focus will be narrowed down on Walmart’s role as a food retailer, in which it competes heavily with other grocery stores. This chapter provides the theoretical background on which the statistical analysis in the next chapter will be based and addresses not only the important implications that big box retailers have on the structure of the retail sector in general, but also more specifically on regional markets.

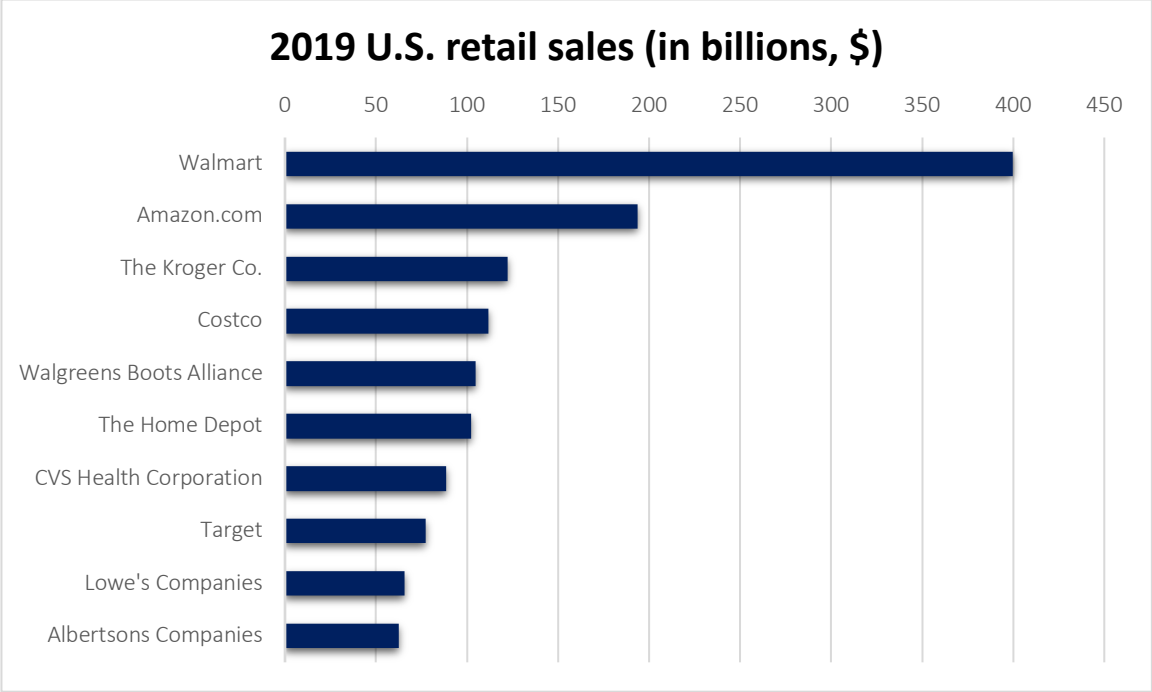
2.1 The ‘Big Box Strategy’

The process through which the big box store has become the dominant format in the American retail market is mostly referred to in the literature as the ‘big box strategy’. The modern technology and advanced logistical systems that they apply in their warehouse-style stores have allowed them to create demand-driven models and have given them the ability to supply more customized products (Parlette and Cowen, 2011). By being tailored to public demand and with a focus on high shopping convenience through ‘one-stop-shopping’, they managed to draw in large groups of customers. The true strategy to become dominant players in the market lies in their exploitation of large store sizes, buying in bulk, and market power to lower the prices of their products and gain the upper hand over their smaller competitors. These strategic advantages that they create through the big box format has also earned these stores the name of category killers, as they have the ability to undercut or ‘kill’ competitors that operate in the same category of the retail market. The high effectiveness of this strategy has not only made the big box store currently one of the most prevalent store formats in the country but has also led to a shift in the nature of competition. While previously firms would compete through service and quality, the main focus now lies on volume and price (Parlette and Cowen, 2011).

In the case of Walmart, the proper use of technology and its scale have mainly led to its dominant position. The initial growth of the company was spurred by the effective use of

technology available at that time. The operating costs of these technologies went down together with the increasing number of stores, allowing for an even better application (Basker, 2007). The more these economies of scale increased, the more Walmart was able to outcompete its competitors on the most important factor in retailing, namely price. The scale on which Walmart operates now is unprecedented, making it quite impossible to effectively compete with them, even for other big box retailers. The effect of conventional cost-cutting and quick adaptation to demand, combined with the company's superior logistics and distribution systems have made it the largest retailer in the world (Basker, 2005b; 207). In the US market Walmart has been the dominating company for decades. In 2005, it had more revenue than the next five biggest retailers combined (Parachuri, Baum and Potere, 2009; 210), and in 2019 it was still more than $200 billion ahead in sales of the second largest retailer in the US, Amazon (National Retail Federation, 2020). It should come as no surprise that a company of this magnitude has been the leading force in shaping the American retail market in the past few decades.

Graph 1. Top 10 retailers in total U.S. sales, 2019



Source: National Retail Federation, 2020

2.2 Impact on Local Markets and Retail Prices

A lot of research has been done in relation to the impact of big box retailers on local communities, especially the impact of Walmart. The long period of time in which the big box store format has been in operation and has dominated the US retail market has allowed researchers to investigate certain developments over time, which has given a good overview of the situation. Mainly economic aspects are discussed, but social implications are also taken into account by some. The literature identifies several positive and negative developments, which sometimes tend to be quite contradicting, depending on the set up of the research.

The most important point that is being made about big box retailers is that they force their small competitors out of the market. In a case study on Home Depot in Canada, a significant negative effect of the big box format on small and traditional home improvement retailers was found, leading to a concentration of this retail sector into a small number of stores (Hernandez, 2003). In the case of Walmart, specific estimates of competing store closures are available. Basker et al. (2012) have estimated that on average each new Walmart store leads to a net reduction of 4,7 stores with fever than 100 employees in its immediate vicinity. This would mean that between 1977 and 2007, a period in which Walmart opened around 3.000 new stores, it can be expected that around 14.100 competing small businesses were forced to close their doors. The effects of a new Walmart will thus be mainly felt by the smaller retail stores, the so-called mom-and-pop stores. Hicks et al. (2012) provide a more nuanced picture of the situation. They suspect that the entrance of Walmart might have the biggest negative impact on other big box stores instead of small businesses, and actually provides a boost for the smaller stores, as they attract different types of customers. They still find a large decline in the number of small retail establishments once a Walmart store is set up, but they attribute this to the fact that small shops can grow into larger size categories due to spillover effects. In general, the literature tends to adapt the line of reasoning that is presented in Basker et al. (2012), but it does not necessarily portray this as a bad thing when looking at the retail sector as a whole.

It is argued that the closure of competing stores paves the way for other types of non-competing businesses to emerge (Parachuri et al., 2009; 213). More and better types of goods and services will be offered in a wave of creative destruction. The stores that are no longer profitable and close were apparently not good enough to keep their customers from going to the new and better option, so it will be better for them to leave the market (Anderson, 2004). Additionally, big box stores with a wide variety of products can become a pull-factor for customers from surrounding areas without such stores, which will not only lead to a higher

number of customers for the store itself, but also for the other types of businesses in the area (Parachuri et al., 2009; 213). The local retail market experiences a structural adjustment which results in a better and even more varied offer of goods and services.

Another important way in which big box stores impact local markets is that they create wealth and raise the general standard of living for consumers (Morillo, 2015; Hicks et al., 2012). By lowering the price of products through their economies of scale, more products become available to more people and more money is being saved. Due to the fact that competitors are forced to lower their prices as well to stay in the market, living costs will go down and the increase in savings will be widespread, especially among lower income households. The gained savings are likely to benefit other sectors as well as they get spent in a different way and reinforces the process of the emergence of other small retailers elsewhere, potentially compensating for the closures of competitive retailers close to the big box stores. Basker (2005b) finds that in the short run, the entry of Walmart leads to a general price decline of 1,5 to 3%, while in the long term it can be as much as 7 to 13%. These price declines are caused by both an increase of competition in the local market and Walmart's interaction with both suppliers and other retail chains to lower costs.

The above-mentioned arguments sketch the presence of a big box retailer as something quite positive, but this depends heavily on which aspect you focus on, which factors you deem most important and to what extent the net effects are taken into account. Additionally, it is also found that some of the positive developments seem to hold up in theory but work out quite differently in practice. This is especially prevalent in the argument that closing competitors are replaced by new, non-competing small stores that diversify the supply of products. First, it is observed that other types of businesses mainly thrive and emerge in the direct vicinity of a big box store. Adjacent towns without them experience even larger losses of all types of retailers, not just direct competitors, as shoppers are drawn away from these towns (Stainback and Ekl, 2017; 4). New shops are less likely to emerge here, as it simply becomes much harder to attract customers. This is a signal that competition in surrounding local markets is impacted as well, suggesting that the spatial scale at which the large stores deal with competition is larger than that of conventional supermarkets.

Second, it is found that the presence of big box stores heavily depresses the level of social capital in local communities (Goetz and Rupasingha, 2006; 1309). If mass closures occur in an area, local entrepreneurship is discouraged as a result of both the perceived and actual market conditions. The business climate becomes tougher, leading to less favorable conditions for start-ups, which will eventually lead to real costs for communities in the form of reduced

economic growth. This discouragement in local entrepreneurship is problematic, as small businesses play a key role in spurring innovation and boosting the renewal process in market economies, leading to increased economic growth and productivity, as well as better employment opportunities (Parachuri et al., 2009; 211). The aspect for which big box retailers are praised in the articles by Anderson (2004) and Ozment and Martin (1990), namely increasing the variety of supply, is expected to be suppressed by the second-round effects that the closures are likely to cause. If old established companies are not able to hold up against large chains like Walmart, it sends a discouraging message to potential new entrants to the market. This process of 'scaring off' of potential entrants is primarily observed in markets in which large retailers are present, while in adjacent markets the 'killing off' of competitors and other small retailers is more prevalent (Parachuri et al., 2009; 228). This creates a high risk for monopolies or oligopolies to emerge, as only one or a few big chain stores will remain in the area. Through this process, consumers will also be more heavily affected in the long run.

With retailers being the final and most visible link of the relevant supply chains for the majority of consumers, the developments that occur here have direct impact on individuals. In limiting the available choices in retailers, a growing dependency on big box chains is emerging in all sectors of the retail market. This is not only the case for consumers, but also for suppliers. Some have taken control of the entire supply chain and can exert power on all the actors in the chain by taking up the role of gatekeeper for access to consumers (Dobson et al., 2003; 112). The control over the total selling process not only facilitates a more aggressive application of the big box strategy by cutting costs even more, but also leads to a so-called 'waterbed' effect. In this process, major chains use their powerful positions to force suppliers into charging lower prices, which in turn makes these suppliers look for ways to gain income elsewhere to make up for the costs that they make, meaning that they tend to increase their prices for primarily smaller retailers. As a result, it is highly likely that the overall retail prices will be raised and/or even more businesses will not be profitable anymore and opt for leaving the market (Dobson and Inderst, 2008). This is in line with findings that retail prices have been rising while prices paid to producers have declined (Wardle and Baranovic, 2009; 478).

The spatial scale at which the discussed effects are observed differ quite substantially. The empirical research ranges from the very specific ZIP-code level (Parachuri et al., 2009) to a more broader county level (Hicks et al., 2012). The focus is mostly on what the entrance of a big box store means for a certain specified area, like towns and cities in general (Basker, 2005b; Stainback ans Ekl, 2017). Looking at these different spatial scales, it is evident that the effect of big box stores on competition is widespread, but also hard to define. Local markets in general

are often taken into account but there is no consensus on the exact distance over which specific big box stores tend to have the most impact. Empirical research is mostly focused on the impact of big box stores when they are present within cities or counties, but the actual distance over which competitors are influential for a single big box store is unclear. This gap in the knowledge should be addressed to determine the most relevant spatial scale at which competition should be defined.

It is however undisputable that big box retailers have a big impact once they enter a local market. Whether this is positive or negative is highly dependent on the context and area in which it will locate. In regions where employment is decreasing, a new big box store can provide a great boost in employment initially (Basker, 2005b; Drewianka and Johnson, 2006), but resulting changes in the market structure has the potential to overturn this effect. Local communities should be aware of the fact that the benefits of greater shopping convenience and lower prices also comes with costs in the form of labor displacement and increasing poverty (Goetz and Swaminathan, 2006; 223). The impact of the effects that are discussed is dependent on the degree to which the big box stores are substitutes or complements to the retail services that already exist in the market, with the positive effects primarily falling on the businesses it complements and the negative ones on which it substitutes (Haltiwanger et al., 2010). However, in the case of Walmart the group of retailers it substitutes encompasses more types of companies than one might think of initially. With a constantly expanding offer of goods and services, the Supercenters take on more and more categories of the generally diverse retail market. With the focus on maximizing the 'one-stop-shopping' effect, Walmart has entered the territory of previously unaffected businesses. This makes the substitution effect much more prevalent than the complementary effect, increasing the level of market concentration. One of the first territories that Walmart expanded into and in which it has become extremely dominant is the grocery sector.

2.3 Competition in the Grocery Sector

While originally being a general department store, Walmart quickly began expanding its line of products as it grew into a larger chain. When in 1988 its first Supercenter opened in the small town of Washington, Missouri, Walmart made its entrance in the grocery market by offering a full range of groceries next to their general range of products (Mitchell, 2019). This step turned out to be a key factor in the company's rapid expansion across the country. In the 20 years after they started selling groceries the store count nearly tripled, and continued to grow

even larger after that, with the majority of new stores following the Supercenter format (Basker et al., 2012; 559). At the end of July 2020, Walmart had a total of 5.353 store locations across the United States, of which 3.569 are Supercenters, representing two-thirds of all existing stores (Walmart, 2020). Their strategy of low pricing turned out to be extremely effective in dominating the grocery market, and in just 13 years after the opening of the first supercenter, Walmart became the largest grocer in the country. In 2018, 1 in every 4 dollars spent on groceries in the USA was spent at a Walmart store, which is more than the market share of the next five largest supermarket chains combined (Mitchell, 2019).

The move towards selling groceries has on the one hand been praised as contributing to lower food prices and better food availability, especially in poorer areas (Courtemanche et al., 2019; 177), but on the other hand has led to an expansion of the fields in which Walmart is extremely competitive. While first it was mainly the general merchandise retailers that were affected by the growth of Walmart, the company is now the primary competitor for independent grocery retailers. In line with the general impact of forcing out small competitors discussed earlier, it is found that independent grocery retailers are more likely to exit the market once a Supercenter has been established in the area (Çakir et al., 2020; 1354). This way, the new Supercenters contribute heavily to increased market concentration, especially in more rural areas. Walmart's monopolization of the grocery retail market is an interesting point to look into, as the extent to which this is going on can differ quite drastically across regions.

As was already briefly discussed in the introduction, in a report published in June 2019, the ILSR looked into Walmart's monopolization of local grocery markets. By analyzing spending data from 2018, it was discovered that in 43 metropolitan areas and 160 smaller markets, Walmart captured 50 percent or more of the total spending on groceries (Mitchell, 2019). This report highlights the overall dominance of Walmart across the country, as well as the large differences that are present between local markets. It gives a good indication of where the process of taking over the market is still in its early stages, or not (yet) so successful, and where Walmart has swallowed up nearly the entire grocery market. The most extreme case of monopolization that has been reported is found in Atchison, Kansas, where 95% of total grocery spending is spent in a Walmart store. Such extreme situations in which Walmart has the possibility to act as a monopolist might create harmful situations for consumers and additionally has the potential to completely overturn the positive effects for which Walmart has been praised.

The report uses the local market shares of Walmart to measure the level of local monopolization of the grocery market. The use of these market shares can give a good

indication on the level of market concentration that is present in a region. It tells a lot about where the money in a certain area is being spent but does not necessary paint a comprehensive image of the amount of different store choices consumers have. While one can assume that a high market share for one company indicates a dominated market with few competitors, it is not a direct measurement for the amount of choice. Stelder (2012) finds that large chains have the ability to cluster in such a way within parts of a local market that it grants them significant spatial market power while their overall market share in that market barely changes. This is especially relevant for larger markets. In creating these clusters, large chains like Walmart can 'trap' the consumers and essentially force them to shop at their stores. This process is likely to be more dominant in the grocery market, as consumers tend to be willing to travel less far for their groceries and are therefore more likely to be 'trapped' (Eastwood, 2001). To properly identify these clusters without competition it is better to look at the number of competitors in a certain area around the Walmart stores instead of looking at the local market shares. Although the market shares can still be a proper indicator for successful spatial monopolies (Stelder, 2012), the number of competitors in a certain radius can provide an even better image on a more local scale. This also allows to look into the spatial extent at which competitors can be expected to have effect.

The spatial extent of competition can be linked to the willingness to travel of consumers. Competitors that are located within the area in which consumers are still willing to go to your store should be considered influential, as they take up a part of the potential customer base. The distance that consumers are willing to travel for groceries is short, as they are frequent purchases and travel costs are limited more severely than with other products. The smaller retailers used to have the large benefit of being located in the inner cities and thus be located closer to the consumer, while larger stores would be further away from the city center. However, with the increasing expansion of big box retailers they have moved into more populated areas as well, limiting the location advantage that small retailers used to have (Goswami and Mishra, 2009; 139). The catchment areas for big box grocers can be expected to be larger than conventional supermarkets, as the one-stop-shopping convenience is likely to increase the willingness-to-travel of consumers.

2.4 Effect of Monopolization

The discussed literature and statistics paint a clear picture of how big box retailers have started dominating the local grocery markets. This can have some severe implications for consumers. The most important factor that is likely to be affected is the price level. Monopolistic price-setting is something that policymakers try to prevent at all costs, in order to maintain a competitive market and to protect consumers. However, the process that is observable in the USA indicates that Walmart has the capability to engage more and more in monopolistic price-setting behavior at the local level. The large differences in market domination across regions might have induced a severe case of price flexing, which is the practice of varying prices in different geographical locations in relation to local competitive conditions, independent of the variations in costs (Competition Commission, 2000; 5). This can lead to disproportional price increases for consumers who have no other options available to them. When this is the case, the processes of reducing the overall retail price level (Basker, 2005b; Parachuri et al., 2009) and the subsequent creation of wealth for consumers (Morillo et al., 2015; Hicks et al., 2012; Peralta, 2016; Parachuri et al., 2009) will be limited and potentially even be overturned. The same can be said about boosting other types of businesses with the money saved by shopping at Walmart (Parachuri et al., 2009), which will logically be less prevalent once prices bounce back up and consumers pay more for their groceries.

Another important implication is that in achieving spatial monopolies, the positive effects on consumer choice, for which Walmart is praised by Anderson (2004), are severely limited. The total range of available products in the region might still be larger than before the entry of Walmart but being dependent on one company does not truly entail free consumer choice. Especially with groceries, for which its availability is more bounded by the location of physical selling points, the lack of competitors obliges more consumers to shop at Walmart, while they might consider this not to be their optimal choice. Such a lack of variety in retail supply, which is also observed by Mitchell (2006), is both a cause and result of increased monopolization, leading to a vicious circle which strengthens monopoly positions even more when left unhindered. The diversification of supply that big box retailers can bring into a community tends to be limited once the chain becomes too prevalent in the market.

There is no going around the fact that big box retailers have become a force to be reckoned with in the American retail market. Their process of taking over local markets is much more advanced in some places than it is in others, leading to large regional differences. The initial entrance into a local market usually leads to positive developments for consumers, who

will experience increasing retail supply, decreasing prices and arguably even an increase in employment, resulting in the creation of wealth and a better standard of living. In terms of small businesses, a renewal process is initiated. Competing companies are more likely to close while new complementing businesses take their place and existing ones tend to benefit from the increased number of potential customers that big box stores attract to the area. Next to this renewal process, concentration of the market in categories that they are active in is taking place, the most important one being the grocery market. Theory suggests that when this concentration process is advanced, and has led to a monopoly position, the prices charged by the monopolist, in this case Walmart, will increase. This would overturn the majority of benefits that consumers enjoyed initially, but whether this is actually happening is still unclear.

Looking at the theory that is discussed above, it is expected that prices in more competitive markets will be lower, as in those locations Walmart is still in the process of eliminating competition, while in dominated markets the prices will be higher as a result of monopolistic market power. Local markets in which more competitors are located are likely to be subjected to a more aggressive big-box strategy to gain market power. As a result, a higher number of competitors is expected to be linked to lower grocery prices. The next chapter discusses the method through which the research questions will be analyzed.

3. Method

The study focuses on price setting in the Walmart Supercenters in the states of Kansas, Nebraska and Oklahoma. The choice to only include Supercenters is made because it is the store format through which Walmart made its entrance into the grocery market and where it is guaranteed that groceries are being sold. Additionally, this type of store follows the big box format, which arguably has a bigger impact on local markets than regular, often smaller, stores. Opting for the same store type also eliminates potential external differences that may arise from the operation of different formats. Other types of Walmart stores also contribute to the degree of market power in a local market and are therefore important to include in the analysis as well. A variable on market share that will be discussed below partially makes up for the presence of other types of Walmart stores in the area, as they increase the market share.

Due to the fact that price data had to be collected manually for every included store through the website of Walmart, the choice has been made to narrow the research down to three states instead of the USA as a whole. The large number of Walmart stores that exists and the amount of data that has to be collected for every store creates an unfeasible task to carry out manually. A method to automate the data collection is not available for the specific data that is needed, leading to the decision to focus on smaller case studies. These case studies of Kansas, Nebraska and Oklahoma are selected on the basis of the results that come forward in the previously discussed report by the ILSR (Mitchell, 2019). By looking at the data, it becomes clear that Oklahoma has the highest number of different regional markets that are being dominated by Walmart, while the most concentrated market of that research is located in Kansas. These extreme cases are important to include in the analysis, but it is also important to look at regions where the situation is still less severe. That is why Nebraska has also been included. It is a state which is located in the same region as Kansas and Oklahoma and shares the characteristic of consisting of many rural regions with a few large cities. This allows for a deeper look into the differences between rural and urban areas. Additionally, the three states had similar regional price parities in 2018, which were valued at 88,4 (Oklahoma), 89,5 (Nebraska) and 90 (Kansas), with 100 being the U.S. average (U.S. Bureau of Economic Analysis, 2020).

3.1 Price Variable

In order to look into potential price differentiation as a result of the level of competition, data is needed on both the prices and amount of competition for each individual Walmart store included in the analysis. The price data for all the different stores is obtained through the online store finder that Walmart provides on its website. Through this store finder it is possible to select a store and look at the products that are available in that particular store and for which price they are sold there. These prices have been collected in September 2020. Although there is no absolute guarantee that the price displayed online is the exact same price that consumers see in the actual brick-and-mortar store, it is highly likely because the option for pick-up in that particular store has been selected. Additionally, it is the closest estimation that can be made without travelling to each individual store in person.

The products that have been selected each come from one of the 5 specified broad food types that are also used in the estimation of the so-called price baskets to determine the price index (Gundersen et al., 2016). These food types are grains, vegetables, fruits, milk products, and meat and beans. The specific product that has been analyzed in each category can be observed in Table 1. Including products from each of the different categories creates a small varied price basket per store which gives a good indication of the price levels of groceries in different Walmart Supercenters. The selected products are basic products in each category that are sold in every Walmart Supercenter included in the dataset. The individual prices are added up to create the variable *Total_Basket*, which is used as an indicator for the price level in each store.

Table 1. Products included into the price basket

	Avg. Price*	Min.*	Max.*	Food Type
Great Value All-Purpose Flour, 10 lb	**$2,25**	**$2,03**	**$3,06**	**Grains**
Broccoli Crowns, each	**$1,04**	**$0,14**	**$1,26**	**Vegetables**
Bananas, each	**$0,18**	**$0,07**	**$0,22**	**Fruits**
Great Value Whole Milk, 1 Gallon	**$2,63**	**$1,14**	**$3,47**	**Milk Products**
4.5lb 80/20 Ground Beef Chuck Tray	**$13,87**	**$10,98**	**$15,03**	**Meat and Beans**
Total Basket	**$19,96**	**$17,03**	**$22,53**	

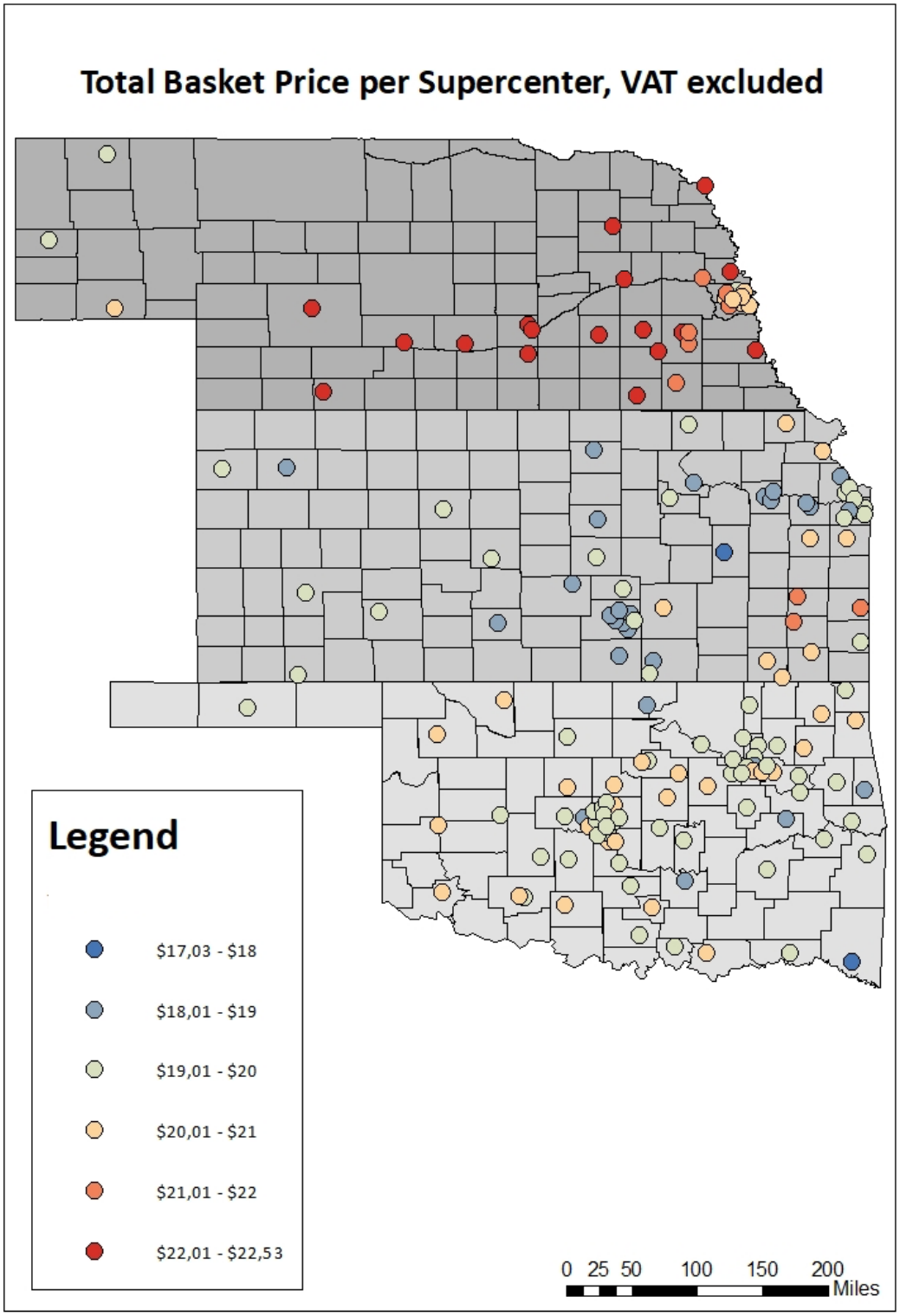
*VAT excluded

Source: Walmart.com

In the prices obtained from the website of Walmart the sales taxes are included. This can lead to a distorted image when analyzing different states and counties, due to the complex nature of the US tax system. A sales tax or VAT at the federal level does not exist, but this is levied at the state, county and/or city level, leading to substantial differences in VAT rates across, but also within the states, even at a very local level. These differences should be controlled for, so that is why in the analysis the total price without the VAT is used. To calculate these prices, the most recent VAT rates at the ZIP-code level are used, which are retrieved from Avalara.com. The ZIP-code level is the most local level at which tax rates are available and includes all city, county and state taxes. After calculating the total VAT that is charged over the products in the specific Supercenters according to the ZIP-codes that they are located in and subtracting this from the variable *Total_Basket*, the new variable *Basket_Price* is created which corrects for the different tax rates. An overview of the prices of the individual foods and total basket without VAT is provided in Table 1. Additionally, the distribution of the basket prices across the individual Supercenters is mapped in Map 3. To increase the interpretability of the coefficient estimates in the statistical analysis later on, the variable *Basket_Price* has been transformed in log variable *lnBasket.*

In Map 3. a clear pattern of pricing can already be observed. Apart from the state differences in prices, which will be discussed later in the chapter, it seems that more remotely located stores tend to be more expensive and in cities, where the Supercenters are more clustered, cheaper prices are observed. This already indicates that Supercenters in rural markets, which are also expected to have less competitors, tend to be more expensive, which is in line with the expectations. It also shows a potential presence of spatial price clusters. To check whether there exists spatial dependence between the basket prices, the Moran's I statistic has been calculated. For the price data collected the Moran's I is 0.199 with a p-value of 0.000, indicating that a spatial dependence is present in the data, indicating that spatial price clusters are present. The further statistical analysis will show if these price clusters are based around the level of competition in the area.

Map 3. Total Basket Prices of Supercenters in Kansas, Nebraska and Oklahoma



3.2 Competition Variables

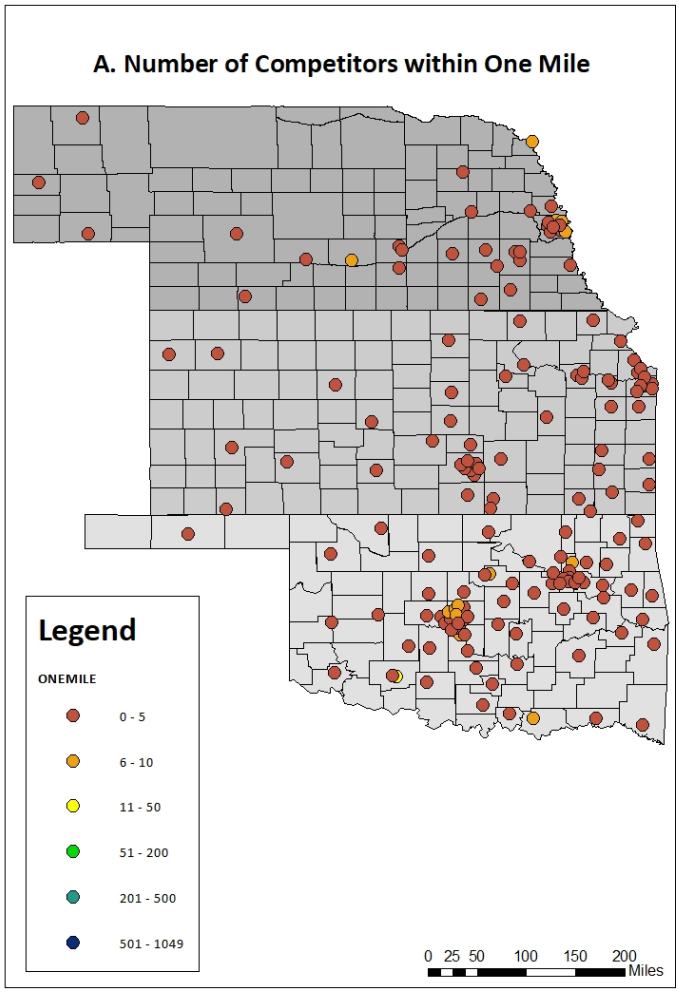
In terms of measuring the level of competition in a certain market, different methods can be adopted. In the ILSR report by Mitchell (2019), the local market share of Walmart is used to assess its dominance and the lack of competition in a regional market. This is a good measurement to identify where the most extreme cases of monopolistic price-setting might occur, but it focusses on the local market level instead of the individual store level. It is still possible to link the market shares to the specific Walmart stores in the area, but this can only be done for a limited number of cases. This is because the report only includes micro- and metropolitan areas, therefor excluding the most rural areas, and only reports a precise value of the market share for areas where it is above 50%. The data from the Chain Store Guide on which they based the report does provide the precise values for all areas, but this data is unfortunately not publicly available. Due to the limited availability of the market share data, it was better to look into a way in which the level of competition could be expressed in detail for every individual store. This data on regional market shares will however not be entirely ignored, as will be explained later on.

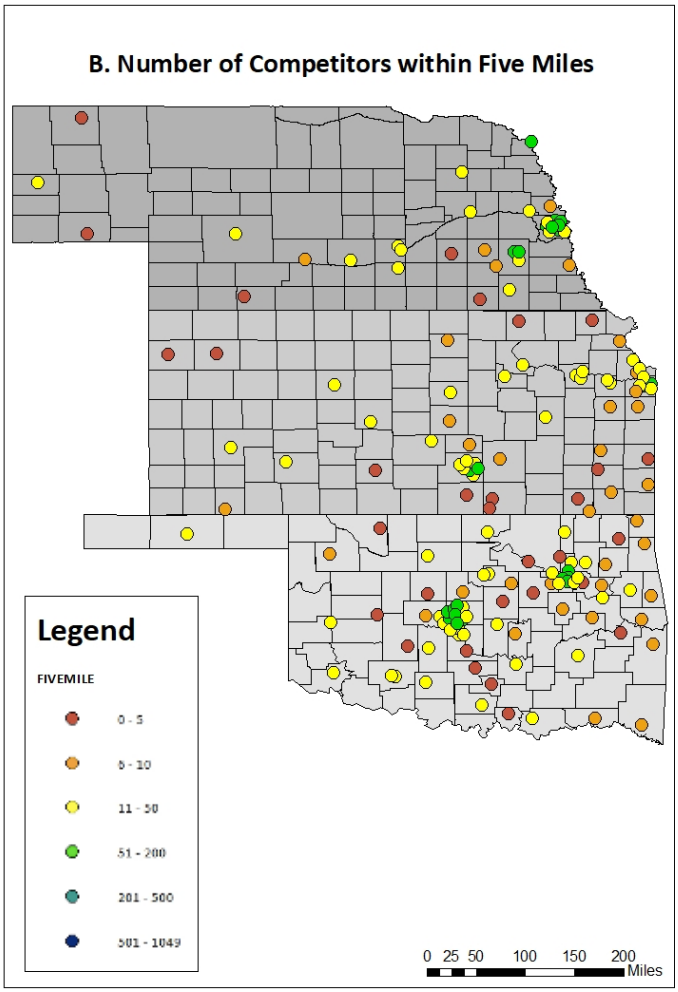
The level of competition for a specific store is obviously dependent on the number of competitors that are located within a certain area of that store, so this would make a useful variable to include into the analysis. Nevertheless, the spatial scale at which this area should be considered is still unclear. To determine at what distance a competitor should still be considered influential to a store, different distance bands will be analyzed. Considering that one of the main effects of the presence of Walmart is eliminating competition (Basker, 2007; Basker, 2012; Parachuri, 2009 Stainback, 2017; Stone, 1997), the number of competitors is a great indicator of the extent to which this has happened within a particular distance radius of a specific Supercenter. The use of a distance radius around the store is also considered a proper way to catch the market area, as the level of substitution possibilities is best described by analyzing a specific area instead of for example the distance to the nearest competitor (Ulrick et al., 2020). Through the use of ArcGIS and location data of both the Walmart Supercenters and other grocery stores in the region, the number of competitors in a radius of 1, 5, 10, 20 and 50 miles around each Supercenter was calculated. The use of different distances can give insight into the precise spatial level at which the effects are the strongest and at which distance the market area of a single store is best defined. It is expected that the 5- and 10- mile radiuses are most relevant in this research, as the willingness to travel for groceries is more limited compared to other goods, as these have to be bought more frequently (Eastwood, 2001). The 1-mile radius might

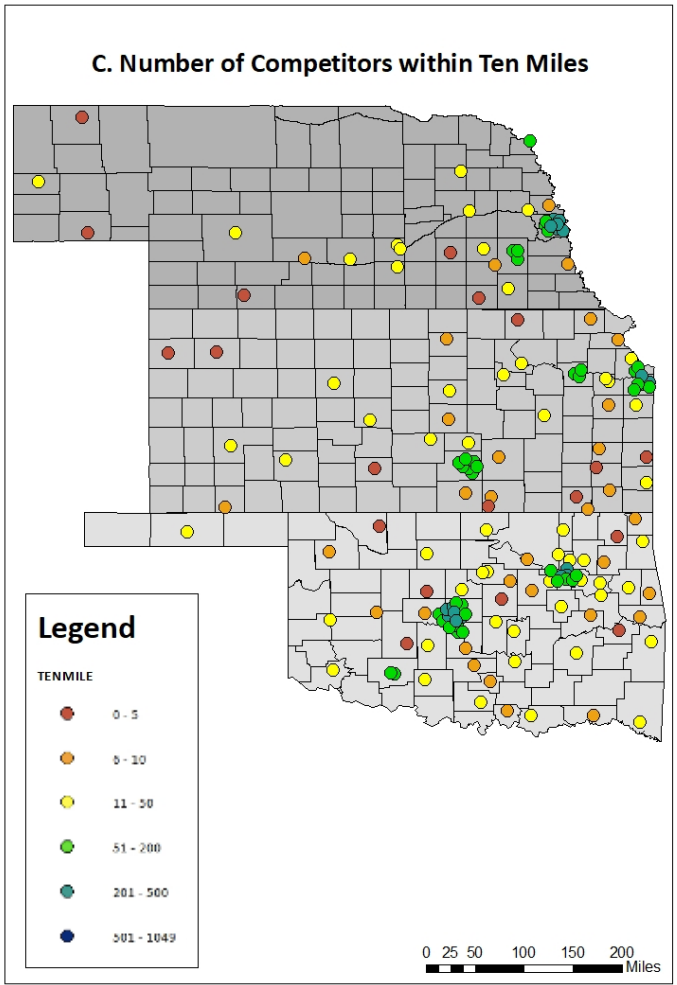
be too small to sketch a full picture of the competition level and would therefore lead to invalid results, which will likely result in insignificant results if this is the case. The 20- and 50-mile radiuses are also analyzed due to the more widespread impact that big box stores tend to have and their influence on small retailers in surrounding local markets (Stainback and Ekl, 2017; 4), which might result in a noticeable effect at these distance bands as well.

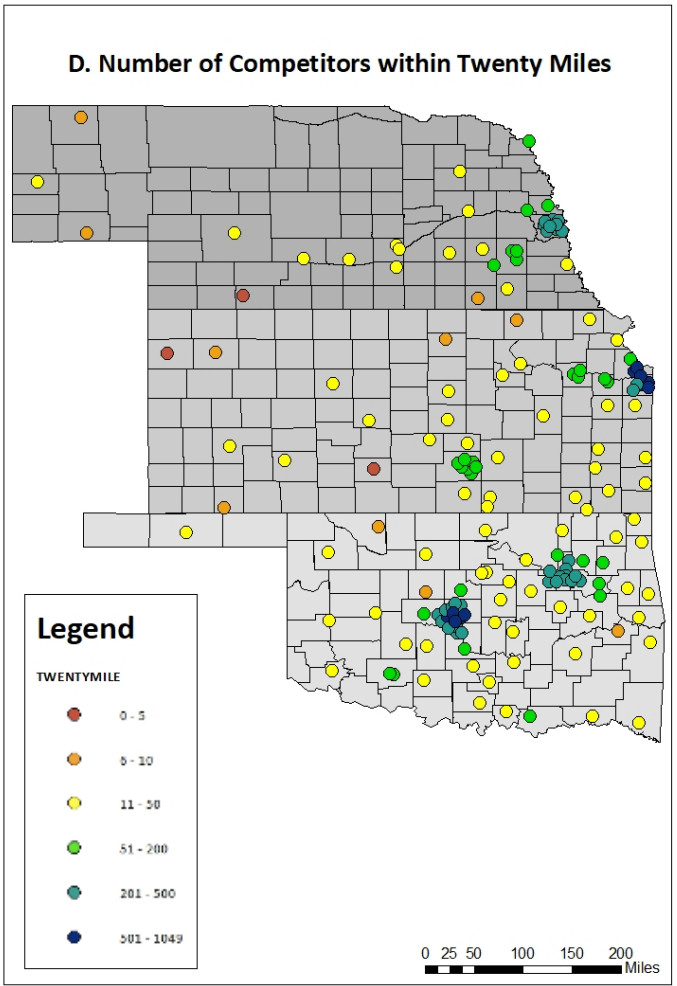
The locations of all the Walmart Supercenters were sampled from a dataset of all Walmart stores in the USA in 2014 which is available on Github.com, while the other grocery store locations were sampled from a full dataset of all grocery stores in the USA, which has been retrieved from the ArcGIS online database. From this dataset all types of stores operated by Walmart have been deleted. All the other competing grocery stores in all the neighboring states of Kansas, Nebraska and Oklahoma were also added into the sample to properly include all potential competitors of the Walmart Supercenters in the three states, especially for those stores located close to the state borders. The number of competitors for each of the different distance radiuses are displayed in Maps 4 A-E. For the statistical analysis the data on the number of competitors will be centered around zero. Usually this is done to increase the interpretability of the intercept, but in this case, this is not the reason because a value of zero is a meaningful value when considering the number of competitors. Instead, this has been done to limit multicollinearity issues with interaction terms that have also been added.

Maps 4 A-E. Number of competitors in the area

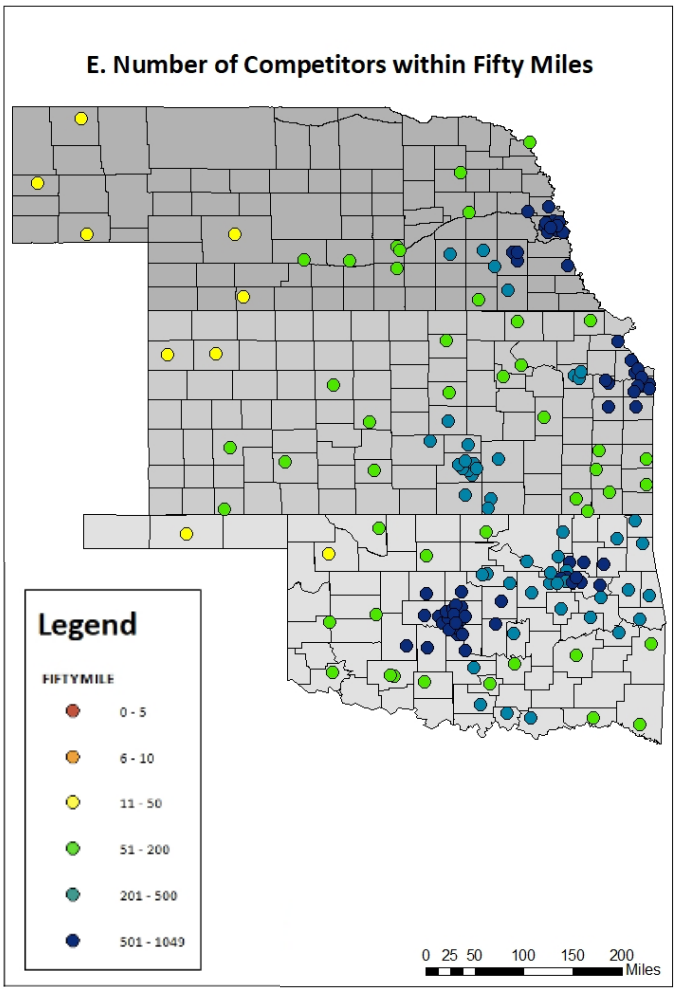








Maps 4 A-E. Number of competitors in the area (continued)



As previously discussed, the data on local market shares of Walmart of the ILSR report is not detailed enough that it can be applied as a decent explanatory variable on its own in explaining the degree of competition for a specific Walmart Supercenter. However, it is still important to include it in some way into the analysis, as it provides an indication of the actual market power the giant food retailer has in a local market. Capturing a large market share in a market with a high number of competitors can still grant the possibility of monopolistic price-setting, as this indicates a weak competitive position of other grocery stores. As specific market share percentages are missing for most of the regional markets included in the dataset, it is not possible to estimate the impact of the degree of market domination on prices. Instead, it is possible to identify whether prices are expected to be different in markets that are classified as dominated. To include this in the analysis, the ILSR data is transformed into a dummy variable for market domination with value 1 for the Supercenters located in markets for which it was reported that Walmart had captured 50% or more of the total grocery sales in 2018, and value

0 for all the other markets. This dummy on market domination can tell a lot about the development of the price level once a dominant position has been achieved, while the number of competitors can tell the opposite, namely how much the price is different when high numbers of competitors are still in the area. Including the market domination is important, as high numbers of competitors do not always automatically imply that Walmart is not a dominant player in that specific local market. This dummy captures the importance of market share of grocery sales.

However, it should be noted that the setup of this dummy does not provide a full image of all the dominated markets included in the dataset, as noncore markets are not analyzed in the report of the ILSR, but it is the closest estimation of the presence of dominance in the different local markets. It can give a good approximation of the impact of market domination. As it can be expected that a substantial number of the noncore local markets are also being dominated, it is likely that the reported coefficient, if significant, will be less severe than the actual effect, as some of those markets will be classified as not dominated. Nevertheless, this should not lead to major problems, as noncore local markets only make up a small share of the total dataset.

3.3 Interaction and Control Variables

In addition to these two competition variables, it is expected that some interactions are at play. The first one deals with the potentially different impact of additional competitors on pricing of Supercenters located in a rural area. Due to high differences in population densities, there are large discrepancies in the number of stores available per customer. For example, when a Supercenter located in the middle of a large, densely populated city has three competitors within a one-mile radius, it can be considered a dominant store, since the high demand would suggest more grocery stores to be located there. The level of competition is likely to be low, as the number of grocery stores is below the number needed to properly satisfy demand. This is different in a rural, scarcely populated area. Here the presence of the same number of competitors within a one-mile radius can suggest a competitive market, as fewer potential consumers are available per store. An additional competitor in a rural area is expected to have a stronger impact in limiting the local monopoly power of a big box store there than an additional competitor in an urban area. In other words, it is expected that the size of the market influences the impact that an additional competitor can have. The distance band in which a store has its customer base is likely to be larger in rural areas than it is in urban ones. That is why

this should be controlled for in the analysis by creating a dummy variable for market size that can be used to generate an interaction variable.

As the report by Mitchell (2019) shows a disproportional domination in micropolitan areas, these markets will also be identified in the dummy variable as small markets. In this dummy variable the value of 1 is attributed to the areas that are classified as 'Noncore' and 'Micropolitan', according to the 2013 NCHS Urban-Rural Classification Scheme for Counties (CDC, 2014), and a value of zero for every other classification. By using this dummy variable to create an interaction variable with the number of competitors indicator, it is possible to test whether there is indeed a significant difference in the impact of additional competitors between areas with high or low urbanization. The possibility to include the dummy variable as an independent variable on its own has also been looked into. Although it is expected that a difference in prices can be attributed to the distinction between rural and urban markets, it also says a lot about the number of competitors. Including it into the models as an independent variable on its own has led to unnecessary multicollinearity problems, especially in the ten- and twenty-mile radius models. The number of competitors is strongly correlated to the dummy variable for market size, so that is why the dummy itself has been excluded as an explanatory variable.

A second interaction that has been included is between the dummy on market domination and the number of competitors. In local markets that have been captured by Walmart it is expected that the competitive position of other grocery stores is lower than in markets that are less dominated. It should therefore be considered that the coefficient for the number of competitors will be different in these markets. This difference in effect can potentially go two ways. On the one hand it can be expected that additional competitors in a market controlled by Walmart will be less of a threat to their dominant position, and therefore will be less influential in determining the price level. In this case, the coefficient of the interaction variable is expected to be flipped relative to the coefficient of the number of competitors, signifying that the impact is less severe in dominated markets. On the other hand, it could also be that the dominant position of Walmart allows them to react on competitors even more and apply more extreme tactics in maintaining their dominant position. In this case, the coefficient of the interaction variable would add to the effect of the number of competitors variable. If significant results are to be found, it can give even more insight into the potentially different pricing strategies that are adopted based on competition.

Finally, a number of control variables should be considered. To get an indication of what type of controls might be needed, it is important to look at the price distribution across the

different Supercenters that is displayed in Map 3. By looking at the map, two key divisions stand out. First, it appears that in general the prices of Supercenters in more remote areas tend to be slightly higher. The places where Supercenters are closely grouped together, which are the large cities in the area, tend to have cheaper products on offer than in the rest of the region. This is in line with the expectation that prices in less competitive markets will be higher. The second division is between the states. While the stores in Kansas and Oklahoma all fall more or less in the same price categories, the stores in Nebraska generally fall in a more expensive price category. All but three of the Supercenters in that state fall in the three most expensive categories, with the most expensive category only consisting of Nebraskan Supercenters. By looking at the average state prices of the baskets, the differences become even clearer. The average price without VAT in Kansas is $19,35, in Oklahoma it is $19,71 and in Nebraska it is $21,52, a difference of $2,17 and $1,81 respectively. This is contrary to the expectations based on the ILSR report, as Nebraska is the least Walmart dominated state of the three. It is therefore highly unlikely that these higher prices can be attributed to the dominance of Walmart and should thus be considered external to the current model.

These inherent differences in prices between states call for a control variable that makes a distinction between the three different states. Categorical data of the names of the states cannot be included in the regression as such, so that is why two state-dummy variables have been created and added to the model, *Nebraska* and *Oklahoma*. *Nebraska* has a value of 1 when the Supercenter is located in Nebraska and a value of zero when located in one of the two other states. In the same way, a value of 1 in variable *Oklahoma* is attributed to Supercenter locations in Oklahoma. A third state-dummy variable for Kansas does not have to be added, as the intercept will provide the estimated mean of this omitted state. These two dummy variables are able to control for many of the differences that are inherent to the states, which can stem from differing purchasing power parity (PPP), institutional and regulatory differences and other factors that to some degree impact price levels.

Another important control variable that has been included is the median income in the county of where the store is located. Areas with higher income households generally have higher absolute prices as well. This is both a result of higher demand of consumers in the region and the adaptation of more expensive pricing strategies to take advantage of the higher level of disposable income. Although the states of Kansas, Nebraska and Oklahoma have comparable regional price parities in general, according to the US Bureau of Economic Analysis (2020), there do exist large differences in median income levels across and within the three states. The poorest county in the region is Adair County, Oklahoma, with a median income of $13.732,

while in the richest county, Johnson County, Kansas, the median income level is almost three times higher at $37.882. The variable which contains the median income is centered around the mean to increase the interpretability of the intercept, as a value of zero for median income is not a meaningful value.

It can be expected that Walmart takes this into account in their pricing, so it is important to control for this. Additionally, if income is found to have a small and/or insignificant impact on prices, consumers in poorer regions can be disproportionally affected by the dependence on Walmart, as the stores will be relatively more expensive for them. Typically, people living in urban areas on average tend to have higher incomes, so this effect might counter the effect of more competition to some degree. If the competition effect on price overpowers the income effect, large discrepancies in purchasing power at different Supercenters can be expected. This purchasing power, which is potentially different than the general PPP, highlights the actual relative impact that customers will experience. This can tell more about whether the consumers that are more severely limited in their choice are also impacted on the level of how much they can buy.

Additionally, the presence of other Walmart Supercenters has been considered another potential factor in the way prices are established, but it is found that this number is highly representative of the level of competition as well, which is already included in the analysis. Contrary to what one might expect, a higher number of other Supercenters in the area actually signifies a more competitive market. This is due to the nature of location decision-making by big box stores. Due to their large size, a single Supercenter can serve an extremely large number of customers. The market area for each individual Supercenter is dependent on the population density. The general location strategy of the big box stores is to open new stores outside of the market area of own stores in order to avoid 'cannibalization' of their own sales. Instead they focus on opening new stores within the scope of rival firms (Schuetz, 2015). In more competitive and densely populated markets it is thus expected to find more Supercenters. This is also found through statistical tests, as the number of other Supercenters is very strongly correlated with the number of competitors in the area, which can be seen in Table 2. This is an indication that the variables *WM_...* are another way of representing the level of competition. Therefore, it will not be included as an independent variable, as the number of competitors provides a better indicator.

Table 2. Correlation coefficients between the number of competitors and number of other Supercenters in a one-, five-, ten-, twenty-, or fifty-mile radius

	WM_One	WM_Five	WM_Ten	WM_Twenty	WM_Fifty
One_Mile	*-- (WM_One = 0 for all observations)*	*X*	*X*	*X*	*X*
Five_Mile	*X*	*0,7786*	*X*	*X*	*X*
Ten_Mile	*X*	*X*	*0,9421*	*X*	*X*
Twenty_Mile	*X*	*X*	*X*	*0,9582*	*X*
Fifty_Mile	*X*	*X*	*X*	*X*	*0,928*

3.4 Statistical Approach

With a clear distinction between a dependent variable (*lnBasket)* and independent ones (the number of competitors, dummies, interactions and control variables), the preferred method of statistical analysis leans towards a multilinear ordinary least squares (OLS) regression for each different distance radius. To determine whether this is a suitable method, it is checked if the data meets the requirements to properly carry out an OLS regression. The first requirement is that the dependent variable is measured at the continuous level, which it is. Second, the independent values have to be measured at the continuous or categorical levels. Both the number of competitors and the dummy variable are expressed by numerical values, so this assumption is satisfied. Third, there should be independence of observations. On the one hand this can be assumed, as each datapoint comes from a different store, and no time series are included. On the other hand, it can be expected that regional pricing is taking place and that prices in one Supercenter are related to those of other Supercenters in the region due to coordination within the chain. However, these stores will face very similar conditions in terms of number of competitors and type of market, as they are located in the same local markets. These conditions are also made up for through the inclusion of the state dummies. Therefore, it should not lead to big issues in the independence of observations.

3.5 Checking for Outliers

The next step is to look at the presence of potential outliers. This is done by running the regression models and analyzing the value of the studentized residuals. After ranking the

studentized residuals of each of the models from high to low, it has been checked if any of the observations exceed the value of -2,5 or 2,5, which will be considered as problematic. The 5 highest and lowest residual values in each of the five models are displayed in Table 3. The table shows that the Supercenter with IDs 38, 39, 111, 867 and 2579 should be considered as substantial outliers in at least one of the models, with Supercenter 38 being the most problematic of the observations. To determine whether there are proper arguments in favor of dropping these observations, a detailed look into the composition of the total basket is required. First, Supercenter 38 is analyzed. By looking at the prices of the individual categories of products in this Supercenter, the most notable difference can be observed in the meat and beans price category. The price of ground beef is the most stable across all the Supercenters, which costs either $14,86 or $15,86 (VAT included). However, in Supercenter number 38 the price of ground beef is considerably lower, namely $12 (VAT included). This leads to the total basket price being substantially lowered as well, as the meat and beans price makes up a large share of the total basket. A clear explanation for this individual outlier cannot be given from the viewpoint of competition, as this specific Supercenter is located in a small rural market with a small number of competitors, for which it would be expected that prices will be higher. Due to this unusual differentiation in the ground beef price, the choice has been made to delete this observation from the dataset. In the four other Supercenters that have high residuals such unusual price differentiations cannot be observed. Due to the lack of strong arguments to make these observations invalid and the fact that the threshold of -2.5/2.5 is not violated as much as with Supercenter 38, it has been decided to still include these observations in the analysis.

Table 3. Ranked Studentized Residuals

Rank	rsOne	ID	rsFive	ID	rsTen	ID	rsTwenty	ID	rsFifty	ID
1	*-4,283*	**38**	*-4,491*	**38**	*-4,320*	**38**	*-4,267*	**38**	*-4,103*	**38**
2	*-2,766*	**2579**	*-3,067*	**2579**	*-2,885*	**2579**	*-2,639*	**2579**	*-2,524*	**1637**
3	*-2,473*	**557**	*-2,723*	**867**	*-2,751*	**867**	*-2,515*	**867**	*-2,485*	**2579**
4	*-2,396*	**1637**	*-2,340*	**1637**	*-2,292*	**557**	*-2,417*	**1637**	*-2,425*	**867**
5	*-2,372*	**867**	*-2,239*	**557**	*-2,153*	**558**	*-2,321*	**557**	*-2,249*	**557**
…..										
159	*1,712*	**368**	*1,732*	**1054**	*1,794*	**368**	*1,720*	**242**	*1,727*	**368**
160	*1,740*	**242**	*1,857*	**1943**	*1,900*	**1054**	*1,857*	**1054**	*2,079*	**1054**
161	*2,309*	**111**	*2,309*	**1187**	*2,423*	**1187**	*2,310*	**1187**	*2,405*	**1187**
162	*2,345*	**1187**	*2,449*	**111**	*2,652*	**111**	*2,529*	**111**	*2,556*	**111**
163	*2,483*	**39**	*2,563*	**39**	*2,748*	**39**	*2,601*	**39**	*2,620*	**39**

3.6 Linearity of the Data

A very important assumption of a multiple OLS regression is linearity of the data, so it is important that this is checked. The linearity of the data used in this analysis has been checked by plotting the standardized residuals of the different models against the values of the continuous predictor variables, which are the number of competitor variables (*..._Mile)* and the variable for median income (*Med_Income).* The dummy variables that have been included do not have to be checked for potential linearity issues, as they can only consist of a value of zero or one. Because it is limited to only two values, the only possible relation between these variables and the independent variable is a linear relation. The residuals versus predictor variable plots can be found in the Appendix. Although in most models the points are quite concentrated around low levels of competitors, no clear trends can be observed in the graphs. Variation in the residuals tend to decrease a bit at higher numbers of competitors, but the heteroskedasticity checks will tell more about this. The distribution of the points is considered to be sufficiently random, and therefore no linearity issues are identified.

3.7 Multicollinearity Issues

In order to determine whether the obtained coefficient estimates of the regression models are stable and no large inflation of the standard errors is present, the models are checked on the presence of potential multicollinearity. By analyzing the variance inflation factor (VIF) of each of the different variables it becomes possible to identify if a problematic linear relationship between the predictors is present. Such a linear relationship has been considered as problematic when VIF values exceed a score of 5. As discussed earlier, multicollinearity issues have been identified once the *Rural_Dummy* was added as a separate variable outside of the interaction. The VIF values for this dummy and the interaction in which it is used are very high in model 3 and 4, as can be seen in Table 4., leading to unstable estimates of the coefficients. A way to solve this is to delete either the *Rural_Dummy* variable as a separate predictor variable or to get rid of the interaction in which this variable is included. The interaction term has been considered the most important of the two, as the marginal effect of an additional competitor is expected to be different in more rural markets than in more urbanized ones. The *Rural_Dummy* variable in itself to some degree can also be considered as a variable that tells something about the degree of competition, as areas classified as noncore or micropolitan can be expected to be less competitive than the metropolitan areas. This level of competition is already taken up by other independent variables, and a high correlation between the dummy and these variables is present. That is why it was decided to delete *Rural_Dummy* as a separate variable from the models. The VIF values for these models, which are displayed in Table 5., show that the multicollinearity issues are solved through this measure, as all the values are well below a score of 5.

Table 4. VIF values with *Rural_Dummy* as a separate independent variable

Variables	VIF Model 1	VIF Model 2	VIF Model 3	VIF Model 4	VIF Model 5
…_Mile	*2,20*	*2,56*	*3,38*	*2,99*	*3,41*
Rural_Dummy	*1,71*	*4,61*	*29,77*	*28,48*	*2,14*
MS_Dummy	*1,15*	*1,33*	*1,30*	*1,14*	*1,21*
Interaction …_Mile#Rural_Dummy	*1,76*	*4,10*	*29,07*	*27,84*	*2,86*
Interaction …_Mile#MS_Dummy	*1,65*	*1,92*	*2,02*	*1,50*	*1,52*
Med_Income	*1,62*	*1,81*	*2,12*	*2,23*	*2,07*
Nebraska	*1,31*	*1,37*	*1,36*	*1,32*	*1,32*
Oklahoma	*1,50*	*1,55*	*1,56*	*1,58*	*1,56*

Table 5. VIF values without *Rural_Dummy* as a separate independent variable

Variables	VIF Model 1	VIF Model 2	VIF Model 3	VIF Model 4	VIF Model 5
…_Mile	*2,20*	*2,56*	*3,38*	*2,99*	*3,37*
MS_Dummy	*1,11*	*1,18*	*1,20*	*1,14*	*1,21*
Interaction …_Mile#Rural_Dummy	*1,70*	*1,64*	*1,87*	*1,94*	*2,56*
Interaction …_Mile#MS_Dummy	*1,65*	*1,84*	*1,95*	*1,48*	*1,51*
Med_Income	*1,12*	*1,72*	*2,12*	*2,17*	*1,71*
Nebraska	*1,31*	*1,37*	*1,36*	*1,30*	*1,32*
Oklahoma	*1,44*	*1,54*	*1,54*	*1,56*	*1,54*

3.8 Presence of Heteroskedasticity

Another important assumption of OLS regression is the assumption of homoskedasticity. Although a violation of this assumption will not lead to biased and inconsistent coefficient estimates, it does lead to biased standard errors. In order to consider multiple OLS as the best linear unbiased estimator, there should be no heteroskedasticity present in the data. In all of the five models the IM-test which checks for heteroskedasticity gives a significant result under $\alpha = 0.05$, indicating that the variance of the residuals is not homogenous. It should therefore be considered that the reported standard errors will be biased when fitting the model in this way, but there is a method to still obtain unbiased standard errors of the OLS coefficients under heteroscedasticity. By using robust standard errors, it is possible

to work around this problem and improve the validity of the models, so this type of standard errors, also known as Huber-White standard errors, have been applied.

3.9 Normality of the Residuals

Finally, the normality of the residuals has been checked. By applying the Shapiro-Wilk test for normal data on the residuals of each of the models, the null hypothesis of the data being normally distributed is checked. For each of the five models the p-values show no significant result under $\alpha = 0.05$, indicating that the residuals are normally distributed. A table with the exact p-values can be found in the Appendix. Although it is not a strict requirement of a multiple OLS regression and will neither lead to biased estimates of the regression coefficients, it does tell something about the explanatory power of the models. This normality assumption assures that the p-values for the t-tests and F-test can be considered valid, therefore improving the validity of the hypothesis testing.

Considering all the tests that have been carried out above it has been decided that a multiple OLS regression of the number of competitors at different distance radiuses and presence of market domination on the total basket prices (VAT excluded) in the different Supercenters with added interactions with market size and market domination and controls for income and state differences will result in stable and valid coefficient estimates. Relevant summary statistics of the continuous variables that have been included are shown in Table 6. With some minor changes to the original data and setup of the models e.g. deleting a substantial outlier and *Urban_Dummy* as a separate variable, centering the *..._Mile* and *Med_Income* variables, and using robust standard errors, some issues with multicollinearity and heteroskedasticity have been made up for. The resulting coefficient estimates will give insight into the way in which Walmart reacts to competitors in different markets through pricing. These results and potential implications are discussed in the following chapter.

Table 6. Summary statistics of the continuous independent variables

Variables	Observations	Mean	Median	Min	Max
One_Mile	*162*	*2,691*	*2*	*0*	*13*
Five_Mile	*162*	*26,593*	*14,5*	*1*	*171*
Ten_Mile	*162*	*66,784*	*19*	*2*	*374*
Twenty_Mile	*162*	*148,605*	*44*	*3*	*648*
Fifty_Mile	*162*	*402,012*	*319*	*22*	*1049*
Med_Income	*162*	*$23.494,76*	*$23.236*	*$13.732*	*$37.882*

4. Results and Implications

The results of the multiple OLS regression that has been carried out are reported in Table 7. on page 39. The log transformation of the dependent variable makes it that the coefficient estimates should be interpreted as the percentage change in the price when a specific independent variable increases by one unit. First, each individual model will be discussed in detail, followed by the general trends that can be identified and the implications that these have on consumers.

4.1 Analysis of the Individual Models

Before the individual models are discussed in detail, how well the models fit the data should be taken into account. The r-squared values, which fall between 0,5590 and 0,6094, give an indication that the goodness-of-fit is quite reasonable. Considering that the F-statistics are also highly significant in all of the models indicates that the relationship between the models and the response variable are quite strong and highly significant. The models are sufficiently fitted to draw valuable conclusions from the resulting coefficients.

The first model, which analyses the impact of competitors within a one-mile radius of a Supercenter, shows no significant results when it comes to competition. The price differences that are present in the data are completely attributed to state differences. Compared to Kansas, prices in Oklahoma are expected to be around 2% higher, while in Nebraska this is around 10,7%. A potential explanation of the insignificant estimation coefficients for competition can either be that Walmart does not take the regional competitiveness level into account when deciding on their prices or that the one-mile radius is too small of an area to correctly estimate the correct number of competitors that a certain Supercenter has to deal with. Additionally, almost 15% of the observations have no competitors within a distance of one mile, which is likely to distort the results to some degree. It is expected that a one-mile radius does not fully include the catchment area of a single Supercenter, and therefore does not sketch the full picture.

When analyzing the next two models, which include the level of competition in a 5- and 10-mile radius, the coefficient estimates of the competition variables take on more interesting values. In model 2, the fact that a Supercenter is located in a different state still explains most of the price differentiations, but also a small but highly significant negative effect of competitors on the price level is found. Perhaps even more interesting is that the interaction variable of the number of competitors and the dummy variable classifying areas as rural also

gives a significant negative effect. This indicates that additional competitors in more rural areas are expected to have a stronger impact on lowering the price level than in more urban areas. One extra competitor in an urban area is estimated to lower the price of the basket by 0,038%, while in rural areas the total effect is estimated at -0,116%, indicating that the marginal effect of an additional competitor decreases when the market becomes larger. These are low percentages, but it is interesting to see that the effect of competition in rural areas can be expected to be around three times as strong as in urban areas. Finally, the market share dummy variable also implies that prices tend to be around 1% higher in local markets classified as dominated, but it should be noted that this effect is barely significant under an α-level of 0,1. Therefore, it should not be considered as having substantial explanatory power.

Looking at Model 3, the state differences are again the most substantial estimator of price differences. Here the percentual increases attributed to these differences are the highest of all the models. Nevertheless, the negative effect that competition has on the price level remains highly significant, but it is around half of the effect that is found in the five-mile radius. This is also partly due to the fact that more competitors can be expected to be located in a larger area, and therefore each individual grocery store will be less influential. Interestingly, the different effect of competitors in rural areas found in the previous model becomes insignificant when the market area is extended to a ten-mile radius. Instead, a different effect of competitors in dominated markets is identified. The positive value signifies that competitors in dominated markets are less influential on the prices of Walmart, which shows the high degree of market power that the grocery chain possesses in those markets. Although the model estimates very small price differentiations, the effect in dominated markets can still be expected to be half that of the effect in non-dominated ones. Furthermore, the ten-mile radius model is the only model in which the median income can be considered a significant estimator of the price level. The implications of this will be discussed under the general trends.

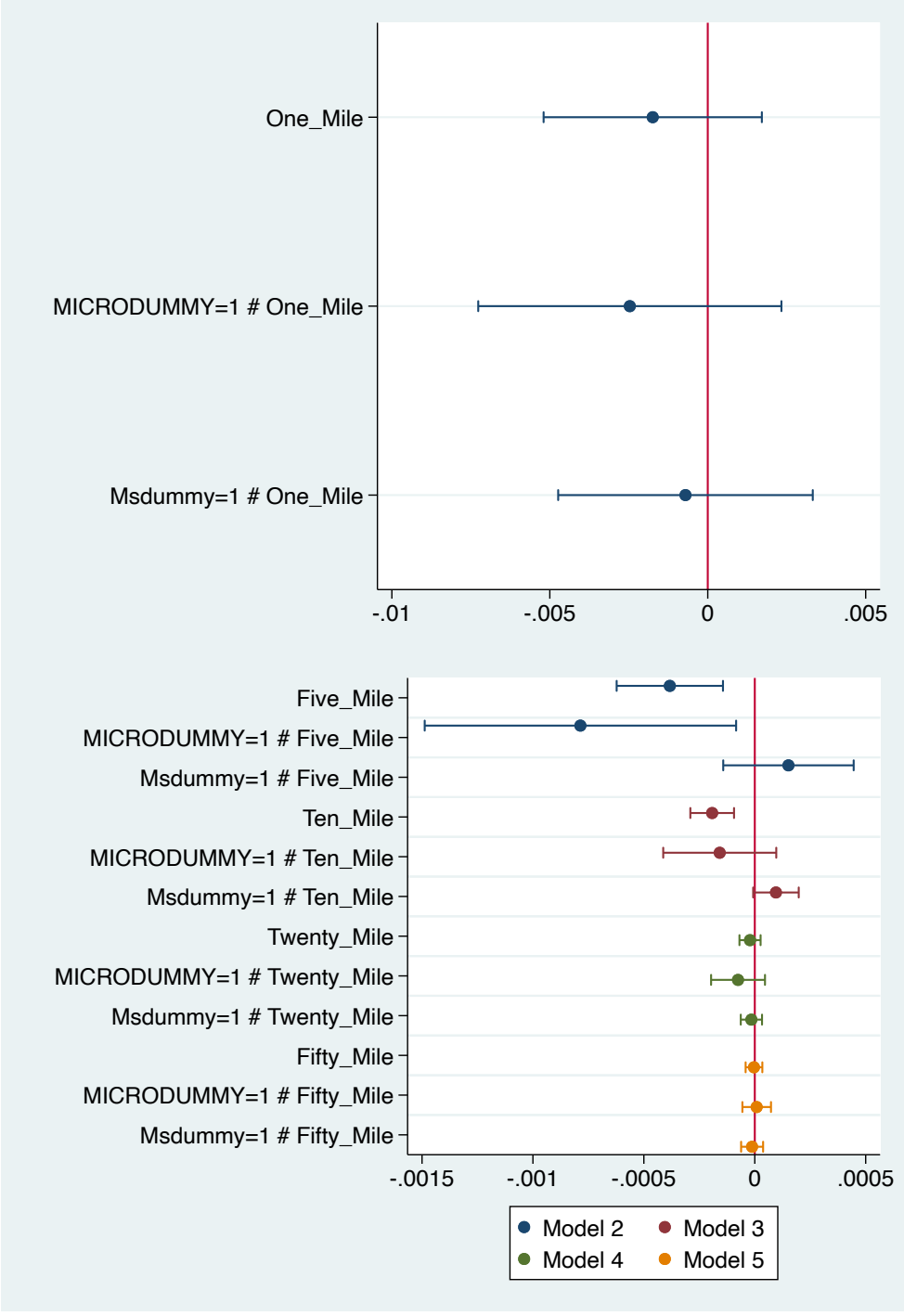
Table 7. Estimation Results

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5
One_Mile	*-0,0017417*	*-*	*-*	*-*	*-*
	(0,321)				
One_Mile#Rural_Dummy	*-0,0024668*	*-*	*-*	*-*	*-*
	(0,311)				
One_Mile#MS_Dummy	*-0,0007051*	*-*	*-*	*-*	*-*
	(0,730)				
Five_Mile	*-*	*-0,000383****	*-*	*-*	*-*
		(0,002)			
Five_Mile#Rural_Dummy	*-*	*-0,000786***	*-*	*-*	*-*
		(0,028)			
Five_Mile#MS_Dummy	*-*	*0,0001518*	*-*	*-*	*-*
		(0,309)			
Ten_Mile	*-*	*-*	*-0,000192****	*-*	*-*
			(0,000)		
Ten_Mile#Rural_Dummy	*-*	*-*	*-0,000158*	*-*	*-*
			(0,223)		
Ten_Mile#MS_Dummy	*-*	*-*	*0,0000955**	*-*	*-*
			(0,068)		
Twenty_Mile	*-*	*-*	*-*	*-0,0000214*	*-*
				(0,375)	
Twenty_Mile#Rural_Dummy	*-*	*-*	*-*	*-0,0000755*	*-*
				(0,222)	
Twenty_Mile#MS_Dummy	*-*	*-*	*-*	*-0,0000152*	*-*
				(0,530)	
Fifty_Mile	*-*	*-*	*-*	*-*	*-3,59e^{-6}*
					(0,851)
Fifty_Mile#Rural_Dummy	*-*	*-*	*-*	*-*	*8,55e^{-6}*
					(0,794)
Fifty_Mile#MS_Dummy	*-*	*-*	*-*	*-*	*-0,0000121*
					(0,631)
MS_Dummy	*0,0072684*	*0,0108515**	*0,0100943*	*0,0043274*	*0,0044983*
	(0,224)	*(0,091)*	*(0,125)*	*(0,489)*	*(0,488)*
Med_Income	*-8,24e^{-7}*	*1,08e^{-6}*	*1,67e^{-6}***	*2,28e^{-7}*	*-1,01e^{-6}*
	(0,205)	*(0,134)*	*(0,039)*	*(0,790)*	*(0,228)*
Nebraska	*0,1069934****	*0,1122618****	*0,1122731****	*0,1068277****	*0,105902****
	(0,000)	*(0,000)*	*(0,000)*	*(0,000)*	*(0,000)*
Oklahoma	*0,0198195****	*0,022497****	*0,0231616****	*0,0224821****	*0,0178545***
	(0,005)	*(0,001)*	*(0,001)*	*(0,002)*	*(0,021)*
Intercept	*2,959045****	*2,951269****	*2,952805****	*2,955639****	*2,962855****
	(0,000)	*(0,000)*	*(0,000)*	*(0,000)*	*(0,000)*
F	*24,60****	*25,30****	*28,61****	*24,22****	*22,62****
	(0,000)	*(0,000)*	*(0,000)*	*(0,000)*	*(0,000)*
R^2	*0,5759*	*0,6092*	*0,6094*	*0,5723*	*0,5590*
Observations	*162*	*162*	*162*	*162*	*162*

*Significant at $\alpha = 0{,}1$ **Significant at $\alpha = 0{,}05$ *** Significant at $\alpha = 0{,}01$

When the radius in which competitors are measured is expanded to twenty and fifty miles, the competitor variables again fail to explain significant price differentiations. Only state differences should be considered to have a substantial impact at this spatial scale. An overview of the coefficient estimates together with the 95% confidence intervals of the competition variables of the different models are plotted in Graph 2, showing how the coefficients become insignificant once the measured number of competitors is extended to a larger distance. Model 1 is plotted in a different graph because the larger size of the insignificant coefficients in that model make it impossible to distinguish the confidence intervals of the other models.

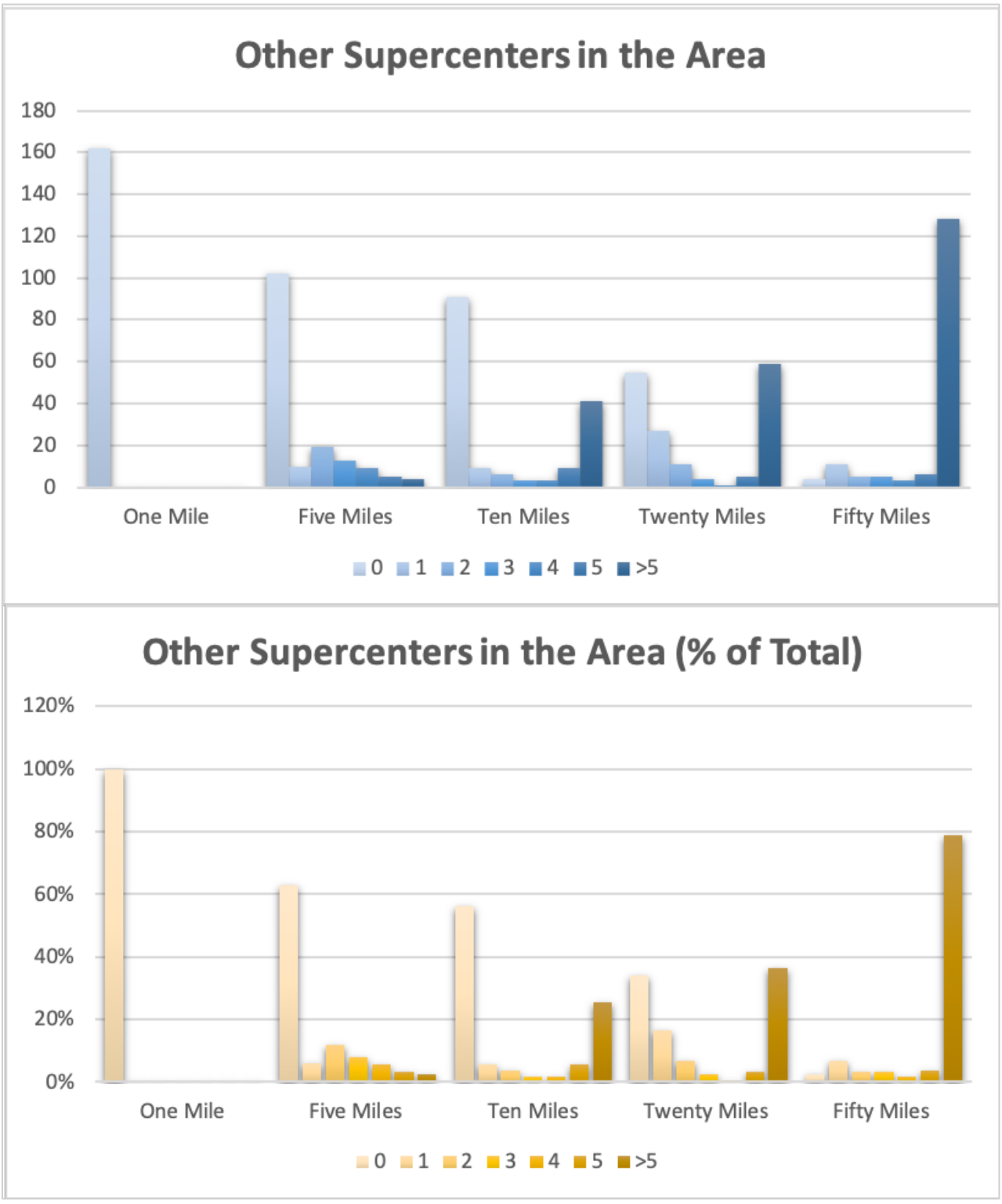
Graph 2. Coefficient estimates with 95% confidence intervals of the competitor variables



By looking at these changes in the significance of the estimated coefficients, it appears that the local market in which a Supercenter is located, or at least the area in which competitors can play an influential role, is best defined around a distance of five or ten miles. This can be explained by the fact that consumers are unwilling to travel large distances in order to get groceries, as has been discussed by Eastwood (2001). Since these are weekly or even daily purchases, the travel costs can become extremely high when a store is far away. Considering this, it is likely that a grocery store will have trouble in attracting lots of customers that are further away. Although the catchment area of a Walmart Supercenter should be considered larger than a conventional grocery store due to the one-stop-shopping convenience that they offer by selling other types of goods, the data implies that it would not be much larger than a distance of ten miles.

This limit to the catchment area can also be observed when looking at the presence of other Supercenters in the specified radiuses. A higher number of other Supercenters implies that the specified area falls outside of the market area of an individual Supercenter, as that area is taken up by other stores. In Graphs 3. and 4. the number of other Supercenters is shown for all the analyzed areas. It shows that at a radius of twenty miles, the number of stores for which no other Supercenters are present in the area drops well below 50%, signifying that for the majority of the observations this area is too large to properly indicate the relevant market area, as others have an impact there as well. In combination with the results from the models, it is considered that the best spatial scale to look at the competitiveness level that a single Supercenter has to deal with should be a five- to ten-mile radius. When the spatial scale is too narrow, it does not provide a clear picture of the actual competitive situation of a local market, as can be observed in the one-mile radius model. When it is too broad, it captures a market area in which more Supercenters are active, and therefore includes competitors that would not be so competitive to the individual Supercenter for which it was reported.

Graphs 3 and 4. Other Supercenters in the area



4.2 General Trends and Implications

Moving on to the general trends that can be observed in the data, the focus will primarily be on models 2 and 3, because of the reasons discussed in the previous paragraph. The significant results in those models indicate that indeed some degree of price flexing might be attributed to the degree of competition, especially in smaller markets. However, it should also be noted that these price differences could also be attributed to the general economies of scale being better in places where a higher number of grocery stores is located, allowing Walmart to operate more cost efficiently in those locations. The number of competitors would in this case be a proxy for the degree of urban agglomeration. Nevertheless, the size of Walmart has allowed them to internalize almost the entire supply chain (Dobson et al., 2003), so this might not be as influential for the large chain as it is for other stores. Additionally, a chain of this size could engage in price flexing in the cheaper regions to offset the higher costs in more remote areas. The fact that negative estimation values are found implies that the presence of competition plays a slightly larger role in the nature of price flexing.

Another interesting point is that the income variable can only significantly explain some of the price differences in model 3. If the price setting should be considered to be independent from the level of income, discrepancies in purchasing power at different Supercenters emerge. This is not surprising if you consider Walmart to have similar pricing in all their stores in areas with different income levels, but these discrepancies can become more skewed when competitive price flexing is at play. The areas where competition is lower are often also poorer, so the increasing dependency on the chain for food and the higher prices can lead to consumers being worse off. However, considering the small negative influence of competition on price, it is plausible that the initial decrease of the price level once a big box store enters a local market, as described in the literature (Basker 2005b; Parachuri et al., 2009), is greater than the degree to which the prices bounce up again once competition is forced out of the market. In this case, consumers would still be better off than before, although the advantages would become more limited. It should be noted that no previous price declines are analyzed and instead the focus is on the differences, so it is better to assume that Walmart applies its big box strategy more aggressively in high competition markets instead of concluding that prices bounce back up in more concentrated ones.

Nevertheless, the takeaway message remains that the presence of other grocery stores seems to play a significant role within five and ten miles of a Supercenter and that prices do tend to be higher if in a certain area less competitors are present. Additionally, a dominant

position in the local market tends to play a role in increasing prices as well, but the significance of this estimator can be taken into question. As discussed in the Method chapter, gaps in the data to identify a dominated market can lead to the effect reported in the regression to not be completely reliable and it is expected that these gaps lead to underreporting. Therefore, to find estimates around a significant level that are also quite substantial, around 1% in models 2 and 3, might indicate that domination of the market indeed leads to significant price increases. These claims should however be made with extreme caution, as it is based on expectations and no strong evidence supporting this can be derived from the analysis in its current form.

The multiple OLS regression carried out in this paper shows signs that regional pricing is indeed a thing among Walmart Supercenters in the states of Kansas, Nebraska and Oklahoma, and that the price differentiation cannot only be attributed to state differences and different income levels. Although the effect of competition on prices that has been found is small, it should still be considered worrisome. It signifies that when the process of eliminating competitors is advancing, it can be expected that prices bounce up again while at the same time the dependency on Walmart is increasing. The positive effects on local markets for which Walmart is sometimes praised in the literature would be mostly overturned in this case. The most important one would be that in extreme cases, the initial price reduction of groceries would be eliminated. If this is already the case in some of the markets within the analysis is hard to say, as the initial price drop after the market entrance is unknown. This is also considered to be outside of the scope of this research, as it seeks to find out if differences are present, not how they have developed over time. This would be an interesting point of further research, as it can give insight in whether Walmart, or any other big box retailer, actively changes its prices once a market becomes more concentrated.

Looking at the results, there is no complete certainty that the Supercenters intentionally factor in the competitiveness levels when prices are established, but it does give an indication that consumers can benefit from a higher level of competition. It proves once again the importance of competition, especially in smaller markets and rural areas. Over the years, big box retailers have been praised as drivers of competitiveness that the market needs (Anderson, 2004), but the extremes to which it is developing in now potentially lead to undesirable outcomes for consumers. With groceries being such a vital part in the retail sector, basically every consumer will be affected by these developments. The focus of this research has been on Walmart and groceries, but the developments discussed here can be expected to be applicable to big box stores in general operating in all different kinds of sectors in the retail industry, as similar business tactics are applied in other chains as well.

Policymakers should be aware of the extreme situations that have been emerging over the years and the implications that these can have on the welfare of consumers. The price flexing that to some extent is present tends to benefit consumers in more competitive markets, while the people with the least amount of choice in which store to go to also tend to pay more as a result. Especially in more rural areas additional competitors are found to have a stronger effect, which emphasizes the importance of a competitive market in those regions. Initiatives to draw more competitors to these remote areas could potentially alleviate the largest differences. However, just like how a specific market became concentrated in the first place, it remains very difficult for smaller companies to effectively compete against big box retailers like Walmart.

Creating a competitive market has always been considered an important point to develop a local market, and for many local authorities this has actually been a reason to invite large retailers into their towns and cities. However, in the long run this can actually result in the uncompetitive situation that they tried to prevent in the first place, for which consumers will likely pay the price. The monopolistic situations that have emerged should be broken up, but this is easier said than done, especially in relation to big box retailers. A potential solution against spatial monopolies has been proposed by Stelder (2012). In his paper on spatial monopolies of Dutch supermarkets he proposes that these can be broken up by banning stores from the same chain to be located within a radius of one kilometer from each other. This could also be applied to big box chains, albeit over a larger radius, but it is likely that it would be far less effective than in The Netherlands. Due to the size at which the Supercenters operate, their main competitive advantage is not drawn from locating many stores in the same area. Instead, a single store is already capable to take up a large share of the markets in most cases, so these types of policies would not be very effective. Additionally, it has already been discussed that big box retailers tend to open new stores outside of the market areas of their existing stores (Schuetz, 2015), so banning stores from locating within the same local market would likely solve little of the dominated markets.

Price regulations might also be a possible solution to limit the negative consequences for consumers that have been observed. This would tackle the price flexing behavior directly but is not without consequences. As discussed by Larue and Bonroy (2009), such measures are controversial and mainly imply minimum prices to prevent further concentration of the market. They find that this does little to curb market power of the largest chains, leads to a reduction in consumer welfare, and even tends to disadvantage smaller retailers more than bigger ones. Nevertheless, measures should be implemented that impact the free functioning of the market, as this freeness has allowed the market concentration to occur in the first place. While chains

like Walmart are praised as success stories of using the free market to their benefit and becoming clear winners of capitalism, the size to which they have grown into have started to undermine the systems which allowed them to grow in the first place. These developments will be felt by consumers, not only in the number of choices that they have in which grocery store to go to, but likely also in their wallets.

5. Conclusion

The growing market power of Walmart and other big box retailers should be a concerning development for all other actors in the US retail market. Despite disagreements in the literature on the benefits and disadvantages of the presence of retail giants in local markets, there is no going around the fact that their dominance in several parts of the country has taken extreme forms. Changing market structures as a result of these chains entering the market has led to a concentration of the sectors in which they operate in, one of the most important ones being the grocery retail sector. With large differences in captured local grocery market shares, and thus different degrees of market power in different locations, some price discrimination has been identified between less and more competitive markets.

Although the effect is small, higher numbers of competitors seem to be related to lower grocery prices in Walmart Supercenters, especially in smaller markets. This implies that Walmart might exploit its advantages as a big box store to lower prices more aggressively in more competitive markets. The presence of more grocery stores in a local market seems to benefit Walmart shoppers, as they can get cheaper groceries. On the other hand, this small degree of price flexing also means that consumers with a higher dependency on Walmart to buy their groceries actually tend to pay more at the discounter from Arkansas than consumers who have more options available to them. It seems that, as expected, Walmart is strengthening the process of market concentration in markets in which they are not yet so dominant by charging lower prices, attracting more customers. While the most dominated markets are now mostly rural and micropolitan, it is only a matter of time until larger cities are also dominated. Some cities in Kansas, Nebraska and Oklahoma can already be classified as dominated, and although the process will likely go slower than in rural areas, it grants the chain even more possibilities to engage in stronger price flexing.

Whether the retail giant actively increases its prices once competitors have been forced out of the market cannot be concluded from the current analysis, but this is an interesting point for further research. If the effects uphold when looking at all operating Walmart Supercenters in the USA is also still unclear, but it can be expected that price differences will be even stronger as Walmart is also less dominant in other states. Another interesting point for further research is to look at the development of prices over time and see whether they have substantially increased as a result of competitors leaving the market.

Nevertheless, it is important that regional municipalities, policymakers and other local authorities should be aware of the potential risks that come with inviting large retail chains into their markets. While it can lead to direct advantages and a boost of the local economy, in the long run it can be expected that consumer welfare goes down. Although it is difficult to say whether initial price drops will be completely overturned when market power is increased, there are clear signs that the initial welfare gains will be limited as the concentration of the local market progresses.

While the research has been focused on Walmart and the grocery sector, such developments can be expected to occur in all retail sectors. Big box retailers operate with similar tactics in all categories of the US retail market. Even Walmart itself is far from limited to the grocery market and continues to compete in more and more product categories, capitalizing on their increasing 'one-stop-shopping' convenience. In order to ensure increasing consumer welfare in all parts of the country and to maintain the free and competitive markets that have been praised by American politicians for decades, it should be considered that the dominance of retail giants might have to be limited. The enormous retail chains that have emerged as a result of effective capitalism are likely to be the ones that will undermine this system, for which consumers will eventually pay the price.

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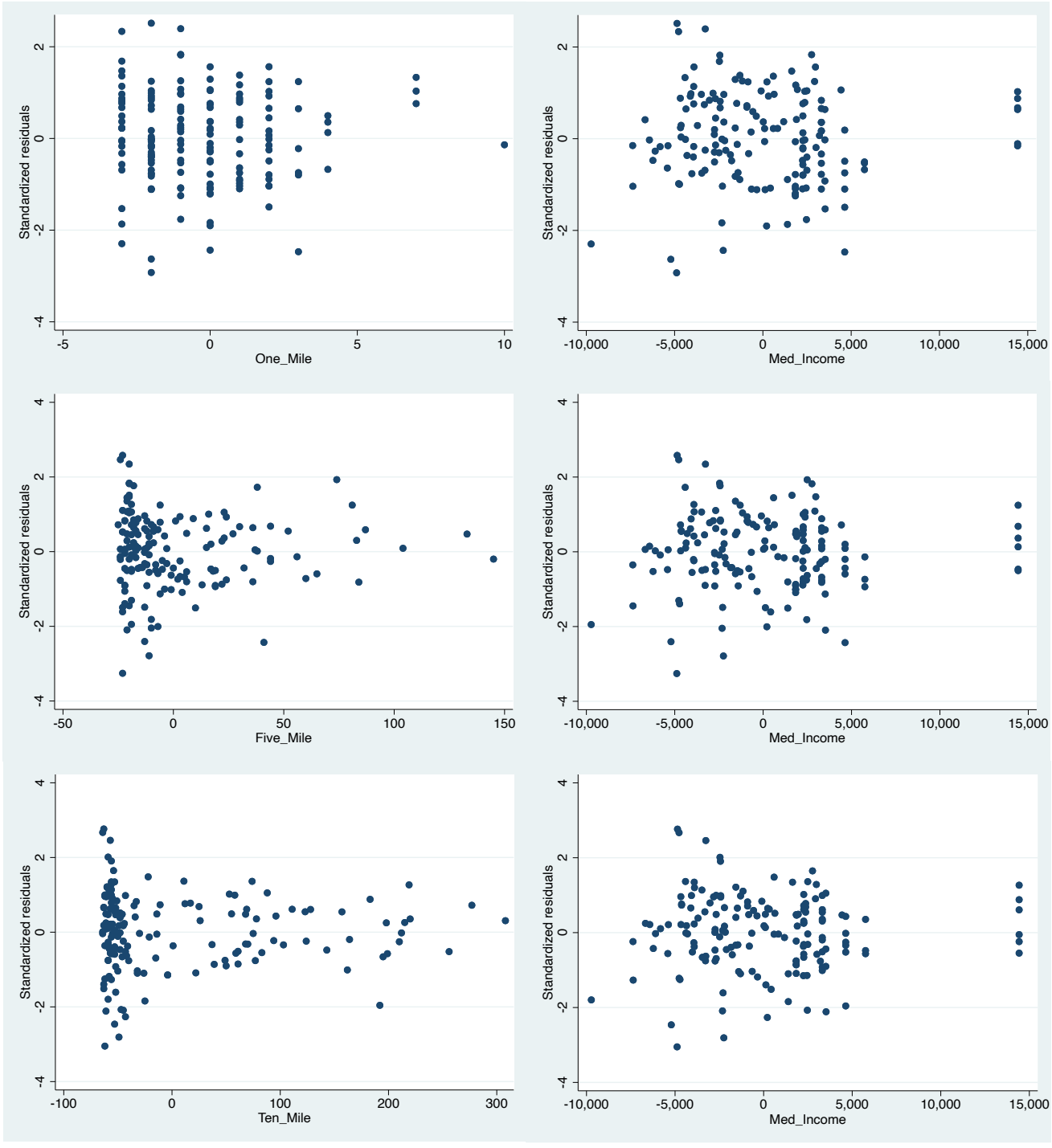
Appendix

Graphs A. Standardized Residuals versus Predictor Variable Plots to check linearity



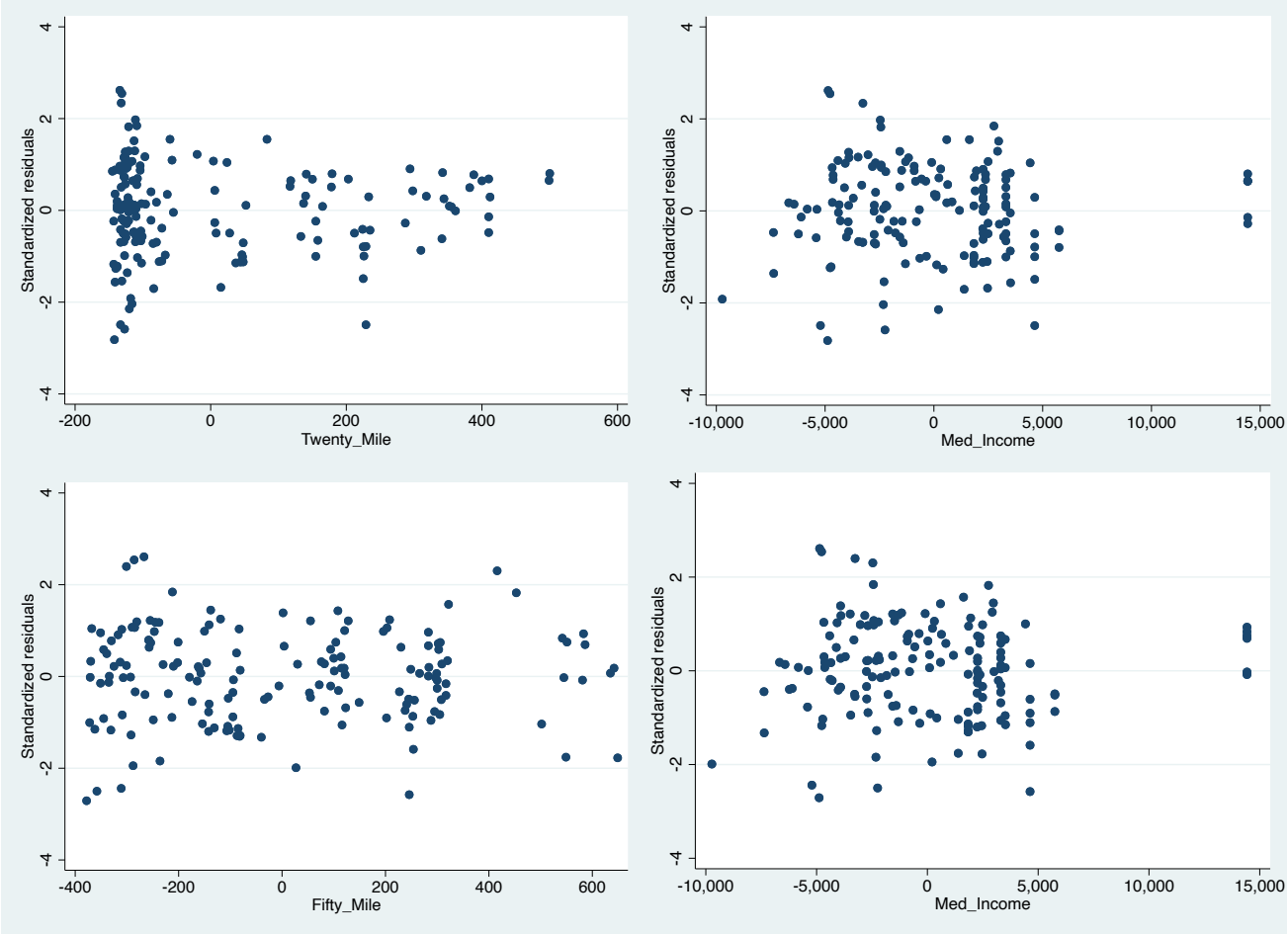


Table A. IM-test to check for heteroskedasticity

	P
Model 1	*0,0061*
Model 2	*0,0312*
Model 3	*0,0098*
Model 4	*0,0036*
Model 5	*0,0004*

Table B. Shapiro-Wilk test results to check normality of residuals

Residuals	**P**
rOne	*0,36559*
rFive	*0,19656*
rTen	*0,11339*
rTwenty	*0,35893*
rFifty	*0,42922*