Food beliefs and food supply chains: The impact of religion and religiosity in Israel

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ABSTRACT

This paper demonstrates that religion and religiosity affect norms, which affect food consumption patterns and production. Heterogeneity and asymmetric information lead to multiple certification channels as well as multiple supply chains. Major supply chains may address multiple constituencies that are secular or less religious. Technological change affects norms and thus the food system. We obtain these results by analyzing the food systems for meat products in Israel where there are three religions – Jews, Muslims, and Christians – and people assign themselves three levels of religiosity – secular, conservative, and orthodox. Israel has multiple Kosher and Halal certifiers and several specialized supermarket chains for orthodox groups. Its main supermarket chains serve secular and some conservative segments. The immigration of secular Jews from Russia led to the proliferation of non-Kosher supply chains and products, and increased consumption of pork. New technologies and higher incomes led to emergence of fast food chains serving orthodox Jews that had previously tended to eat at home.

1. Introduction

Beliefs and attitudes about the environment and health affect food purchases and consumption patterns. Consumers have preferences about the way that food is produced and processed, which results in supply chains for organic and other similar products.

The importance of attitudes and beliefs about food in the developed countries has recently been recognized (see Rauser et al. (2015) for an overview of the non-economic literature on the economics of food). Books by the influential journalist Pollan (2006) emphasized that food consumption choices are reflecting social values, and that consumers’ attitudes about how food is produced and by whom are affecting their choices. His work established criteria to discriminate among food suppliers. The Slow Food Movement promotes certain attitudes towards food and engages in developing new sources for foods that meet their criteria. Animal welfare considerations, preference toward organic food (Batte et al., 2007; Jansen and Hamm, 2012; Hughner et al., 2007), and avoiding genetically modified organisms (GMOs) (Huffman, 2010; Huffman et al., 2007; Rousu et al., 2007) have become major criteria for food selection by consumers, and are leading to the development of new products as well as supply chains to serve segmented markets. The literature recognizes that consumer heterogeneity of beliefs, perceptions and attitudes towards food affects significantly consumers’ willingness to pay for products with specific food attributes that match better their idiosyncratic needs and set of beliefs (Lusk and Briggeman, 2009).

Another source of beliefs that affect food consumption is religion. Even though economists have recently recognized the importance of religion in determining individual choices and structures of institutions and markets (Iyer, 2016) the role of religion in affecting food choices has been underemphasized in the literature. This paper demonstrates how both religion and the intensity of belief affect food consumption as well as food supply chains, through three case studies from Israel.

We will emphasize the roles of religion and religiosity on food systems through its effect, along with technology and other factors, on norms. Religions, and other systems of beliefs, establish specific guidelines about rules about what is allowed and what is forbidden to eat and how the food should be processed. For example, Judaism and Islam have specific rules about how and who can be involved food preparation and in the slaughter of livestock. Mormonism restricts the consumption of alcohol, coffee and tea, while Hinduism prescribes a vegetarian diet. These rules are more binding as religiosity – the intensity of beliefs – is stronger. Studies have used three categories of measures of religiosity: subjective measures (e.g., self-assessment of strength of affiliation), behavioral measures (church attendance) and quasi-institutional measures (e.g., respect given to religious authority)

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(Alston, 1975), Ostrom (2000) has suggested that systems of beliefs and technology affect social norms. Furthermore, Stavrova et al. (2013) and Cochran et al. (1988) suggest that religiosity establishes social norms, the extent of adherence to rules within groups, including norms of work, food and alcohol consumption.

Religious beliefs impact what should be consumed and, importantly, how food should be produced and processed. For example, Judaism has Kosher rules and Islam has Halal that shape the demand for meat products and constrain the production and distribution of meat. The interpretation of religious rules in producing food may vary by religiosity and strictly observing religious rules requires extra costs, which food producers may be tempted to avoid in the absence of inspection. Because of asymmetric information between consumers and producers, and the risk of fraud (Hamilton and Zilberman, 2006; Almeida et al., 2010; Caswell and Padberg, 1992), third-party certification mechanisms have been established to guide consumer choices. Thus, similar to Organic, Fair Trade, etc labels, there are labels established by religious authorities such as Kosher and Halal labels (Starobin and Weinthal, 2010; McCluskey, 2000). One of the key points of this paper is how religion and religiosity lead to emergence of different certification regimes.

The variation of consumer preferences and production practices resulting from religious differences may lead to emergence of different supply chains. A supply chain is a sequence of processes by which organizations handle the flow of materials, parts, intermediate products, production of final products and then the delivery of the final products to customers. Supply chain design is viewed as an economic decision-making problem aimed to optimize expected returns subject to constraints. Better designs improve the level of coordination between the elements of the supply chain given possible conflicts of interest, randomness, heterogeneity in level of risk aversion and variances in economic variables and reduced transaction costs (Williamson, 2008). Supply chains are introduced and modified in response to new innovations, changes in cultural practices (Du et al., 2016) or perceived changes in demand (Adner and Leinthal, 2001; Franke and Von Hippel, 2003; Mowery and Rosenberg, 1979). Our analysis will demonstrate how supply chains that combine production, processing, and distribution, along with monitoring (leading to certification) at each stage, of food products were created to target varying degrees of religiosity. We find the co-existence of food supply chains that narrowly focus on meeting the requirements of orthodox groups with others that serve multidimensional constituencies of more secular individuals. We also show that changes in food technologies and income may lead to changes in norms, introduction of new food products and services and emergence of new supply chains (fast food for orthodox Jews). Our basic conceptual framework is summarized in Fig. 1. It emphasizes that religious affiliation and religiosity affect social norms and through it demand for food and the supply chains and the interaction of demand and supply result in consumption patterns and prices. Our analysis is limited to several dimensions of this system. For example, we under-emphasize the impact on prices and emphasize to impact of religiosity on consumption patterns, certification networks, and co-existence of supply chains serving different constituents.

We selected cases in Israel because the country includes members of three religions (Judaism, Islam and Christianity), within each group we can differentiate people according to their religiosity, and there is a diverse network of supply chains and food products that accommodate these differences. The next section will provide background discussion on food beliefs and religions in Israel, followed by results of studies as well as evidence that analyze and illustrate with examples how religion and religiosity affect various aspects of food systems, especially meat products in Israel. We first show that norms resulting from religious affiliation and religiosity affect consumption patterns of various poultry products. We then demonstrate that different requirements associated with religiosity results in emergence of multiple systems of processing and certification of meat products. This is followed by results demonstrating that religion and religiosity, which affect both consumption and production patterns, result in emergence of different supply chains for meat and food products. Some supply chains target the most observant population, while others cater to a broader spectrum of individuals with lower religiosity. Our analysis of the evolution of supply chain emphasizes how changes in demographics and technologies are changing food consumption patterns as well as re-alignment of supply chains.

2. Demographics and religious affiliation in Israel

In 2016, Israel had a population of 8.46 million, and there are three major religions (Judaism, Islam and Christianity). Further, within each religion, people tend to self-select into at least one of three levels of religiosity, namely orthodox, conservative, and secular (Heiman et al., 2004, 2001). There are 6.33 million Jews (75%), 1.62 million Muslims and Druze (19%), and 500,000 Christians and others (6%) (Central Bureau of Statistics, 2016). Also, Muslims and most other non-Jews identify as Arab, with a population of 1.76 million. Religions and religiosity result in significant differences in lifestyle and food habits, and some are specified by Shatenstein and Ghadirian (1998). Orthodox Jews or Muslim tend to pray few times a day (three in the case of Jews, five in the case of Muslims), conservatives go to temples on weekends and also respect fasts, and secular may participate in religious events a few times a year (Pew, 2016). Orthodox Jews and Muslims are subject to strict restrictions on food preparation. Pork consumption is forbidden by the Jewish and the Islamic religious law. Seafood is forbidden to the Jewish believers but is allowed to Muslims. Orthodox Muslims don’t drink any alcoholic beverages, while orthodox Jews consume wine made by only pious Jews. Both orthodox, and most conservative, Jews and Muslims buy meat slaughtered according to religious law, but interpretations vary.

The population in Israel tends to be segregated by city, with few major exceptions (Jerusalem and Haifa). There is also some segregation among cities and neighborhoods based on religiosity (Central Bureau of Statistics, 2016). Table 1 shows the population of major cities in Israel by their religious affiliation. Jerusalem and Haifa are mixed cities having individuals from multiple religions, and Jerusalem has many orthodox and ultra-orthodox neighborhoods. In Jerusalem, 45% of Jews consider themselves secular, 22% orthodox, and 33% ultra-Orthodox, while 64% of Jerusalem Muslims define themselves as secular and believers to some extent and 36% religious. Tel-Aviv-Jaffa, Ashdod, Netanya and Rishon are mostly Jewish, secular cities with many individuals that are with weaker intensity of religiously committed. Modein-Elith, Beit-Shemesh and Beni-Brak are all orthodox and ultra-Orthodox Jewish cities. Umm al-Fahm and Rahat are Muslim cities. Umm al-Fahm has many orthodox Muslims while Rahat is a city of Bedouin. Nazareth is an Arab city where one-third of the population is Christian and the rest are Muslim.

Berman (2000) analyzes the economics of the lifestyle of ultra-Orthodox Jews in Israel. He identifies that they tend to be lower income than the rest of the population. Furthermore, a high portion of ultra-Orthodox males tend to be religious scholars in yeshivas (religious academies of learning). Their learning is perceived as a public good supported by the orthodox community, by government subsidies, and working wives. The subsidies have benefited from the strong bargaining of the orthodox parties in Israel. Among orthodox and conservative Muslims, women are more likely to work in the house, while a high percentage of secular women tend to work outside the house. Generally, orthodox Jews and Muslims tend to have larger families with the number of children per family in 2014 was 3.2 for Arabs and 3.1 for Jews, while in 1995 it was 4.2 for Arabs and 2.6 for Jews.

In 2014, 11% of the population of Israel were ultra-Orthodox Jews (0.9 million). The ultra-Orthodox population is the youngest with the fastest growth rates (the ultra-Orthodox segment is growing by 4% per
year, while the country has a growth rate of 1%). In a 2013 population survey, 52% of the ultra-Orthodox were poor, with income per capita below the national poverty line, compared to 12% among non-religious Jews and 19% for the entire population. In 2015, overall labor participation among individuals between 25 and 64 is 77.2%. The rate of participation is low among two groups – Arab women (32.5%, compared to 19% in 1995) and ultra-Orthodox Jewish men (45.7% compared to 32.9% in 2005) (Central Bureau of Statistics, 2016). The relative poverty of ultra-Orthodox populations reflects the combination of young families with many small children, and proportion of non-working males. Different norms based on religiosity affecting family size and employment affect income per capita per household and serve as constraints on food selection, which result in different consumption patterns among groups.

3. Religiosity and food consumption – the case of poultry products

Chicken is the primary meat in Israel and it may be consumed either fresh or frozen, and whole or in parts. Frozen versus fresh stands for modernity versus convenience, whole versus cut confronts the important utility determinants of price, preparation time, income and perception of morality of leisure. McWilliams et al. (2016) explained patterns of consumption based on an approach that combined the work of Becker (1965) and Becker and Murphy (1994) on family production function with Akerlof (1997) work on social norms.

While traditional literature on food demand assumes that consumers gain benefit directly from goods purchased on the market, the concept of family production function, Becker (1965) suggests that consumers derive benefit from characteristics like taste and convenience that are produced in the home following a family production function that relies on goods purchased in the markets, as well as family labor, and the other resources of the family. The activities of family members tend to be constrained by social norms that depend on religion and religiosity of the family. This approach suggests that purchases of food products in the market are dependent on family resources and interhousehold division of labor choices (Strauss and Beegle, 1996). In this paper, we follow Akerlof (1997) and incorporate social norms as constraints on consumers. These norms have their own shadow price of consumption of goods, and result in different valuations of goods by consumers of different levels of religiosity or culture.

When it comes to the choice of what type of meat to purchase, McWilliams et al. (2016) assume that consumers aim to maximize utility of food consumed, leisure time, and expenditure on other products subject to income and time constraints, as well as constraints imposed by norms of religion. McWilliams et al. (2016) suggest that Muslims tend to be more traditional, less accepting of frozen products, and give more weight to freshness of goods, and Orthodox Jews and Muslims put more weight on home-cooking than more secular households. They also assume that fresh products are more expensive, and that chicken parts are even more expensive than whole chickens. Based on these assumptions they derive the optimal likelihood of selection of different poultry types by different buyers, and the results are consistent with the statistical findings in their paper. Using data taken from a survey that was held in Israel in 1999 and included 388 participants from three religions (Judaism, Islam, and Christianity) and stratified to segments according to their level of religiosity Heiman et al. (2001, 2004), Just et al. (2007) and McWilliams et al. (2016)1 found that Muslims eat

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1 They use Tobit analysis to estimate the shares of different types of chicken used by consumers as a function of religiosity and other variables. We summarize their findings with respect to religion and religiosity.
significantly less frozen chicken relative to Jews regardless of their religiousity (orthodox, conservative, secular) and consume less fresh cut chicken (time saving).

This higher tendency among Muslims to consume fresh may reflect both conservatism and stronger preference to unprocessed food. The lower tendency to consume cut chicken reflects lower average income and higher percentage of stay at home women among Muslims. Compared to other groups, the ultra-Orthodox Jews preferred purchasing more whole and frozen parts. Ultra-Orthodox females frequently tend to work outside the household because in many cases they are the major source of income as males are encouraged to devote their life to religious learning. In addition, families often have six or more children. This observed preference to frozen foods suggests that the income effect (this is the poorest group) and the binding time constraints of the mothers are stronger than the modernity aversion effect, associated with consuming frozen food. The relative higher likelihood to purchase frozen parts among the ultra-Orthodox may reflect accommodation to the time constraints of the mothers. The Ultra-Orthodox community also established outlets that supply its family foods like frozen chicken in discounted prices.

Conservative Jews, who tended to have higher incomes than ultra-Orthodox Jews, and many of them are originated in middle eastern countries, tend to purchase more fresh than frozen chicken and within the fresh category, they purchase more whole than cut chicken. These findings suggest that modernity aversion (conservativism) would dominate the income effect. Secular Jews tended to consume relatively more fresh and cut chicken than other groups. The time constraints, reflecting higher tendency of women to work, and higher incomes lead to these behavioral patterns.

The McWilliams et al. (2016) study also documents that the secular segments of the population, in particular secular Jews, had higher tendency to dine in restaurants (including fast food outlets) and buy ready to eat food. This change diffused also to the religious society. The increasing likelihoods of dining outside the house and buying larger shares of ready to eat and convenient food were explained by (i) increased scarcity of time (Jabs and Devine, 2006) and (ii) eroding religious norms that favor traditional ways of life (Wilkes et al., 1986; Delener, 1994) that include buying as little as possible ready to eat products. The perception, which became a norm, that consumption of ready to eat, ready to cook and dining outside the household symbolizes modern and non-religious life style has roots in the perception that homemade food symbolizes the family and pertains to family roles and relationships in a household (Bourdieu, 1990). Therefore in traditional societies, such as the ultra-Orthodox Jews, it is expected that females will do their best to juggle low food budget with time constraints.

4. Religiosity, product differentiation, and certification: The value of brand name

Religions can be understood as social networks with their distinct codes of behavior and norms, punishment systems and economic benefits (Granovetter, 2005). Some religious norms are directly derived from religion rules while others were formed in order to differentiate between members and nonmembers of a specific religion. Religion and religiosity affect the type of products consumers will buy, as we saw in the case of poultry. Furthermore, different religions have laws prescribing how and by whom food consumed by followers must be processed and handled. Muslims follow Halal laws and Jews have Kosher laws. Kosher laws are originated in the Old Testament and Halal in the Koran. In particular, they prescribe animal treatment and slaughter procedures, bar consumption of various foods (i.e. pork), and Kosher disallows consuming dairy and meat products concurrently and require that they be cooked using different utensils. While there is some overlap between the laws, there are a lot of differences. One measure of religiosity is the magnitude of interpretation of these religious restrictions. Orthodox individuals may be followers of religious leaders that establish their own interpretation of these laws. For example, food consumption patterns among two ultra-Orthodox sects are significantly different (Shantenstein et al., 1993). Because food preparation cannot be observed by the final consumer, it requires monitoring and enforcement, and Jewish law establishes guidelines for monitoring. This may result in the emergence of differentiated products that adhere to different standards. But adhering to these standards, entails some costs.

A 2007 study conducted by the Israeli industry association identified 23 Kosher certificates that vary in their strictness (vertically differentiated) and the organization that issues the certificate (horizontal differentiation). The most stringent certification is issued by the “Badaz” – the court of justice of ultra-Orthodox Jews - and the least stringent are issued by the Municipal rabbinate as well as the “K” or the OU certificate most popular in the U.S. Horizontal differentiation is done on the basis of country of origin, religious stream and political affiliation. For example, in Beney Brak, the largest city of ultra-Orthodox individuals, there are many kosher certificates: the Landa certificate for most ultra-Orthodox unless they belong to Litvak stream, another one for ultra-Orthodox from Hungarian background, and the certificate of Rabbi Mahapod (teacher of knowledge) preferred by non-European and non-Anglo-Saxon Jews, mainly with routes originated from Arab or Muslim counties.

The large number of kosher certificates may sound like the old-time joke about two Jews on a sinking ship that escape and come upon an isolated island. After a while they build three synagogues. They are soon rescued and asked why should two Jews have three synagogues and reply that the first is for me, the second is for him and the third, well, we will never pass its doorsteps. However, the kosher certification system is no joke, but rather represents a sophisticated system where the certification is the backbone of a brand that generates revenue as well as political power from differentiation based on beliefs and image.

The main cost of kosher certification is the payments to the signer certifying the process of food preparation (Krisal, 2009). The kosher certification system is labor-intensive and a certifier costs around 35–40 NIS per hour and one may be employed part- or full-time by restaurants or food processing facilities (Amit, 2014). Furthermore, Kosher meats require more elaborate and costly slaughter processes and not all the meat from the animal can be used for sale. Therefore, the cost of Kosher food is higher than non-Kosher food. Furthermore, when the number of adherents to specific certification is smaller, the extra cost per unit of food increases.

Many poor, ultra-Orthodox individuals elect to buy the more expensive Kosher brands that are certified by their Rabbi. Thus, the authenticity and identity of different Kosher foods are encompassed by the identity of the signer (the Rabbi) on the kosher certificate. This supports the claims that (i) brand image is an intangible asset that contributes higher symbolic influence on buyers’ status and self-esteem relative to its competitors that have similar functional qualities (Dobni and Zinkhan, 1990) and (ii) the higher the congruity between the image of the brand and the consumer’s self-image, the higher the benefit to the buyer (Sirgy, 1985), and therefore, the greater the willingness to pay for the brand. Interestingly, many non-observant Jews and Christians perceive that kosher certificates stand for higher quality food (Kamins and Marks, 1991). This perception is not grounded in reality but rather demonstrates how the kosher image is an example of brand image. This suggests that authenticity is often related to a story that the brand tells - a story that also delivers a promise for better quality to non-affiliated members.

5. Religion, religiosity and supply chain design for meat products

Supply chains for food products consist of at least three stages: (i) feedstock, which is the raw product, in the case of meat products is animals; (ii) processing, which is done in slaughtering houses and processing facilities (producing, for example, sausages), and (iii)
distribution, which includes wholesale and retail. When the products are credence goods, and there is concern about the manner they are produced and processed, there is a network of certification systems, which in the case of Israel includes the health department and Kosher/ Halal certifiers. Design of supply chain that pursues profitability aims to develop either vertical integration or contracting with units that perform the various functions along a supply chain to take advantage of economies of scale in production and demand, the human and physical capital of the organization that controls the supply chain, and constraints imposed by both the specifications of the product and requirements of the clientele (Zilberman et al., 2017).

This suggests that for the case of a supply chain that is designed to address specific concerns associated with religiosity the organization and optimization may require special attention to the religious constraints and restrictions in production and distribution. Distinct religious groups may vary in size and since there are likely to be some economies of scale in importing, storing, and processing food, supply chains will emerge to serve specific market niches when they have sufficient scale to be profitable. When a segment of the population is not large enough, or its buying power is low, no dedicated supply chain will be established, and existing outlets serving multiple constituents will serve these segments. If some of the segments share similar constraints or similar needs (e.g. secular across religions) they can be served by the same supply chain. Upward sharing, i.e., less religious person who purchase from a member of the supply chain that specialize in the striker religious is also possible although the price will be higher and the variety smaller relative to a matching supply chain (less restrictive). This analysis suggests that significant changes in demand that provide sufficient scale for introducing new products may result in new or modified supply chains.

The difference between Kosher and Halal in their applicability to the rules and constraints of the two large religions in Israel, the differences in price and the geographical distribution of the Jewish, Muslim and Christian communities is meaningful enough to divide the market into three segments: (1) secular Jews and Muslims and Christians, (2) religious Muslims, and (3) religious Jews. The classification of the market into these three segments is a business opportunity in creation of a variety of supply chains.

The challenge of designing elements of supply chains that take advantage of economies of scale while addressing the demand of different niches is especially important in two elements of the supply chain for meat products: slaughterhouses and supermarkets.

Slaughterhouses that choose to follow either Muslim or Jewish religious rules may choose to distribute their products to one of these three segments. However, unless the slaughtering house (butcher) is vertically integrated with a distribution chain in the case of large scale meat producer or a butcher shop in the case of small scale meat producer the slaughter house needs to uses independent distribution that would assume the responsibility for the logistics, distribution storage and commercial side. Thus, a slaughtering house must find a channel of distribution that will match the pair of religious and level of religiosity that matches its targeted market and its own constraints.

Supermarkets need to make a similar choice between segments and then search for distribution chain and producers that fit their positioning and constraints. As we shall see shortly constructing a supply chain may prove to be challenging. Pursuit of profits may drive entrepreneurs to create supermarket chains that are differentiated by the type and variety of products offered (based on certification, quality, etc.), location (within or away from neighborhoods with high number of religious residents), and opening hours (whether or not they were opened on the Sabbath). For example, a supermarket that serves a relatively homogeneous population that belongs to the same religious segment will provide only products certified by that sect, while a supermarket serving a mixed clientele will offer a greater variety of products.

For clarity, we will analyze the specifics of the supply chains of meat products for each the major segments of the Israeli population.

5.1. The secular segment

Historically, most of the foods in Israel were distributed through chains that chose to carry either Kosher or Halal food. Production of non-Kosher food was restricted due to legal constraints. Israel is a secular country, but religious institutions are given significant power on issues of food and the religious parties are very powerful. Regulations affect availability and price of different products. The religious parties use their political power and sometimes get support of Arab legislators to pass laws restricting, for example, the spread of non-Kosher food or pork, despite the fact that 35% of Israelis describe themselves as secular. In particular, religious groups use their influence to introduce laws aimed to reduce as much as possible the consumption of pork, which is forbidden by both Jewish and Muslim laws. The legislature cannot forbid consumption of pork (or seafood) yet it can limit production and selling of pork meat. Therefore, pig farming is allowed only in seven Christian villages in the northern part of Israel and in Kibbutz Lahav experimental farm in the Negev. Pork meat and products cannot be imported to Israel. The Israeli regulation does not forbid (for now) the import of fresh or frozen non-Kosher fish and seafood.

In the 1960s, non-Kosher food was supplied by delicatessens that developed their own supply chain for pork products. A major example is Menia, which started at Rishon Le-Zion in the 1960s as a non-kosher sausage factory that opened a delicatessen. The first large immigration wave from the former Soviet Union, between 1971 and 1975, that brought to Israel about 100,000 secular and Christian family members changed the rules of the game (Jewish Virtual Library, 2013). Between 1990 and 2000, a second wave of about 1 million immigrants (with 350,000 in 1990 and 1991) arrived to Israel; non-Kosher could no longer be regarded as a small segment leading to the development of new supply chains to serve this market. Tiv Ta’am, a small butchery from Tel-Aviv, which was founded in 1965, expanded its business and have established a non-Kosher supermarket chain2. Over time it expanded to 15 stores in urban areas populated with former USSR immigrants. Menia grew to be the largest pig farm in Israel that currently produces around 50% of Israel’s pig production, purchased a dough factory supplying pastry and bread retailers, and purchased a distribution company that ships its products to more than 800 stores. Karl Berg, which targets mainly former USSR immigrants, started in the 1970s as a delicatessen shop in Rehovot. It then purchased a meat processing factory and pig farms in the north that account 10% of Israeli production. Today, the chain owns 15 stores.

One of the challenges of non-Kosher supermarkets was to obtain non-Kosher meat, other than pork, because most local slaughterhouses found it more profitable to maintain Kosher or Halal slaughter and would find it risky to threaten their kosher certificate for the added revenue resulting from supplying to non-kosher supermarket chain. A non-Kosher chain should prefer non-Kosher slaughtered chicken or beef for two reasons. First, non-Kosher slaughter of chicken and beef costs less; and secondly non-Kosher chicken or beef is somewhat preferred since Kosher meat is salted as part of the process of making it Kosher. In 2003 Tiv Ta’am signed an agreement with the Chicken of the Valley (Aof Haemek) chicken slaughter facility where the slaughter facility was committed to supply all its production (60,000 chickens a day) as non-Kosher chicken to Tiv Ta’am. But, Tiv Ta’am only needed a supply of 20,000 chickens a day, but thought that it could sell the remaining 40,000 chickens to other buyers. However, it could not find buyers for much of the extra chicken and in 2008 it opted out the contract. Chicken of the Valley returned to producing Kosher chicken and Tiv

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2 In 1994 it became a public company and in 2009 it was sold to the Argaz Company, which specializes in transportation and logistics. They purchased Domo, an importer and retailer of kitchen and cooking products in 2014, and the organic food market chain Eden Teva Market in 2015.
Ta’am was forced to purchase Kosher chicken and beef even though it is a non-Kosher chain. Thus, the ban on importing non-Kosher or Halal meats restrains the supply of non-Kosher meats and harms non-Kosher chains. Tiv Ta’am is the largest non-Kosher chain in Israel but it does not have sufficient scale to have a dedicated supply chain of beef and chicken, thus reducing profits.

Because of the constraints of domestic production of non-Kosher meats, Tiv Ta’am had to create its own supply chain for non-Kosher products from imports and limited local production. In 2010 Tiv Ta’am purchased the largest non-Kosher meat factory Mizra, which enabled it to vertically integrate its non-Kosher food. The purchase of Mizra allowed Tiv Ta’am to vertically integrate along its supply of non-Kosher fresh food, meat and poultry. Tiv Ta’am maintains its own production facilities and imports are done by three daughter companies: non-Kosher food, and in particular cheese, fish, and seafood, are done by Isramko, Kosher fish imports are done through Snapir Yam, and alcohol is imported by a Scottish beverage company. Vertical integration with Mizra was necessary to guarantee supply of pork meat given that its two largest competitors were completely vertically integrated in this area. Tiv Ta’am accumulated enough resources and expanded to other segments followed by secular, and especially high income, Israelis.

This chain exemplifies the choice of differentiation strategy based on offering products underserved by the extant supply chains. By targeting, Tiv Ta’am pursued a double-headed strategy by targeting Christians and secular Jews, in particular the fast growing, mostly immigrant population from the former USSR. These populations have strong demand for buying pork, imported non-Kosher meat products, cheeses, and wines and are indifferent to purchases made on the Sabbath or religious Jewish holidays. Being open on Saturday offered a huge competitive advantage since the major supermarkets are closed from Friday afternoon until Saturday night (and in smaller chains until Sunday morning). Only convenience stores (e.g., AM-PM) or grocery shops owned by Arabs (and often located in the Arab quarters of mixed cities) were opened during the Sabbath. The large competitors could not compete on these two dimensions since once a store is opened on Saturday or holds non-Kosher food products, it loses Kosher certification and thus access to the strictly observant population, which was historically larger than secular Jews and Christians.

5.2. Religious Jews segment

The major food chains in Israel, Shufersal, Mega, and Rami-Levy, sell kosher products certified by different groups, in particular the Chief Rabbinate and Badaz. There are many smaller grocery stores, and the ones in orthodox neighborhoods sell mostly products certified by the stricter certifiers. However, while in the past orthodox Jews emphasize home cooking, there are indications that changes in food consumption patterns of ultra-Orthodox Jews have occurred since the start of the new millennium. Hanany (2008) sheds light on the changes in the Israeli religious society: “For many years the ultra-Orthodox community would not eat outside the household. A religious person who has some pride in himself would not step in a restaurant unless he came to an unfamiliar city in which he had no relatives or friends and otherwise would starve. Sitting in a restaurant was considered to be improper and would signal that the lady of the house does not know how to cook.... Nowadays the ultra-Orthodox American culture diffused [to the Israeli religious society] legitimizing dining out at restaurants and as a result the number of ultra-Kosher restaurants is on a rise.” The progress of modernity affects the patterns of out of home food purchases. Religious and ultra-Orthodox families increase purchases of ready to eat food for the Sabbath and for dinner. Ultra-Orthodox catering services that cannot operate their businesses on Friday night (Sabbath eve) use their production facilities to sell ready to eat meals. Fast food and eateries in religious cities sell after 7 pm only ready to eat food but do not serve food to be eaten in their establishments (Alper and Almog, 2008). The eateries in Beney Brak, the largest religious city, are forbidden by a major authority, Rabbi Landa, to sell food after 7 pm in order to avoid crowding of young individuals who would sit there rather than study the Torah. The growing proportion of religious females who work outside the household and their need to balance between the family and work increases and the need to purchase inexpensive dinner are primarily responsible for the creation of this sort of ready to eat food. Yet, Hanany (2008) reports that a smaller proportion of the ultra-Orthodox families (49%) purchase ready to eat food than non-ultra-Orthodox Jewish population (81%). These two examples demonstrate how a combination of changes in the society (modernization of the religious segment) and in the religious norms resulted in creative supply chains to cater to new demand patterns.

5.3. Religious Muslims segment

Goldman and Hino (2005) found that while most of the food purchases by the Jewish population in Israel has shifted towards supermarkets, at least until the beginning of the millennium, most Arabs, especially in smaller cities and villages, tended to shop in small grocery stores almost daily. This corresponds to the preferences for freshness, especially of perishable goods, the low labor force participation of Arab women, and their tendency to stay within a confined radius of the household. However, over time, there has been a growing tendency to purchase non-perishables in supermarkets (when husband accompanies wives among more traditional families) and the emergence of Arab supermarkets. In 2015, the Israeli Arab sector is served by 2000 small, family-owned groceries, 1300 specialized stores for fresh produce and meat, and 400 Arab-owned supermarkets. About 90% of Arab consumers purchased perishables at specialty stores, while 67% purchased non-perishables, and some fast moving consumer goods, at supermarkets. Israeli Arabs may also switch stores in pursuing greater freshness, improved cleanliness of stores, and lower prices (Hino and Levy, 2016).

The traditionally Muslim segment has its own retail outlets. King Store, an Arabic supermarket chain with 6 branches, targets the Arab sector that resembles in its requirements the ultra-Orthodox population, i.e., large low-income families with many children that prefer buying large packages that come in lower price. Despite the differences between the Muslim and the Jewish segments in the definition of what makes food kosher, some Halal meat is acceptable to some Orthodox Jews. Salach Dabach an Arabic meat producer that operates two stores, but chose to sell its meat products to the Kosher Observant Jews, and so cannot open or operate its stores on Saturday. On the other hand, King Store that is opened on Saturday and therefore reaches both Muslim as well as secular Jewish clientele.

Since consumers purchase multiple varieties of food products, the non-Kosher chains that sell non-kosher food, and in particular pork, face competition from non-kosher stores that sell only kosher food and Muslim-owned retail stores open on Saturday. Thus, the spectrum of religious beliefs creates interesting niche markets. For example, some individuals are nonbelievers according to ultra-Orthodox but consider themselves to be semi-religious because they keep some of the religious rules and ignore others. In our case these consumers do not see any problem in buying and paying on the Sabbath but they have a problem to patron a shop that is opened on the Sabbath but sells pork. AM-PM, a convenience store chain, located in city centers has built itself around this segment. It is opened 24-7 except for the three main Jewish holidays. It sells only kosher food and by definition it is an un-kosher chain since it is opened on the Sabbath.

6. Conclusions

This paper has shown the importance of religious preference and intensity of belief on food choices and production methods. The literature and evidence from Israel suggest that religion and religiosity affect both beliefs and social norms, set diet life style and income.
constraints and change the demand and consumption of foods. Producers and entrepreneurs respond to the varying combinations of religious beliefs and religiosity by establishing production, certification and distribution systems resulting in multiple food supply chains. While some supply chain target particular groups with sufficient purchasing power- some major chains will target major constituents of secular and less observant individuals. Our analysis from Israel also suggest that when religious groups have political power they use it to restrict food that doesn’t meet their norms.

One conclusion that can be drawn from our analysis is that religion and culture are important considerations in designing supply chains as well as food policy. In the development context, especially regions with fast changing demographics where more strictly religious populations are growing faster than other segments (Kinnvall, 2004), it may result not only to segregation of food products and introduction of new supply chains to meet the changing beliefs, given they have sufficient scale. However, the Israeli case indicate that even within traditional segments of the population, entrepreneurs can identify opportunities for innovation, introducing new foods and new supply chains, taking account of new technologies. Similarly, the Israeli case suggest that occurrence of processes of secularization and general reduction in adherence to strict religious codes, may increase the penetration of safe, affordable food. And this may lead to supply chains that serve larger groups and may benefit from economies of scale not previously available.

Research on the evolution of food systems requires an understanding of political economic forces and recognition of the evolving influence of food beliefs. New research should consider: (1) quantification of the impacts of belief and norms on food demand and consumption patterns, (2) assessing the impacts of religiosity and the certification and extra monitoring it requires on food prices and food expenditure among different groups, and (3) implications of policies restricting food availability for religious reasons (restrictions of imports of ‘non-kosher foods), on food prices and consumption patterns, economic efficiency and distribution well-being of different groups. In principle, restricting food supply because of religious beliefs is no different than restricting GMOs that affect the welfare of consumers, especially in developing countries (Zilberman et al., 2016). Finally, the results of these papers emphasize the importance of research on the evolution and economics of supply chains in agriculture, their design and evolution under various conditions, their economic implications and how it can be affected by policy.

References