

Staff Paper

**Michigan Pickle Production: Results from 2013
Discussions with Growers and Processors**

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Pickle processing is largely a localized industry requiring proximity to areas of major process cucumber farming. Raw pickles have an extremely short shelf life and have to be processed quickly. Processing facilities may house the full spectrum of pickle processing from grading to brining to final packaging, while others only entail one or two functions on the pickle production chain. Some processors also grow pickles. In effect, no single definition defines the role of a pickle processing facility.

However, all pickles go through one of two similar processes, fermentation or refrigeration. Fermented, pickles may go through two processes. Fresh-pack pickles are processed fresh, uncooked and packed in hot solution of vinegar and salt, along with flavoring, and fermented within their packaging. Otherwise, the raw pickles are immersed in large tank of a saltwater brine solution for a minimum of three weeks for fermentation and future packaging. Once fermented, pickles in brine are stable and can be stored for extended periods with no adverse impact on quality. Shelf-stable pickles can be stored year-round and do not require refrigeration. Whereas fermented pickles rely on pasteurization for preservation, refrigerated pickles are preserved with refrigeration. Refrigerated pickles are processed immediately upon picking by packing directly into containers, covered with flavorings, and immediately refrigerated. Refrigerated pickles have limited shelf lives and remain refrigerated.

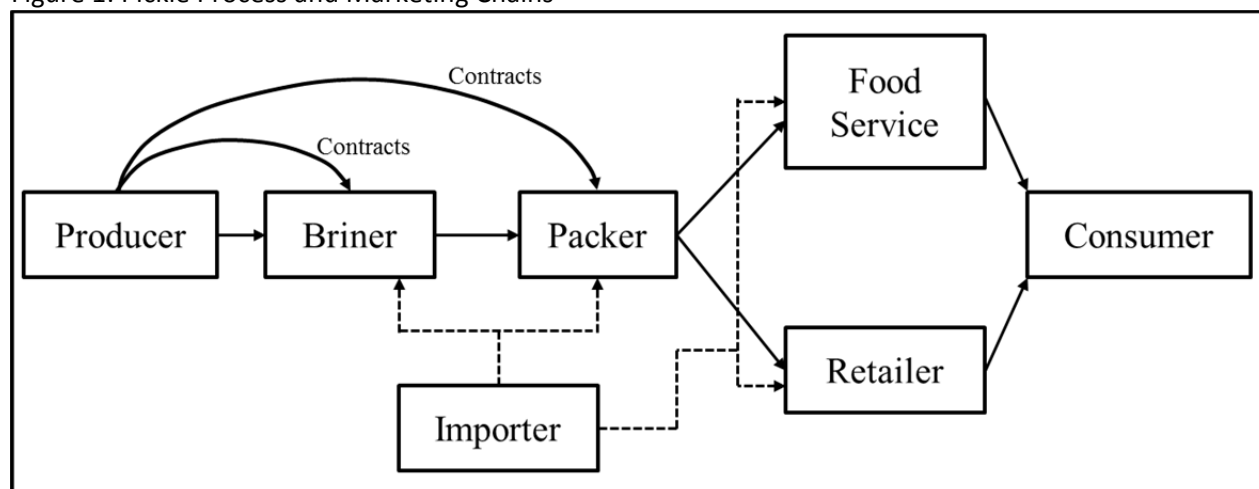
Michigan may well have a comparative advantage in pickle and relish production with a favorable climate and infrastructure for pickle growing and processing. Pickles are largely grown and processed throughout the U.S. However, Michigan generates more processed cucumbers for the pickling industry than any other state, and its share of U.S. pickle production has grown steadily since 2001 (Glaser and Lewrene 2013). Between 2001 and 2011, Michigan's annual growth in processed pickle production has averaged 3.5 percent per year compared to a 1.9 percent decline in the U.S. total based on weight (USDA: NASS 2013). In the 1990s, North Carolina held the second highest share of pickle production, but has steadily lost share to Florida (Miller 2013). Michigan processors rely more heavily on mechanical harvesting than North Carolina and much more so than in India – a significant source of North American gherkins¹ consumption (USDA: Foreign Agricultural Services 2013). The method of harvesting pickles has a direct bearing on not only the economics of pickle production, but also on the marketing, where fruit size is a significant component of the final product.

While smaller fruit, or gherkins, tends to command higher prices, it also entails greater labor costs. When handpicking was common, Michigan's processors were more willing to process smaller sizes. However, technological gains have made mechanical harvesters the primary choice for Michigan pickle growers, where current harvesters are not effective at harvesting smaller midget and gherkins sized fruit. Over time, Michigan growers abandoned manual harvesting for mechanical and the local market for midget and gherkins sized fruit dissipated. Processors also mechanized their operations with systems tuned for mainstream fruit sizes that Michigan growers delivered. Today, non-mainstream sizes have a market, but it is mostly considered a niche market that requires its own production system for getting to market. In the U.S., most midget and gherkins sized pickles are imported from regions with low labor costs.

¹ Gherkins is a term usually applied to smaller pickle sizes of Burr cucumber varieties. They are most associated with India.

Martinez, Thornsberry, and Nagai (Martinez, Thornsberry and Nagai 2006) describe the Michigan pickle production chain from grower to consumer as characterized with contractual relationships between grower and briner or packer who then moves the produce up the production chain (See Figure 1). In some cases, the briner acts as an intermediary between growers and packers, in other cases the packer integrates briner activities to packing activities. From the packer, processed packs follow one of two channels to consumers. One channel is the food service industry, which includes restaurants, schools, hospitals, and others. The second channel is through retail channels where consumers purchase pickles for home consumption. Imports also play a role. Michigan processors import fresh pickles from other states and internationally, largely for fresh pack production during the off-season. However, most domestic and international pickles imported into Michigan are already processed and destined to their final point of consumption.

Figure 1: Pickle Process and Marketing Chains



Source: Martinez, Thornsberry, Nagai 2006

This report discusses Michigan’s pickle production industry from grower to consumer, mostly through the perceptions of Michigan pickle processors. Interviews with Michigan processors were arranged between the months of February and April of 2013 to discuss the Michigan and national pickle industry and uncover factors that may impact the direction of Michigan’s pickling cucumber industry.

Producers

While cucumbers and pickles are grown throughout Michigan’s Lower Peninsula, areas of dominant activities include the Thumb region and the Western Michigan around Oceana County. It is not surprising that these areas also are regions with high capacity for processing pickles. Pickles generally have a short shelf life upon harvest and need to be processed quickly. Most processors estimate that shipping times generally max out at three hours shipping time, and that most shipments are received from a 100 mile radius of the processing facility. While shipping times pose a geographic constraint on where pickles are grown, geographic diversity also provides benefits. Processors indicated that they like to diversify the geography of their suppliers to mitigate risks of pest pressure like downy mildew and Phytophthora and to mitigate against localized, adverse weather events that may hinder harvesting.

Growers generally enter into contractual agreements with briners or packers (processors) in March for the upcoming growing season. Contracts differ across processors, where some reported setting contract on volume and price, while others set contracts on acres and price. Most contracts include limits on the timing and volume of shipments received by any one grower to eliminate on-site spoilage due to processing constraints. This is made necessary because of the short shelf-life of fresh pickle cucumbers that requires immediate processing once shipment is received. Tapered delivery is facilitated by the short growing time of pickles. Michigan's growing season for pickling cucumbers may be shorter than that in North Carolina, but it is sufficiently long to allow growers to taper plantings and therefore expected delivery dates of produce. Through conversations with processors, some contend that growers can plant two crops within a season, while others indicate the growing season is too short for two crops. In practice, both dual and single crop pickle producers operate in Michigan.

Most pickles in Michigan are grown on rain-fed fields. However, a sizable share comes from irrigated fields. Because sandy soils do not retain moisture well, west Michigan growers are more likely to grow pickles on irrigated fields. Regardless of the soil, processors indicated that irrigated fields could generate yields up to 50 percent greater than rain-fed fields. Other sources also suggest that irrigated fields can increase yields, but the difference is not universal (Talley and Zandstra 2011), as soils in irrigated fields may also be less productive than those in some rain-fed fields.

Pickle growers tend to assume greater risks to catastrophic events than program crop growers do. As opposed to program crops, pickle crops do not fall under any of the USDA crop insurance subsidy programs. Hence, pickle growers largely operate without crop insurance, though crop diversification affords a degree of revenue stability. Pickle growing has other inherent risks. Growers generally have a short window of opportunity for harvesting and delivering pickle crops upon maturation. This short window can be an extremely limiting factor if fields are rain-soaked. An unusually wet summer can keep harvesting equipment out of the fields and cause crop failure at harvest time. The short harvest window also makes coordination of resources challenging, especially for growers with limited access to harvesting equipment and labor. In addition, because pickles (and cucumbers) are a specialty crop, access to pest management can be limited, where the economics of pesticide registration with the EPA is often a constraining factor in adding pickle applications to the pesticide label (Miller and Leschewski 2011). Furthermore, pickle growers must contend with strict industry standards of size and quality. While most growers are able to meet these standards, logistical challenges at harvest can severely limit the marketability of one's pickle crop.

Pickle growing also requires substantial fixed costs. Pickle production in Michigan is largely capital intensive, requiring investment in specialized harvesting equipment made especially for pickle harvesting. This contrasts with grain harvesting which generally requires investment in special heads on existing combine equipment. Growers generally own their own harvesting equipment to facilitate the short harvest window, as growers generally have a 24 to 48 hour window for harvesting and delivering pickles upon maturation. Relying on custom harvesting or renting harvesting equipment induces risks of logistical bottlenecks that can result in crop loss. Along with harvesters, many growers own their own trucks for shipping to processors. Hence, pickle growers tend to invest in greater capacity than other commodity growers do and much of this investment is to facilitate the short harvest time window.

Growers appear to be interested in growing and experimenting with multiple varieties to maximize returns. In some cases, processors may limit the varieties that growers pursue. Also, processors generally stipulate rotation standards with growers, with most favoring 3-year rotations, though one indicated a willingness to promote a 4-year rotation. Growers generally follow a three-year crop rotation. The choice of alternate commodities largely depends on regional demand. Eastern Michigan growers often rotate with sugar beets, which provides both logistical and soil benefits to growers. Sugar beet production is mostly centered near the Thumb, where it competes with soybean and dry bean production. Soybean is not a good rotation with cucumbers as cucumber yields following soybeans tends to be suppressed. However, cucumber following dry beans tends to increase fruit quality. Typical 3-year rotations include a rotation of sugar beets, cucumber, corn and a rotation of dry bean, cucumber corn. A good 4-year rotation is corn, corn dry beans, cucumber. However, growers may find themselves with some limitations on desired crop rotation options due to land availability constraints (Ngouajio and Mennan 2005). Most processors agreed that they seek to avoid receiving shipments from fields rotated out of corn. The reason was universal in that processing and harvesting equipment have difficulty in separating out pickle fruit from small corncobs. Many growers find that cover crops are useful in suppressing weed pressures. Common cover crops include wheat or rye (Lamour and Mary K Hausbeck 2003). Harry vetch is a good option if corn is added to the rotation.

Pickle growers seeking to maximize net revenues of the crop rotation face a challenge with high corn prices, which have recently topped \$7 a bushel. The temptation to add corn to the existing rotation is high given recent corn prices, where corn may disrupt the existing rotation. With limitations on land availability, this has strained the established relationships between growers and processors, and all processors expressed concern that they cannot effectively compete against \$7 corn. However, as more than one processor pointed out, pickle growing has some advantages over corn production, in that pickle growers benefit from long-standing relationships with buyers and that, unlike for corn, they receive cash payments at the time of delivery.

Processors

Processors include briners and packers. Briners grade incoming fruit, sort, and deposit into large tanks filled with salt brine water. Packers package pickles in various varieties and forms for their intended final use. Grading activities can also take place on- or off-site of processing facilities. Larger pickle growers may house grading facilities on-site and may even contract with other growers for processing. Such stand-alone grading facilities receive raw fruit and immediately ship the graded fruit because of the short shelf life. Pickle packers process and package fruit for final consumption. They mostly receive brine stock for processing, but those providing fresh-pack, or refrigerated pickle products, may receive direct shipments from growers or graders. Packers provide the branding and label for the finished products.

Most briners have their own grading facilities, but may also receive shipments from third-party grading facilities. Several processors occupy more than one category along the production chain. For example, a briner may also be a grower and packers may also be briners. Most processors that we talked with indicated that market forces tend to favor non-integrated processors. That is there tends to be a

preference for processors to be either briners or packers, but not both. Processers would not go so far as to predict that existing integrated processers will spin off functions, but they did indicate that they do not anticipate that existing firms will further integrate their operations.

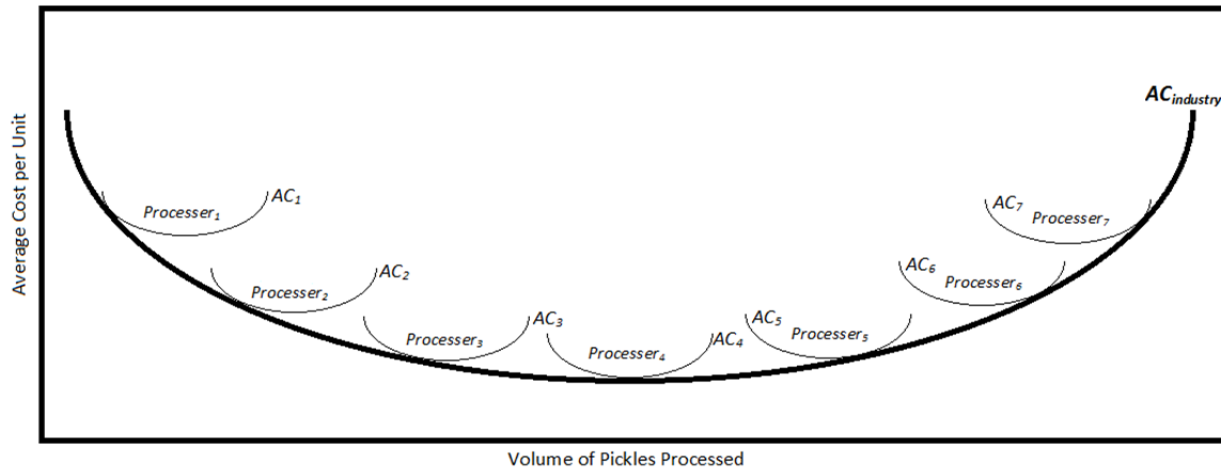
Very little raw pickle production is sold on the spot market. Most sales arise from contract. Most contracts are on volume of delivery, where processers target a price that is competitive with other commodities in terms of net revenues to the grower. Typical contracts specify different prices for different fruit size and may exclude small or large fruit. Processers target fruit between 7/8" and 2", but those with relish customers may be more willing to receive off-sizes and bent fruit. These processers see their willingness to receive off-sized and bent fruit as a comparative advantage in gaining supplier contracts. Most processers indicated a willingness to purchase production overruns from their contracted growers. However, they reserve the right to decline. Rejected fruit is mostly sent back to the grower. In most cases, the rejected fruit is sent back to the farm it originated, but often it is not possible to match rejected fruit to its source.

Processers receiving shipments from growers generally sign those contracts in March, at about the same time that they sign contracts with their customers. Most processers indicated that the coincidence of timing does not pose an unreasonable logistical challenge for them, as they can generally anticipate upcoming sales. However, at least one processer noted that recent corn price spikes have increased the logistical challenge of matching supply with demand.

The lines delineating ownership of produce tends to be blurred at times and may vary depending on the processer. Some processers provide contracted growers with seeds. Of the processers we talked with, seeds are sold to growers such that the growers retain ownership of the crop until delivered. However, it is easy to conceptualize a situation where processers retain ownership of the crop while it is in the field. Pickle buyers usually take ownership of the produce at delivery and maintain ownership until shipped from their facilities, though at least one briner indicated that the customer might own inventory in their tank yard.

Processing systems include significant investment in custom capital and machinery tuned for a targeted size of operation. That is, systems are designed to work most efficiently at a targeted level of operations. Should the volume of processed pickles fall short of this target, the actual cost per unit of output will increase. The converse is also true, in that processing more inventory than targeted will also increase the cost per unit of output. Each processer can be thought of as exhibiting an average cost function shaped like a cross-section of a bowl, as shown in Figure 2. Figure 2 exhibits seven average cost functions for seven hypothetical pickle-processers of various sizes of operation. The u-shaped average cost function shows how the average, per-unit costs changes with different volume. Low volume increases the per unit fixed costs, but volume that is too high for the design of the facilities can also exhibit higher average unit costs as production exceeds the design of the facilities. The lowest point on their respective average cost curve is their targeted volume, where they experience the lowest cost per unit of output.

Figure 2: Hypothetical Cost Curves Based on Size of Processers



Small processers, like *Processer₁* in Figure 2, tend to exhibit higher operating costs because their fixed operating costs cannot be spread over the high volume of sales of a processer like *Processer₄*. In the absence of product differentiation, all producers would produce identical pickles, and *Processer₁* would be at a cost disadvantage to larger processers. *Processer₁* and *Processer₂* may be tempted to merge to increase volume and decrease their combined average production costs. However, with differentiated products, small operations may coexist with larger ones by filling market niches overlooked by large operations.

Economies of scale have limits. As operations get larger, diseconomies of scale may arise through higher logistics costs and higher transportation costs in raw and processed cucumbers, such that there exist an optimal processer size as shown by the lowest point on the $AC_{industry}$ curve in Figure 2. Operations larger than this minimum-cost operating scale will operate at a cost disadvantage to operations optimally sized, like *Processer 4*. Because large operations tend to rely on large batch processes, they cannot target higher value-added niche markets as small firms can, and will ultimately reorganize or exit the industry.

In the absence of product differentiation, enough processers would exist of the size represented by *Processer₄* to cover industry-wide demand. The market would be stable, as there exist no cost advantages for firms to seek to expand or contract operations. However, product differentiation allows processers of different size to compete across multiple niche markets and mainstream commodities markets. Figure 2 paints a stylized description of economies of scale and optimal processer size. In practice, the optimal size may vary by geography and change over time with changes in technology, population shifts and other factors. It may also differ for processers who combine machinery for processing more than one commodity.

Producers may opt to reduce fixed costs' share of production costs by expanding the scope of products offered and through flexible production systems. For example, processers can distribute fixed costs of machinery and facilities to other product lines by utilizing existing equipment for processing related products like peppers, cauliflower, carrots and others. This option is most relevant for packers, as

briners are largely constrained by large capital investment in limited-use brining tanks, though brining tanks can be filled with other fermentable commodities like cauliflower, peppers, etc. To be sure, several packers we talked with indicated they also process other commodities at their pickle processing facilities.

All processors we talked with agree that there is no significant movement in Michigan's pickle processing industry. They view the industry as mostly mature with few prospects for industry-wide growth. Future changes in the industry will likely result from competitive forces shifting market share and driving merger activity. The recent purchase of H.J. Heinz Company follows an active decade of food processor mergers, acquisitions and spin-offs. For example, Vlastic was spun off by Campbell Soup Co. in 1998; purchased by Hicks, Muse in 2001; and now operates as a subsidiary of Pinnacle Food Corp. Vlastic has since largely exited the food services segment and focuses on its retail brand. Additionally, Dean Specialty Foods, a dominant provider of store-brand, shelf-stable pickles was spun off from Dean Foods and renamed Bay Valley Foods, LLC, as a division of Treehouse Foods, Inc. in 2005. Today, Treehouse Foods is the largest pickle producer in the U.S.² and a significant supplier of pickles and peppers to the food services segment.

Processors do show concern about supply. The most pressing issue with supply is the high price of corn, which tends to impact all commodity prices. Pickles currently cannot compete against corn at \$6 and \$7 dollars a bushel. Processors feel that if corn prices remain high, they will have to increase their purchase price, but will not be able to pass that cost up the chain. That is, they speculate that pickles are price-elastic, such that a small increase in price will result in a disproportionately large decrease in sales. Recent research suggests that the own-price elasticity of shelf-stable pickles and relishes are unitary elastic and that refrigerated pickles and relishes may be marginally inelastic (Bergtold, Akobundu and Peterson 2004). If correct, the finding would suggest that fresh-pack pickle processors have a relatively greater capacity for passing higher costs to consumers than shelf-stable processors.

Such elasticity estimates paint a grainy picture for processors. Elasticity measures reflect expected change in consumption demand when the price of all pickles increase by the same amount. In a global market, an increase in price of domestic pickles without an equal increase in the price of imports will lead to a greater shift of consumption away from domestic pickles than if all pickle prices increased. More succinctly, demand elasticity is much higher for products with close substitutes, such that if one processor is tempted to increase its supply price, its drop in sales will more than offset its increase in per-sale revenues, leading to a decline in total revenues.

Processors also anticipate that they will have to foot the bill for the cost of managing the resurgence of downy mildew. While processors have little capacity to pass on costs to consumers, their suppliers can easily move from pickle production if costs of disease management erodes profits below competing crops. From this perspective, price fluctuations are most likely to impact processors the most. Hence, processors perceive that they are exposed to the brunt of market forces.

² From <http://phx.corporate-ir.net/phoenix.zhtml?c=191105&p=irol-irhome> collected on June 5, 2013.

Michigan's market for pickles is mostly confined to mainstream sizes. However, smaller fruit generally commands higher prices. While processing smaller fruit is not economically viable in Michigan, it is possible for the market to move in this direction. Gherkins-sized fruit is sold north of Michigan, in Canada, and innovations in pickle harvesters may revitalize Michigan's market for midget and gherkins sized pickles. Revitalizing and improving upon old technology, pinch and roll harvesting equipment, has the potential to expand the relevant fruit size for mechanical harvesting to incorporate smaller sizes, traditionally reserved for hand-pick operations. Whether this will spark the re-development of a Michigan market for gherkins-sized pickles is yet to be determined.

Michigan processors vie in both niche and mainstream commodity markets. Two niche markets appear poised to roll into mainstream, competitive markets. Hot and spicy, and fresh-pack pickles are growth areas attracting responses from many processors. Hot and spicy variants give processors a great deal of latitude in formulating differentiated tastes. However, increasing competition in this field is likely to suppress prices and move this segment out of the specialty niche segments. Michigan processors largely see growth in this segment slowing. The popularity of fresh-pack pickles continues to grow and refrigerated pickles maintain a strong footing in consumer markets. Both reflect higher perceived quality over traditional tank-stored fermented pickles. However, since fresh-pack requires markedly different production processes, some processors will choose to stay out of this segment or will contract out this segment from their product lines. Processors largely anticipate this trend will continue and has spilled over into the food service segments.

Processors largely expressed concern about their ability to meet future supply needs. As existing growers retire, processors have experienced increased challenges in recruiting new farmers for pickle production. Pickle growing is largely viewed as having more risk than USDA program crops. Beginning farmers, considering pickles, also must contend with high equipment costs. Custom harvesting is difficult to coordinate and the newest pickle harvesters can exceed \$500,000 in price. Hence, for a beginning farmer with less experience, venturing into pickle growing can appear a risky venture. Recognizing this growing challenge, processors are addressing it straight on. One processor, who also grows pickles, has purchased extra harvesting equipment for custom harvesting for their suppliers. A few providers noted that they supply seeds for contract growers, while most mentioned providing support services like technical advisement for their contract growers.

Imports

Michigan farms supply most raw pickles processed in Michigan, but imports make up a significant, but unknown, component of final pickle goods for consumption. Pickle and relish imports include domestic and internationally produced packaging in both retail and food services segments as well as unprocessed pickles for processing. Imports of unprocessed pickles fill a specific role for processors. Besides surrounding states that may have routine seasonal deliveries to Michigan processors, pickles imported into Michigan largely come during the off-season from Florida and Mexico. Imported raw pickles generally go into fresh-pack production where limited shelf life requires year-round production. Processors that process similar commodities, like peppers, also receive non-Michigan shipments of non-pickle commodities. However, given limited capacity for processing Michigan pickles during the prime

harvesting season, it is conceivable that much of the non-pickle processing occurs in the off-season, though Michigan growers also supply a large share of the non-pickle commodities that compete with pickles during the same season.

In Michigan and the Great Lakes Region, Canada may be the primary source of unprocessed imported pickles. Overall, Canada is the second largest source of cucumber and gherkins imports into the U.S. and shipments have steadily increased since 2000 from 22,542 tons to 64,550 in 2010 (Miller 2013). To be sure, Canadian imports of cucumbers and gherkins have grown more than twice as fast as Mexico – the largest source of U.S. imports of cucumbers and gherkins.

Consumption

Most processors we talked with produced for a wide spectrum of the market, including having their own retail market brands, packaging for store brands and private labels, and processing for food service segments. Though at least one national brand, Vlasic, has shifted toward specializing in retail markets, most view market diversification as a hedge against variation in any one-market segment. There is good reason, as the food service segment is largely cyclical. Consumers tend to reign in restaurant expenditures during economic declines. At-home consumption may counter such cycles, as consumers curb food expenditures by substituting home meals for restaurant meals.

Processors view pickles as largely a commodity good, though certain niches remain. Commodity products generally lack the differentiation across providers necessary to generate exacting brand loyalty. Hence, consumers can largely switch among labels. Niche markets, however, provide greater potential for building brand loyalty. While all producers vie for consumer loyalty, whether they market mostly commodity – or common commercial flavors or target niche markets, niche markets afford greater opportunity to develop a loyal following. Processors identified two niche markets consisting of specialty-spicy flavors and cold pack pickles. Another niche market that has received attention in popular media is artisan food producers specializing in niche flavors and catering to the local food movement.

Consumers have shown an increasing concern about their food intake in the wake of record-breaking waistlines. Some tout dill pickles as more nutritious snack alternatives to sweet and traditional salty snacks. While pickles have modest nutritional value, the calorie content per unit weight is significantly lower than potato chips.³ Relative to other fruit snacks like dried cranberries, bananas, etc. pickles are low in vitamins, generally have a high level of sodium content, and often include artificial coloring. Therefore, pickles, while an improved nutritional option over many snack foods, are often overlooked as a healthy snack option.

U.S. per capita consumption of pickles has remained mostly stable over time. However, there is a slight negative trend since the 1970 in per capita consumption where typical consumption is about 4.5 lbs per

³ A Google search on the calorie content of 1 oz of Lay's potato chips indicates 152 calories, versus 4 calories for a 300 gram pickle. As 300 grams is equivalent to 10.6 ounces, an equal weight of potato chips will generate 1,611 calories versus 4 for a dill pickle.

person (Miller 2013). Processors do not anticipate marked changes in consumer demand for pickles in the near future. Regardless, they do recognize some industry trends toward niche-type markets, including specialty flavors and growth in fresh pack. To be sure, fresh pack demand appears to be growing for both the retail markets as well as for food services.

Summary

Michigan has a long history as the largest source of U.S. processed pickles and the state's share of the overall market continues to climb. This is largely a mature industry with few prospects for industry-wide transitions. While pickle processors have transitioned over the last twenty years, most of the movement has been shifts within an existing industry and does not represent breakaway trends. In fact interviews with Michigan pickle processors reveal that processors do not see significant trends in the market, but each processor is largely out to gain greater market share.

While pickle farming historically required significant labor at harvest, Michigan producers largely adopted a capital-intensive harvesting practice that has limited the scope of pickle harvest toward mainstream sized fruit. Technology may alter the horizon. Processors contend that Michigan's willingness to mechanize harvesting is a source of Michigan's comparative advantage in pickle production. The same innovation that went into the large pickle harvesters may shape the direction of Michigan's market, as new harvesters may bring back to Michigan the production and processing of smaller gherkins-type pickle processing, currently reserved for regions with handpicking tradition.

Processors indicated several trends in the pickle market that largely make up fringe changes in the industry scope. The first trend, and possibly most troubling is the price of other farm commodities and how it impacts pickle growing decisions. Corn, recently topping \$7 a bushel competes against pickles. Processors fear this will require them to increase their costs of acquiring cucumbers for pickles, where they have little capacity to pass the cost increase to consumers. However, most analyst do not expect corn prices to remain high.

Additionally, processors noted an increase in consumer preferences for artisan pickles with proprietary flavors. Hot and spicy, though not limited to artisan producers, was a common topic. Such niche market products mostly concern those marketing directly to households, but some of these consumer preferences may be bleeding over to food service segments. Processors, though, indicate that commodity-type pickle products remain the dominant segment and are not likely to change in the foreseeable future.

Finally, processors recognizing a limited capacity to pass on costs to consumers expressed concern about the costs of managing disease. Processors largely indicated that if the costs of managing diseases like downy mildew increase, they will have to absorb the cost to retain volume, but cannot pass those costs on to consumers. While processors indicated this threatens their margins, non were willing to go so far as to indicate it threatens their operations.

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