

Regoverning Markets

Small-scale producers in modern agrifood markets

Agrifood Sector Studies

Restructuring of agrifood chains in Turkey: The produce sector (B)

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Regoverning Markets

Regoverning Markets is a multi-partner collaborative research programme analysing the growing concentration in the processing and retail sectors of national and regional agrifood systems and its impacts on rural livelihoods and communities in middle- and low-income countries. The aim of the programme is to provide strategic advice and guidance to the public sector, agrifood chain actors, civil society organizations and development agencies on approaches that can anticipate and manage the impacts of the dynamic changes in local and regional markets.

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1 Introduction

The role of agriculture has long been crucial to the Turkish economy and is still predominant: it represented nine per cent of GDP in 2006 and it is estimated that it employs 27.7 per cent of the working population (TUIK, 2007). Around seven million people are directly employed in agriculture, about the same number as in the entire EU-15 (Oskam, 2004). Moreover, Turkey is one of the largest producers and exporters of agricultural products in the Eastern Europe, Near East, and North African regions, especially for tomatoes. Despite Turkey's overall trade deficit, the agricultural trade balance is significantly positive, providing some relief to external accounts. Trade liberalization and rising demand in the region resulted in agricultural exports (excluding agro-industry) rising to a value of approximately US\$ 3.5 billion in 2005, and accounting for 4.8 per cent of Turkey's total export earnings. Total exports of agricultural and agro-industrial products were \$ 7.8 billion in 2005 (IGEME, 2006). Turkey was the third-largest tomato producer after China and the USA, with a total production of nearly ten million tonnes. Turkey is thus a major producer of tomatoes, but at the same time it is also a major consumer.

Turkish consumers do still buy most of their fresh fruit and vegetables from open-air street markets, and supermarkets have a rather low share of the market. This report aims to understand the reasons behind producers' marketing channel choice, and the effects of those choices on production and returns to producing tomatoes.

The Turkish food retail sector is still relatively fragmented. Traditional family-run outlets (*bakkals*), open-air markets, and bazaars are still widespread all over the country. These traditional retailers are especially important in rural areas and small towns where modern grocery formats have not yet arrived. In 2002 supermarkets and all supermarkets' share in food retail sales was about 40 per cent and it is now (200x) approaching 50 per cent, but this is higher in cities, where per capita income is higher than the national average, especially for those cities with more than one million people. The number of large food retailer groups (local, national, regional, and global actors) is increasing, as are the number of stores, new retail formats, the number of departments in stores, and the concentration of national and local ownership. The top five food retail chains have about a 20 per cent share in total food sales.

This report is organized as follows. Section 2 summarizes the findings of the meso-study and their consequences for the micro-study. Section 3 presents the sampling method and questionnaire, while Section 4 contains descriptive statistics from the survey and identifies the most important variables. Section 5 sets the empirical strategy and econometrical specifications. Finally, Section 6 discusses the results and concludes.

2 Key points from the village and PRA surveys

The previous report in this study (Koç et al., 2007) investigated 17 villages the Mediterranean, central Turkey, and Black Sea areas. The number of participants per village varied between 10 and 30, and the interviews lasted between one and four hours. Important locations such as packing houses, agricultural cooperatives, and traditional and modern greenhouses were visited. We also included some villages that had successfully built marketing cooperatives to help us to better understand the failures of the others. Interviews at the wholesale markets complemented the village stories to help us to understand the importance of the Turkish regulatory system in marketing decisions.

From these surveys, we draw the following results.

2.1 General setting

Wholesale markets: The villagers testified to the importance of the wholesale markets, as they more often than not rely on commissioners to market their produce when they are not selling directly to industry. (Commissioners are brokers based in the wholesale markets who sell produce on behalf of producers in exchange for a commission). In fact the 1995 wholesale market law oblige producers to market their produce through these commissioners (*komisyoncu*). The producer sets the minimum price, and the commissioner then acts as a matchmaker, without actually taking ownership of the produce. His commission (a percentage and according to the volume sold) is set by law: he cannot take more eight per cent of the total price. But as there are few commissioners in the wholesale markets, and as the establishment and location of the wholesale markets is decided by the municipalities, there is no strong observable competition among the commissioners, so they always charge the highest commission possible. They receive goods for sale from producers or from merchants – middlemen who buy produce from farmers in a particular area and then sell it on via the commissioners.

The role of cooperatives: The 1995 wholesale market law does allow direct sales too. Producer's organizations (marketing cooperatives or 'agricultural development cooperatives') who are registered at the Ministry of Rural Affairs (MARA) are allowed to sell directly to final sellers (who are usually traditional markets, but also supermarkets), and they set up their stall in the wholesale markets. The producer organizations have to buy an expensive certificate to bypass the commissioner, and so need a minimum of about 50 fee-paying members to afford this cost.

Several new laws have been passed since 1995, however, that have further opened the market. Even if an agricultural development cooperative exists at the village level, producers can gather together in a marketing cooperative that is allowed to sell directly to final sellers such as supermarkets, if they can consolidate more than ten

per cent of the total district land area (Bignebat, Codron, Lemeilleur, 2007a). Marketing cooperatives are usually run by large producers who try to organize small producers in order to meet the law's requirements. In addition credit cooperatives are allowed to market their members' produce, which has led them to abandon their primary aim of providing credit and turn to marketing produce for their members. This change is too recent to affect the data.

2.2 Marketing channels identification

We noted the following after the meso-analysis. We observed that each producer used only a few marketing channels: a multi-channel choice is rare. Most are highly specialized, selling only to a commissioner, a merchant, or to industry.

We observed few organizational innovations in terms of alternative modes of marketing or direct procurement from the supermarkets. First, the surveys underline how difficult it is to organize to act collectively. The incentives set by public authorities did not prove to be strong enough to bring people together to collectively market their production. This may be due to the reputation of the cooperatives that were established during Turkey's socialist period (before 1980). They were run by the state and got producers to join; but they were also highly corrupt and did not develop successful investment strategies at the village level. Their image in the eyes of producers is still one of lethargy – and it is a strong disincentive to the adoption of similar ways of working.

Direct procurement rarely happens, either by exporters or supermarkets. Exporters sometimes procure directly from areas in the South Mediterranean, mainly Antalya and its suburbs. Contracts appear to be easily enforceable and commitment to them high. There were few examples of direct procurement by supermarkets. First, supermarkets have to show proof of their procurement and sales at the end of each year, so they cannot easily avoid the legal obligation to use the wholesale markets and commissioners. But that obligation does not hold if they are trading with a cooperative, so they are just about to organize producers into producers' unions to avoid paying commissioners their eight per cent. The surveys show that even if they are still rare, cooperatives are being established tentatively, especially in the Antalya region.

The commissioners still dominate the most common marketing channel, however, where a producer sells directly to the commissioner or sells to a merchant who in turn sells to a commissioner. Producers prove to be rather faithful to their commissioner, and rarely switch from one to the other. Wholesale markets act as a place to collect information about average price, as prices for average quality are posted in the market. Commissioners enjoy a high social recognition, and the most successful producers try to integrate this activity. Producers also frequently find it difficult to get credit, so combined contracts with the commissioners (that agree to

buy the produce but also include advance payments or credit against production) are widespread.

Supermarkets, on the contrary, were considered to be a minor marketing channel and none of the survey interviewees mentioned selling to them.

Lastly, the role of exports could be quite important, as exporters are now facing demands from the European Union and the new EU countries from Central and Eastern Europe to strengthen their requirements in terms of taste and sanitary quality.

2.3 Marketing constraints

The following marketing constraints were identified by the meso-studies and should be taken into account in the micro-study:

The dispersion of production was often mentioned by producers: small scale production dominates, while a few large producers direct their sales mainly towards exports. The collection and consolidation of produce is important. Either merchants come to producers and buy their produce, or producers organize to collect the village's produce and take it to the wholesale market. The latter depends on at least one local producer having the capital to collect and transport the village's produce.

For this reason we think that the role of distance to the nearest wholesale market is a determinant for understanding the marketing channel that producers use; transportation costs to the central market are not negligible, and producers often cannot bear the cost alone. They report that they have to rely on a second intermediary (a merchant) if they cannot organize transport themselves at the village level.

This kind of collection seems to be more common than the collection of local production by a cooperative (if one exists in the village). The mutual lack of trust among villagers, even though it is regretted by many, dominates. Producers regret that no national or local production planning can be sustainable or even contemplated. They suffer from high and unexpected price fluctuations. Some of them cannot even cover the cost of production from their sales. Production appears to be a very risky activity as the prices vary so much from one year to the next, so producers don't necessarily earn better prices as they gain experience.

In fact, there is no place for value-adding activities; a shortage of credit forces producers to get by on just their own profits, which are rather low. They cannot access credit from the traditional banking system as they usually do not have much collateral. Even when they try to organize collectively, we found little evidence of storing, grading, or packing facilities.

Lastly, there is a lack of trust in one-sided contracts (except for exporters and the industry).

3 Data sources and sampling measures

3.1 Selection of the areas and villages

The selection of regions is based on the 2004 data from the Farmer Record System, which has records for tomato production in 78 of 81 provinces. From these the leading producer provinces were defined, and Table 1 shows the major tomato-producing provinces, which together account for 73.13 per cent of tomato production in Turkey.

Table 1: Tomato production by major producing provinces ('000 metric tonnes)

Province	Production	Share (%)	Geographical region
Antalya	1,471.3	16.50	West Mediterranean
Bursa	1,136.2	12.74	Marmara
İzmir	580.9	6.52	Aegean
Balıkesir	564.8	6.33	Marmara
Mersin	541.8	6.08	East Mediterranean
Manisa	490.9	5.51	Aegean
Çanakkale	394.1	4.42	Marmara
Samsun	368.4	4.13	Black Sea
Tokat	351.7	3.94	Black Sea
Muğla	294.5	3.30	Aegean
Ankara	174.2	1.95	Central Anatolia
Bilecik	153.9	1.73	Marmara
Sub-total (major producing provinces only)	6,522.7	73.16	
National total (including rest of country)	8,915.8	100.00	

Note: Average of 1999–2003 years.

After conducting a detailed analysis of each region, the study was reduced to seven provinces on the Mediterranean and Aegean coasts and in the Marmara region (the north-western part of the country) (see Table 2). The Central Anatolia and Black Sea regions are excluded from the sample because they produce very little compared to the other sites. The provinces chosen for further analysis represent 58.1 per cent of total national tomato production. Each region has particular economic, social, and climatic conditions which enable year-round tomato production, which diversifies the marketing choices of tomato producers.

Table 2: Top tomato-producing provinces

Province	Production (metric tonnes)	Share (%)	Geographical region
Antalya	1,471.3	16.50	West Mediterranean
Bursa	1,136.2	12.74	Marmara
İzmir	580.9	6.52	Aegean
Balıkesir	564.8	6.33	Marmara
Mersin	541.8	6.08	East Mediterranean
Manisa	490.9	5.51	Aegean
Çanakkale	394.1	4.42	Marmara
Total	4,785.9	58.1	

Note: Average of 1999–2003 years.

The Mediterranean Region is in the south and lies along the Mediterranean Sea. It has a typical Mediterranean climate, with hot and dry summers and mild rainy winters. The region is free from frost, so farmers can grow tomatoes under very simple structures and without additional heating. The population density is lower than in the Aegean and Marmara regions, as it is mountainous and not industrialized. Tomato production is specialized, mainly in greenhouse production and for the out-of-season market. The coastal strip is rather narrow due to the high Taurus mountains, so the greenhouses are concentrated in certain locations.

The Marmara Region is the smallest region in the country but it has strategic importance because it separates Europe from Asia. Its landscape is flat and rich in vegetation. There are three different climates (Mediterranean, Black Sea, and continental) and a milder coastal area, however they can get very low temperatures throughout winter and thus are limited to greenhouse production or early season production of tomatoes. It is the most densely populated and industrialized part of Turkey, with industry, agriculture, and tourism being the most important sectors.

The Aegean Region is in the western part of Turkey along the Aegean Sea, and is bordered by Marmara to the north, the Mediterranean to the south, and the Central Anatolia regions to the East. It is the second most populous region after Marmara, as the climate is warm and the land fertile. Tomato production is for fresh consumption and for processing into tomato paste and its derivatives or for sun-drying. There are greenhouses, especially in the southern parts of the region and around geothermal sources, but at a regional level more cucumbers are grown under protected cultivation. The Aegean region ranks second for tomato paste production after Marmara, and sun-drying is unique to this region.

After the study regions were identified at the meso-level, villages were selected randomly, except for a few villages that were added specifically because they have active agricultural cooperatives (see Appendix 4). Although the villages selected for having a cooperative are over-represented in the sample, the presence of a cooperative turned out not to influence marketing decisions (only two producers are

selling through a cooperative), so we did not have to correct for this over-representation.

The village questionnaire was completed by the head of the municipality or by the cooperative director, or if they were not available by one of the older producers sitting in the coffee shop.

The selection of households is a longer process which is handled in different steps. First the cooperative is visited (if there is one in the village), to obtain a list of tomato producers. Second, information about small and medium sized farms is collected from the municipalities or the cooperative in order to get information on the general distribution of producers. We then chose to interview half of the producers from the smallest farms and half from the largest farms. Apart from that criteria, producers were chosen randomly and interviews were conducted in the village's coffee house, face to face and with no observers. All the farmers produce tomatoes as either their primary or secondary crop, selection was made in terms of turnover.

The over-sampling issue for some categories in one or the other marketing channel was not controlled for, as macro-data about the distribution of all agricultural producers is not available.

All the observations are weighted to take into account the sampling bias at the sub-provincial level using TUIK data. In all 16 provinces were identified (see Appendix 1 for sampling details). We associated to each producer his relative weight considering the weight of the region in the total regional sub-sample (Column 1), the weight of the province in the region (Column 2) and the weight of the producer (or farm) in the province. The variable of the number of tomato producers in the village was not reliable in the village database, and not available through secondary statistics.

3.2 Survey instruments

The village questionnaire is included in Appendix 2, as is the 19-page individual questionnaire (Appendix 3). The interviews were carried out in mid-November 2006 and lasted between one-and-a-half and two-and-a-half hours each, depending on how many production cycles the interviewee had. The survey was conducted between December 2006 and mid-January 2007 by seven Turkish colleagues. Data were entered from mid-January to mid-February in English and Turkish and encoded in April and May 2007.

4 Production and marketing

4.1 Identification of the relevant marketing channels

According to the previous meso-results and the chosen sampling strategy, marketing channels were split into three components.

4.2.1 Producers selling to processors

Producers typically sell directly to manufacturers or their agents, so we were able to identify them (Question V.2 0.3.b). Those who said that they did sell directly to manufacturers did not report that they also use further marketing channels, that is they do not rely on multi-channel strategies. However, we added to this category producers who sell through a merchant (*tuccar*), but who produce the tomato variety that fits industry requirements (in this case, producers reported that this variety was the one required by industry, or they grow these varieties (i.e. Shasta, Spektrum, or Alto) as their main product). The intersection between the producers who report selling to a commissioner and the ones growing the industry variety is empty, so we conclude that all the producers selling to manufacturers either sell directly or through a merchant, and were thus all identified.

4.2.1 Producers selling to supermarkets

We conducted a further survey at the wholesale market level in order to identify the producers who are selling to supermarkets. We targeted wholesale markets that sell to supermarkets: commissioners in Antalya, Serik, and Kumuluca were interviewed face-to-face in January and February 2007, while those in Istanbul and Bursa were interviewed by phone in June 2007. For the first three wholesale markets the survey was exhaustive, for the rest only commissioners from wholesale markets that were thought to deal with the supermarkets (see meso-study) were investigated. They were asked about what marketing channels they use, and about the volume they sold through each. We selected the following marketing channels: traditional open-air markets (*pazar*), supermarkets (we distinguished between Migros and the others), and exports. If the commissioner reports a volume of sales to supermarkets (whatever the type) of more than zero, the producer is considered as engaged in a modern marketing channel.

The database comprises 243 commissioners, 86 of whom are on both the producer and the wholesale market database (corresponding to the wholesale markets that are selling to supermarkets). We were able to match the individual producer data with the wholesale markets data thanks to the producer's report of the intermediary's number and wholesale market name. We were thus able to learn the name of second the buyer, that is the intermediary's buyer.

To these producers, we add two further individuals that are selling directly to supermarkets (Question V.2 0.3.e).

The result is that we identified producers who had a *positive probability* to sell to supermarkets, not only those who we are sure are using this marketing channel. Moreover, we lost those who are selling to a merchant, who is also probably selling to a commissioner who is selling to a supermarket. All the producers that fall into that final category (21 producers) are in the Bursa region, however, and as in the wholesale market survey no commissioners reported that they sell to supermarkets, we integrated these producers into the traditional marketing channel, even though we do not know if the merchants are selling to the nearest wholesale market. We cross-checked the robustness of the results if these producers are dropped, and were satisfied.

We also tried to cross-check the information with a question to producers about the ‘second buyer’ of their produce (Question V.1 0.2.1). The results showed a significant difference between the commissioners’ marketing channels as reported by the producers versus those reported by the commissioners, demonstrating that the producers do not really know who their commissioners are selling to.

Table 3: Question ‘Are you (Is your commissioner) selling to supermarkets?’

Reported by the producers	Reported by the commissioner			
		Yes	No	
Yes		3 (57%)	4 (43%)	7
No		15 (53%)	23 (47%)	38
Total		18	27	45

We conclude that the answers given by the producer and the commissioner are contradictory for around half of cases, so we think that the supermarket channel is underestimated by the producers.

4.2.1 Producers selling to traditional markets

Finally, producers using the traditional marketing channel were selected if they trade with a commissioner who does not sell produce to supermarkets or to merchants who sell to supermarkets. We also added producers who report that they only sell directly to street market sellers (Question V.1 0.3.f).

The sample was thus split into three marketing channels. We lost two producers who sell directly to exporters and four who only sell through cooperatives. In the first case we could not identify the produce that was sold to exporters as the producer’s identification of the ‘second buyer’ was inconsistent. In the second case, 15 producers sell at least part of their production through a cooperative. Of them

nine are in cooperatives that sell to industry; we considered the sub-sample too small and homogeneous to be used.

4.2 Characteristics of the households compared to marketing channel choice

4.2.1 Location

As we expected from the meso-survey, the location of households is highly correlated with marketing channel choice. This is because both the agro-ecological and economic environments are different in the North and South (see Table A4.1). There are numerous processing plants in the North, and we learned from the village surveys that most of the villages there have a tomato-processing plant near by. Interestingly, the number of villages reporting a positive outcome is not totally correlated to the marketing channels chosen by the producers. For instance, the number of tomato-processing plants in Canakkale region is higher than in Manisa region, but the distribution of the marketing channels in the latter favours industry. The choice of marketing channel with regards to industry is perfectly correlated to location in the Southern regions (Antalya and Mersin). We did not see any tomato-processing plants in the surveyed villages.

This observation should be linked to a symmetric one: the number of wholesale markets relative to the size of the province, as well as relative to production (when taking into account industrial and non-industrial varieties) is far higher in the Southern regions. The location and the size of wholesale markets is decided by the local municipalities, and endorsed by public authorities. In recent years wholesale markets in the Antalyan region were coping with such high volumes of produce that they were running out of space, so smaller wholesale markets were established in the production areas. They are not generally selling directly to supermarkets, as the supermarkets procure from the large wholesale markets in the consumption areas. However, this variable influences the 'distance to the nearest wholesale market'. Looking at the average distance between the villages in different regions (and surveyed in the study) to their nearest wholesale market shows up significant differences. The villages in the southern regions only have to travel on average 14.5km to their nearest wholesale market, while in the northern regions it is 30.6km on average. The Bursa region has the greatest distance – 64.8km on average to the nearest wholesale market.

Looking at these first results, we wonder whether the three alternative marketing channels are in fact alternatives. It may be that households first choose to sell to industry or not, some producers in the South have much fewer opportunities than some in the North, and are then delivering their produce to supermarkets. The assumption we must make at this point is that even if selling to supermarkets is not an individual choice as such (as the commissioner deals with them, not the producer

himself), the commissioner may still set quality standards for producers that originate with the supermarkets. The promotion of quality of the last buyer should be reflected in the incentives set to the producers.

4.2.1 Processing tomatoes versus selling fresh tomatoes: some insights

We have suggested that producers sell to processors or sell fresh tomatoes based on their location. The characteristics of households in each location are also dissimilar.

Household heads selling to supermarkets are the youngest, with an average age of 42.6 years, whereas producers selling to industry or to traditional markets are 47 and 43.9 years old, respectively (see Table A4.2). Furthermore, the producers dealing with supermarkets have more children (defined as less than 15 years old) living at home than those selling to traditional markets, but not higher than for the industry. As the number of children and age of the household head do not seem to be directly linked and correlated to each other, we suspect the number of children does not influence the marketing channel decision.

We note some differences in household risk management with respect to tomato production:

- We first look at the variable showing whether at least one member of the family living on the farm has a job off the farm (Table A4.2). Those households who are working with supermarkets diversify significantly their income sources towards off-farm activities; in particular, the variables show that the wife of the household head is not working on the farm. Producers selling to industry are more dependent on farm activity (only ten per cent have a job off the farm) compared to households selling to traditional and supermarket channels.
- Further information is deduced from the ratio of non-farm income relative to agricultural income (see Table A4.2.d). The outcome of the supermarket channel is very different from the others. The standardized deviation is less for the supermarket marketing channel than for the other marketing channels.

The agricultural revenue from tomato production is calculated from monthly production sold and reported monthly price levels. This income was also analysed relative to area under tomato production. The results differ widely across channels; producers working with industry make more money overall, but at the same time they earn the least per acre. The returns to production are slightly higher in the modern marketing channel, but the dispersion is also relatively higher. We should note, however, that this revenue is calculated for tomato production alone (see Table A4.2.f), and 72.3 per cent of producers report that tomato is their primary product in terms of volume (80.3 per cent in terms of turnover). We should control the econometric model for economies of scale that may be at stake.

Finally, we examine the diversification of agricultural production with the single variable of the survey, total land allocated to tomato production relative to total land used for all agricultural production (see Table A4.3). The traditional marketing channel shows a higher proportion of land allocation to tomato production, 61 per cent compared to 42 per cent for industry and 46 per cent for the modern channel.

4.3 Impacts of marketing choices

4.2.1 Industry and fresh produce

Producers use different agricultural technologies depending on which marketing channel they use, and this may influence the results in terms of distribution of the land according to different production types.

Industrial tomatoes are grown in an open fields, whereas producers selling to traditional markets and supermarkets often use plastic tunnels, plastic houses, and glass houses (in order of cost). As Table A4.3.c shows, producers selling to traditional markets and supermarkets devoted 26 and 28 per cent of their land respectively to glasshouses. Only one producer selling to industry did not use open field production. Producers selling to traditional markets prefer plastic houses as they are cheaper than glasshouses. This distribution is particularly useful in understanding not only the quality of the produce sold by farmers (glasshouses perform much better than other options, and also surely correlate with unobservable variables standing for a performing production system), but also the potential returns to investment cost for the three channels. As we observe more glasshouses in the supermarket channels, we conclude that supermarkets are rewarding producers for their investment through higher prices.

The number of workers employed by the producers also varies between marketing channels. Even though the average number of permanent workers does not vary across channels, the median number of workers is lowest in the industry channel, whereas it is the second one in the other channels. More than half of producers using the traditional and modern marketing channels employ two permanent workers. Industrial tomato producers employ more than 11 seasonal workers, where those selling to traditional and modern markets need four and five workers, respectively, which shows that industrial tomato production is more labour intensive (see Table A4.3.e).

4.2.1 Modern versus traditional marketing channels

To document the varieties of tomatoes that are sold in the traditional and the modern marketing channels, we could not rely on the varieties reported by the producers as they were not consistent. Nevertheless, farmers were asked to classify the tomatoes

that they grow as normal, cherry, or cluster tomatoes (see Table A4.3.f). Producers were able to say that they produced several types of tomatoes, or none of them.

Production and technologies feeling

We observe no evident difference between the types of tomato grown by producers selling to the traditional or modern marketing channels, except that some of the producers using traditional channels are growing cherry tomatoes, while no one using the supermarket channel was doing so. The qualitative empirical evidence we got in the previous study (Koç et al., 2007) showed that the types of tomatoes offered by supermarkets and open-air markets do not differ significantly, especially with regard to cluster tomatoes, and except for some niche markets such as organic and, even more so, packaged fresh tomatoes. In fact, open-air market sellers organize themselves to counter the growth of supermarkets by responding to new consumer preferences, diversify their products, and improve the quality of their products, especially in terms of food safety. However, producers in the database report that they are not certified: nine producers have national certification (protected cover area seal) – seven of them use the traditional marketing channel and another two use the modern marketing channel. None of the producers in the sample have an organic certification. Finally, only two of them are Eurepgap certified.¹

We also checked if there is any difference in the way that production records are kept according to each channel (Table A4.3.h). Significantly more producers who sell to supermarkets keep detailed production records than for the traditional channel. There is no difference between channels when looking at simple production and sales records.

The main observable difference between the tomatoes sold by the supermarkets and those in open-air markets is the way the tomatoes are arranged on the stalls: tomatoes in supermarkets are sold packed in boxes with one or two rows and also loose, but in the open-air markets they are only bought and sold loose. Finally, the industry does not report a full engagement in the production of normal tomatoes, as producers often call their production industrial tomatoes.

In terms of packaging (in order to see whether supermarkets are effectively promoting packaged products), we know from the previous study that packaging is fairly rare at the moment, even more so at the producer level. Some packing into large boxes happens at the producer level, but even here packing factories (often owned by commissioners) are sometimes preferred to on-farm packing by exporters). Some supermarkets (like Migros) do their own sorting and packing of fresh produce

¹ The qualitative surveys investigated this Eurepgap question, and found that a Eurepgap seminar took place in Antalya where it was said that half a dozen producers from the Antalyan region had the certificate. As the number is so low, we had no chance in the sampling to pick up one of them.

because it is cheaper to hire people to do it than to pay what the (few) packing factories charge. The supermarkets that are more experienced in fruit and vegetable procurement tend to outsource this activity to producers (Bignebat et al., 2007). In fact, 24.6 per cent of producers report sorting procedures (we did not ask them directly whether or not they sort; we base our conclusion on their description of the months during which they sort, the number of people employed, and their total costs).

Producers who use the traditional marketing channel sort their production more often than the others (66.7 per cent, compared to only 33.3 per cent for the modern channel) (see Table A4.3.g).

Access to credit

We tried to identify the constraints that may explain why some producers do not have access to modern marketing channels. We therefore looked at the the producers already selling to industry to get some more information. First, we looked at their access to loans, and at the type of loans they get.

We asked about the loans that producers get for agricultural activities or other reasons. The following sources were investigated: the banking system, supermarkets, buying companies, association or cooperative, NGO, government, agro-chemical supplier, agroindustry, intermediaries, and neighbours. Except in a few cases, the loan sources are intermediaries, cooperatives, and banks.

When aggregating the different sources, it was found that 44 per cent of producers did have a loan (Table A4.3.i). Producers using traditional markets had few loans compared to those selling to industry and supermarkets. When advanced payments are taken into consideration (Table A4.3.m), we found that fewer of the producers using the modern marketing channel have access to advanced payments than producers in the traditional system.

We try to explain this apparent paradox by looking at the capital endowment of the producers in each channel. As commissioners report that they have been selling to supermarkets for decades (50 per cent of them answered that they had begun selling to supermarkets before 1990), we cannot know for sure if the investment in glasshouses was made before or after the access to supermarkets. However, we can estimate the investment in glasshouses and plastic houses since 2002.

Land and family capital endowment and investment

We checked the differences in land endowment among producers. We found that producers selling to supermarkets generally have more land (0.33ha) than those selling to traditional markets (0.21ha), but producers selling to industry have the most (1.43 ha). This is mainly because industrial tomatoes are grown in open fields

and there is no greenhouse production the way there is for the other marketing channels.

On average, total land area increased by 17.6 per cent from 2002 to 2006 (Table A4.3.o). This increase varies widely across regions, however. The Bursa and Izmir regions have a significantly lower average increase, and Canakkale–Manisa significantly higher. (This may be due to economies of scale in open-field production, which is important in cost reduction and also processor based on its buying price production cost plus margin and this further may be based on minimum scale such as 10 decares). Given this, we compared the size of the glasshouses used by producers selling to supermarkets in 2002 and 2006. While most producers (83.1 per cent) who had glasshouses in 2002 still have the same area under glass in 2006, 5.6 per cent decreased their glasshouse production area and 8.1 per cent of producers who had glasshouses in 2006 had not had them at all in 2002. These percentages were true for producers using both modern and traditional marketing channels.

It was difficult to find other types of investments or endowments as all the producers have all the domestic facilities we asked for (electricity, TV, phone, even mobile phone) and only 17 do not have a tractor. The only real difference was car ownership, as only 62 per cent have a car (although only 74.4 per cent of the interviewees answered the question).

4.2.1 Perceptions, information

In this section, we investigate if the choice of marketing channel may be due to the way producers get their information about the markets, or to how they perceive these marketing channels (and both may be linked).

Choice of buyer

Producers were first asked about the most important criteria that led them to choose their buyer (Question V1.0.4, a closed question). Most important is price (36.9 per cent), then confidence in the buyer (confidence was in the question related to a long-term relationship, 28.1 per cent); then honesty (11.5 per cent); and finally advanced payments (8.1 per cent) (see Table A4.5). The remaining answers scored very low.

In fact, the previous study revealed a general lack of confidence in transactions in the surveyed villages. Corruption is widespread and contracts are always oral (and on the few occasions that they are not, such as between cooperatives and supermarkets, or with industry, they are very incomplete). As oral contracts are very difficult to enforce, confidence was the number two criteria. Honesty (which came third) can also be interpreted in the same way. Finally, getting an advanced payment (often given by the commissioners) is necessary for those producers who need cash flow before the harvest. Interestingly, the answers are different across the marketing

channels, strongly so between producers working with industry compared to those using other marketing channels. In particular, they concentrate on the first two proposed criteria, namely the same buyer as last year, and the price incentives (93.3 per cent chose one of these two answers). The type of procurement used by the tomato-processing plants obviously affects these choices: producers sell directly to manufacturers or their agents and intermediaries are rare, so the risk associated with them is low. Moreover, traditional and modern marketing channels differ significantly. Producers selling to traditional markets choose their buyers primarily by price, while those using modern marketing channels are driven by honesty. This choice does not seem to be directly linked to the relative pay-off of the channel. Moreover, we have shown that producers are not always aware of the final marketing channel they use; they just care about the buyer that they are selling to. The results reveal that inertia and habit are the most important determinants of marketing choice. Reputation seems to be a predominant determinant for producers engaged in the modern marketing channel.

Price information

We also investigated further the information producers collect to learn about prices and to decide which marketing channel to use (Question V.3.0.1, Table A4.6). Most producers collect their information at wholesale markets, either when the prices are posted publicly locally (first part of the question), or when the prices are announced by the commissioner or his agent (options 5 and 4, respectively). Users of traditional marketing channels mainly rely on this public posting, while producers using the modern marketing channel rely more on private information gathered by the commissioner or his agent.

Producers using the modern marketing channel seem to rely more on their relationship with the commissioner: they take his reputation (in particular his honesty) into account more than in other marketing channels, and then collect information about prices from him instead of looking to the publicly posted prices at the wholesale market.

We collected prices reported by producers for each month (Table A4.7): the price at which industrial tomatoes are sold is low relative to the other marketing channels, but these tomatoes are also a different variety so it is not possible to compare prices directly. The median prices for modern (0.70) and traditional (0.71) marketing channels are about the same.

Subjective ranking of marketing channels

Finally, we asked producers about their preference with regards to the various marketing channels. Six marketing channels were identified: (1) supermarkets; (2) exporters; (3) processors; (4) cooperatives; (5) intermediary in the region (street market, direct consumer, or merchant); and (6) the closest wholesale market (commissioner). As regards different aspects of the transaction (price, volume,

quality of produce, fast payment) producers reported their preferred marketing channel. The results show that supermarkets were extremely rarely cited as the preferred marketing channel regardless of the transaction and the marketing channel in which the producer is engaged. Table 4.7 reports the preferred marketing channels with regards to the price and the reliability of the transaction (continuity).

The preferred marketing channels with respect to price are exporters (for the modern marketing channel) and commissioners (for the traditional). We see that the supermarkets are more frequently mentioned for the modern marketing channel than in general. However, when considering other aspects of the transaction (such as reliability), supermarkets vanished and the traditional intermediaries – the wholesale markets and exporters – are preferred.

4.4 Conclusion

We conclude from these statistics that producers do not know much about the marketing channel they use after the first step. The results show that the modern marketing channel of supermarkets is not that attractive to producers. Even though we say this based on a subjective question, it further explains the decision producers make when choosing a marketing channel.

The characteristics of both the household and their production are totally different for the industry marketing channel, and location matters a lot in this case. We wonder whether studying the three marketing channels as if they are truly alternatives is the right empirical strategy or not, and will test for the independence of irrelevant alternatives (IIA) hypothesis.

Turning to those who use the modern marketing channel (even without knowing everything about it), we found that the type of production (tomato variety and type) is very similar for both the traditional and modern markets. However, producers working for the supermarkets are more likely to sort tomatoes, pack them, and grow them in glasshouses. This implies that a significant investment is needed to achieve the supermarkets' requirements. However, the question of credit is still not disentangled, as producers using the supermarket channel are unlikely to have credit relative to those in the traditional marketing channel, regardless of the credit source.

Producers in the modern marketing channels are also less dependent on tomatoes and rely on different income sources, including off-farm revenues (from the enumerator we know that this revenue often comes from the government). However, we note that the average income from agriculture is slightly higher for the modern marketing channel.

5 Econometric models and estimation

We first present the estimation of the producers' marketing channel choices from among the three marketing channels identified above. We then turn to the gross income per unit of land (decare) equation.

Concerning the marketing channel choice, we derive two competing models from the statistical description in Section 4. We then test their relative performance. In fact, we wonder if the independence of irrelevant alternatives (thereafter IIA) hypothesis is valid when the endogenous variable of the marketing channel choice entails the three choices (modern, industrial, and traditional marketing channel). We suspect that the choice of the industrial marketing channel competes with the choice of the fresh produce channel and not with the modern and traditional marketing channel.

We decided to apply a two-step approach: from the marketing channel choice, we derive the estimated values of the producers' choice and integrate them in the outcome equation.

5.1 Marketing channel choice

We consider the following two models:

Model 1 : $\Pr(\text{Choice}) = f(\text{Incentives, farm size, assets, households, shifters})$

Where Choice is a variable that takes 1 if the producer is engaged in the modern marketing channel, 2 if he is in the industrial channel, and 3 if he is in the traditional channel. X is a set of characteristics of the household, and of the environment.

Model 2 $\left\{ \begin{array}{l} (1) \Pr(\text{Industry}) = f(\text{Incentives, farm size, assets, households, shifters, IV1}) \\ (2) \Pr(\text{Modern}) = f(\text{Incentives, farm size, assets, households, shifters, IV2}) \\ \text{if selection in the first stage} \end{array} \right.$

The endogenous variables were described in Section 3. *Industry* stands for those engaged in the industrial marketing channel (0 otherwise); *Modern* takes 1 if the producer sells in the modern marketing channel (see definition in Section 3).

As exogenous variables, we selected the following (see descriptive statistics in Appendix 5, Table A5.1):

Farm size

Percentage tomato 2002	Percentage of total land allocated to tomato production in 2002 (ratio)
Total land 2002	Total land area (decares)

Incentives

Ratio off-farm/ agricultural income	Off-farm income relative to agricultural income 2006 (ratio)
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Risks

Number of children	Number of children living on the farm in 2006
Bank credit 2002	1 if the producer has a bank credit in 2002
Household characteristics	
Age	Age of the household head 2006
Age squared	Age of the household head 2006 squared
Experience	Experience in tomato production, number of years
Experience squared	Experience in tomato production, number of years squared
Assets	
Car	1 if the household owns a car
Shifters	
Cooperative	1 if a marketing cooperative is established in the village
Technical assistance from the government	1 if technical assistance from an agronomist appointed by the government
Technical assistance from the cooperative	1 if technical assistance from an agronomist appointed by the government
Region	Bursa, 1; Cannakale, 2; Manisa, 3; Izmir, 4; Antalya, 5; Mersin, 6 (regional level)
IV1	
Proportion owned land in 2002	Proportion of the total land used for production which is owned by the producer in 2002
Cost of renting land	Average cost of renting land on the village as reported by the producer
IV2	
Distance to road	Distance from the plots to the nearest road (metres)
Distance to road squared	Distance from the plots to the nearest road squared
Distance to wholesale market	Distance from the plots to the nearest wholesale market (metres)
Distance to wholesale market squared	Distance from the plots to the nearest wholesale market squared

We used a cluster option² to allow for the covariation of the residuals within regions. As regions are perfect predictors of the outcome we could not integrate fixed effects for them, but clustering them captures unobserved heterogeneity. This procedure turned out to be highly successful and corrected standard errors. In fact, the regions differ highly according to the production function of farmers, especially to whether they grow tomatoes in open fields or in greenhouses.

We performed a Hausman Specification Test to test for the independence of irrelevant alternatives hypothesis; Model 2 (simultaneous equations estimated by the maximum likelihood method) performed better than Model 1.

Model 2 was thus selected, and we applied a bivariate probit with censoring.

As an identifying variable for the first step estimation, we use for equation (1) (namely the probability to choose the industry marketing channel instead of the fresh produce marketing channel) the proportion of the total land used for production which is owned by the producer and the average cost of renting land in the village as

² Stata, option *cluster*

reported by the producer. In fact, as the production of industrial tomatoes is exclusively in open fields, we believe that constraints on the land market should raise the probability of selling to the fresh produce market rather than to industry. We selected two proxies for this constraint: the amount of land the producer bought before 2002; and the average cost of rented land stands for the actual constraint of expanding his land area.

For equation (2) (namely the probability to choose the modern marketing channel instead of the traditional one), we selected variables standing for the farm's location. The distance to the nearest road refers to transportation costs as well as transaction costs. In fact, the most remote producers have less access to infrastructure, but also to information about the marketing channels' requirements and the prices they should expect. We think that this variable does not impact the gross income per decare (see Equation 3 below) as, contrary to net income, it does not include transportation costs to the wholesale markets, as the producers collectively organize the collection and transportation of the production. The latter variables were used as a set of exclusion variables allowing for the identification of the income equation.

5.2 Impact on income

We regress the total gross income relative to the tomato area on the same variables except identification. The observations related to industry turned out to be not workable, probably because of a perfect colinearity between fresh or industrial marketing channels and location. None of the producers in the Southern region produce for industry. Moreover, censoring the industry marketing channel would have meant dropping the entire regions of Manisa and Izmir and most of the producers located in Bursa. The impact of marketing channel choice on income is restricted to the regions of Antalya and Mersin (South) and Cannakale and Bursa (North).

We included in Equation (3) the predicted value of the marketing channel

(3) $Y = f(\text{Incentives, farm size, assets, households, shifters, predicted marketing channel})$

We were not able to compute the net income because of numerous misreported observations for the different costs borne by the producers.

6 Empirical results

6.1 Marketing channel choice

We first present the results from the first equations. This is a probit estimation with selection, that considers the determinants of the growing industry versus fresh tomatoes first, and then investigates the determinants of channel choice only for those producers who are not working for industry. Table 6.1 shows the estimation of the determinants of belonging to the modern marketing channel in Column 1, and in Column 2 the determinants of working with industry. As industry is concentrated in the Northern regions of Turkey, we clustered the estimation by region, thus allowing for the correlation of residuals within a region, in particular for environmental omitted variables. The results show that the correlation among the residuals of the first and second step equations estimated simultaneously (maximum likelihood estimation) is significant at the one per cent level.

As a variable standing for 'family asset' we include car ownership, which is a discriminating variable as only 60.8 per cent of the producers in the total sample have a car (or 58.8 per cent of the fresh tomato sub-sample). We do not know anything else about family assets (home ownership, for example).

Table 6.1: First step equations (probit with selection)

	Endogenous variable	Modern	Industry
Farm size	Total land 2002	-0.00342 (0.0021)	-0.00370*** (0.00072)
	Percentage tomato 2002	-0.361* (0.21)	0.607* (0.36)
Incentives	Ratio off-farm/agricultural income	0.899*** (0.21)	2.995*** (0.48)
	Distance to road	0.00000351 (0.00015)	-0.000228 (0.00029)
	Distance to road squared	9.33e-09 (0.00000014)	0.0000000340 (0.000000027)
	Distance to wholesale market	0.0963*** (0.012)	-0.0115 (0.0085)
Risk	Distance to wholesale market squared	-0.000981*** (0.00017)	0.0000141 (0.000017)
	Number of children	0.0740 (0.20)	0.265*** (0.073)
	Bank credit 2002	0.163 (0.34)	0.138 (0.20)
Household characteristics	Age	0.550*** (0.18)	0.0241 (0.056)
	Age squared	-0.00658*** (0.0023)	-0.000235 (0.00050)
	Experience	-0.0847*** (0.0056)	0.312*** (0.029)
	Experience squared	0.00294*** (0.00038)	-0.00585*** (0.00076)
Assets	Car	-0.442 (0.58)	-0.0811 (0.10)
Shifters	Cooperative	-1.056** (0.44)	-0.873** (0.42)
	Technical assistance from the government	-0.771 (0.57)	-0.968*** (0.22)
	Technical assistance from the cooperative	-0.442*** (0.15)	0.242 (0.34)
IV	Proportion owned land in 2002		-0.872 (0.64)
	Cost of renting land		0.000404*** (0.000054)
	Constant	-11.96*** (2.77)	-4.613*** (1.08)
	Censored: 140 Uncensored: 181 LL = -0.0008	Rho: 0.481 (0.041)	

Weighted simultaneous regressions, corrected for intraregional covariation of residuals
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

6.2.1 Industrial versus fresh tomatoes

- **Farm size:** Farmers who produce for processors are specialists, and concentrate more on tomato production than growers who use other channels. Even when the price for industrial tomatoes is lower than for fresh tomatoes, the producers of industrial tomatoes produce more than the others.
- **Incentives:** The families of industrial producers diversify the family's source of income (note: the coefficient here is the variable non-agricultural income relative to agricultural income). There may be several reasons for this. First, off-farm income should be taken into account at the family level, as some family members work off the farm. But second, a non-negligible part of it is due to benefits, in particular retirement benefits that are included in non-farm income. And the household members in the industrial marketing channel are older than in other channels. We suspect that non-agricultural income is highly linked to social benefits received by the family.

The distance between the plots where tomatoes are produced and the nearest road is not significant. However, the distance to the nearest wholesale market turns out to affect negatively the probability of selling tomatoes to industry. We suspect this result to be due to the fact that the density of wholesale markets in the regions producing industrial tomatoes is lower than in the regions producing fresh tomatoes. In this respect, industrial tomato producers are on average farther away from wholesale markets than fresh tomato producers.

- **Risks:** The indebtedness (2002 level) of the producers working with industry is not higher than that of producers using alternative marketing channels. We include this variable because industrial producers have more stable incomes than others and their intra- and inter-annual price variation is low. Their position is less risky than that of producers on the fresh produce market. This makes it more likely that they would qualify for a loan from the traditional banking system, both by self-selection and selection. But this is not the case. We also supposed that households with many children would be less likely to use a risky marketing channel. This supports the argument presented above, which shows that the industrial marketing channel is less risky.
- **Individual characteristics of household head:** Age is not significant when choosing a marketing channel, which strengthens the idea that location is the determinant with regards to using the industrial marketing channel. Producers do not adapt their choice to temporal elements such as accumulated wealth or access to credit when thinking about dealing with processors. The choice is made when they start to produce. However, the length of experience of the producer in producing and selling tomatoes is significant, and positively correlated with selling to processors. Age and experience are only slightly correlated (0.18) so we

think that the non-significance of the age variable is not due to the fact that we integrated the experience into the same equation. Producers experienced in tomato production are more likely to work with industry. The observed influence of the length of experience in tomato production is slightly concave (we tested age squared which was significantly different from zero).

- Shifters: The existence of a marketing cooperative (of any kind) in the village and the availability of technical assistance from a government-paid agronomist affect negatively the probability of selling industrial tomatoes. When looking at the summary statistics we noticed that even when the proportion of industrial tomato growers with a cooperative in their village is high (relative to other marketing channels), only a few of them are cooperative members. So the presence of a cooperative should not be understood as a marketing opportunity. This statement is confirmed by Lemeilleur et al. (2007). However, due to the high number of villages with no cooperative, the variable 'belonging to a cooperative' is not workable but reflects a constraint.
- Instrumental variables: The cost of renting land at the village level as reported by the producer is significant, although small, significantly different from 0. We tested for other variables, such as having a collective water irrigation system (which is particularly profitable for open field industrial tomato growing) but none were consistently significant. We conclude from these variables that where land pressure is high (as a collective market outcome at the village level, thus not individually endogenous), producers are more likely to grow industrial tomatoes. A Wald test testing for the predictive power of those variables in the selection equation does not reject the fact that the performance of the equation (1) is higher when they are included in the specification.

6.2.1 Traditional versus modern marketing channels

- Farm size: Producers using the modern marketing channel do not differ from those in the traditional channel in land size or degree of specialization.
- Incentives: The total household income of producers in the modern marketing channel relies more on off-farm activities than that of households using the traditional channel. This result is not particularly due to the fact that producers selling to supermarkets are older than those in the traditional marketing channel and thus enjoy higher social benefits. The former diversify their labour supply towards off-farm activities.

The distance to the nearest wholesale market has a positive and slightly concave impact on the probability to sell to supermarkets. Farms in remote areas are not disadvantaged compared to the more central ones.

- Risk: The variables standing for household sensitivity to risk (number of children and indebtedness in the traditional banking system) do not influence individual behaviour.
- Individual characteristics of household head: Producers selling to supermarkets are on average older than those in the traditional marketing channel, and the impact of age exhibits decreasing returns. However, their length of experience in tomato production affects negatively the probability that they work with supermarkets. We used both variables standing as they are only slightly correlated, namely the correlation coefficient is 0.18; and the individual combinations of these two variables are diverse, so that no multicollinearity problem between these two variables is suspected. We thus associated this positive impact of age with capital accumulation rather than experience.
- Shifters: The presence of a marketing cooperative in the village turns out to be significant, with a negative impact on the probability of selling to supermarkets. Moreover, producers who report that they get technical support from a cooperative are less likely to sell their production to supermarkets. The two variables are not correlated as the first refers to the presence of a cooperative, whether the producer is a member of it or not. Even if surprising, this result is coherent within the Turkish context. Marketing cooperatives are in fact rare, and more often than not are not efficient with regards to their marketing strategy. They are used by their members as cheap input suppliers and as a way for them to get subsidised investment from the government. They are not progressive organizations for producers, and the villages in which they are located may remain oriented to traditional markets.

6.2. Impacts of marketing choice

We draw from the preceding estimation the predicted value of belonging to the modern marketing channel (*Modernpred*) that will, as an explanatory variable, control for the endogeneity of the marketing channel choice and its impact in terms of technology choice. The endogenous variable is the gross income per decare (see Table 6.2).

6.2.1 Impact on income

- **Farm size:** There is no evidence of increasing returns to total farm size, or to specialization in tomato production.
- **Incentives:** The ratio of off-farm to agricultural income has no impact on gross agricultural income per decare, but we noted before that it influences the marketing channel choice.
- **Risks:** Having a bank loan through the traditional credit system has no influence on gross returns to tomato production. In fact, producers were not asked if the credit they had was invested in production or not. Many of them report in question VI6 that they had recently built their house. That is why this lagged variable was used as an indicator for the risk of impossible reimbursement of the credit and not as a proxy for productive investment.
- **Household characteristics:** The returns to tomato production are higher for older producers, but the length of experience in tomato production has a negative impact on gross income per decare. As age and experience are not correlated, we can interpret these coefficients separately. First, older producers rely on a higher level of fixed capital, accumulated during their years of farming, so age is correlated to length of experience in agricultural production as a whole. However producers who began growing tomatoes recently enjoy higher returns to production: it may be that they adopt different (new) practices while more experienced producers may stick to traditional production procedures.
- **Shifters:** Being in a village with a cooperative (without knowing if the producer is a member of it or not) has a negative impact on gross income from tomato production. This may be because returns to tomato production depend on agro-climatic conditions, which are particularly favourable in the Antalya region – but Antalya also has the lowest concentration of cooperatives. When we looked at who had received technical assistance from a cooperative, we found that only 14 per cent of the producers in the fresh tomato sub-sample had done so, and in two-thirds of the cases this cooperative was a credit cooperative. This statement is thus not related to marketing choices, as a credit cooperatives were not allowed to market produce at the time of this survey.

- Importance of marketing channel choice: The predicted participation in the modern marketing channel is not significant ($P>t=0.156$). Gross income per decare has no impact on marketing channel choice.
- The validity of the instruments was tested. We integrated all the first stage and second stage instrumental variables in the outcome equation, one by one and then all together. All these variables turned out not to affect significantly the producers' income per decare.

Tables 6.2: Impact of marketing channel choice on gross income per decare (tomato production)

	Endogenous variable	Gross income/da
Farm size	Total land 2002	0.0172 (0.026)
	Percentage tomato 2002	2.739 (1.44)
Incentives	Ratio off-farm/agricultural income	5.223* (4.60)
Risk	Number of children	0.682 (0.71)
	Bank credit 2002	-0.140 (1.41)
Household characteristics	Age	1.399** (0.33)
	Age squared	-0.0146** (0.0038)
	Experience	-1.055*** (0.15)
	Experience squared	0.0260*** (0.0035)
Assets	Car	0.187 (1.25)
Shifters	Cooperative	-5.953** (1.65)
	Technical assistance from the government	0.0511 (2.23)
	Technical assistance from the cooperative	1.370* (0.69)
Selection	Inverse mills ratio	17.47 (7.84)
	Constant	-25.27* (10.1)
	R ²	0.29
	N	180

Weighted regression, corrected for intraregional covariation of residuals

Robust standard errors in parentheses, control for regions *** p<0.01, ** p<0.05, * p<0.1

7 Conclusion and policy implications

7.1 The role of commissioners

We found that commissioners still play a large role in the marketing of fresh produce.

First, direct sales or sales through a cooperative are rare (a few observations in the database and in the previous study).

Second, producers do not rely on multichannel strategies even though the produce they are selling is non-homogeneous. They sell their produce in bulk (or sorted) to a commissioner, but sell them a great variety of different quality tomatoes, and the commissioners find the appropriate buyer by re-sorting the produce.

Furthermore, we show that the relationships between the producer and his commissioner depend on confidence, reputation, and habits. The producers rarely change from one commissioner to another, and do not work with several of them at once.

7.2 Off-farm revenues and credit

The results show that off-farm revenues are determinant when the producer is deciding whether to use the modern marketing channel. From the descriptive statistics point of view, we show that more family members are engaged in off-farm activities when the off-farm revenue is growing (or that the total number of hours working in non-agricultural activities is higher), and we believe that the revenue from these non-agricultural activities is re-invested in agricultural activities.

Moreover, the fact that those producers who invested heavily in building glasshouses, for instance, which is a very costly investment, do not differ from others shows that their financial sources are not exclusively bank credit. This suggests that off-farm incomes may be important to support agricultural activities.

7.3 Age and experience

The conclusions concerning the influence of the age of the household head and his length of experience in tomato production are strongly supported. Age affects whether a producer is using a modern marketing channel whereas length of experience does not.

Regarding the negative impact of length of experience on the probability of selling to supermarkets and on the gross income per unit of land, we suppose that producers who have only recently decided to grow tomatoes have taken a more proactive marketing strategy. In fact, we noticed that the more experienced producers are

frequently trapped in their relationship with the same commissioner because of interlinked contracts. They rely on their commissioner's advance payment.

We deduce from this observation that the know-how is not determinant for the marketing channel choice, but that the accumulation of individual fixed capital may be.

In this respect, and as for the previous point, access to credit should be promoted by producers. This statement is confirmed by the fact that the producers who do not report having any credit (to invest in fixed capital, not advanced payments) more often than not do own land. The problem is thus not about collateral, but may be to do with credit denial or high interest rates.

7.4 Role of cooperatives

We saw that the presence of a cooperative in the village has a negative impact on the choice to participate in a modern marketing channel, and on gross income from tomato production. We focused on the fact that the presence of a cooperative does not imply membership of the observed producers. However, cooperatives are not used by producers as a marketing tool, but rather to access both inputs and, more often, technical advice.

In fact, technical advice given by cooperatives seems to be important to producers, but when looking more precisely at the data, we saw that the cooperatives that are supporting producers from the technical point of view are credit cooperatives that, at this time, did not market any produce.

The producers' reluctance to take part in collective action seriously affects cooperatives' contribution and role.

Appendix 1: Sampling plan

Province	Sub-province	Village	Area (% within)	Tomato area (da)	Rural population	Household	Coop.	PO's
Antalya	Merkez (35)	Yurtpinar	17.6	866.40	110,939	135	No	
		Merkez	14.54	716.20				
	Serik (20)	Karadayi	12.78	514.80	78,781			Kumluca Tar. Kredi Koop. 2717 S. Mavikent
		Aşağı Kocayatak	8.91	358.60				
	Kumluca (25)	Merkez	0.25	659.40	36,289			Kınık Tarım Kredi Koop. Kale Tarım Kredi Koop
		Sarıcasu	0.13	356.00				
		Beykonak	0.10	258.30				
	Kaş (20)	Ova	40.45	1038.2	41,158			Hasköy Kredi Koop.
		Kinik	23.21	595.8				
	Manavgat (15)	Çakış	17.11	233.6	127,706			
		Çardakköy	16.00	218.4				
	Finike* (10)	Merkez	100	710	32,341			
	Gazipaşa* (10)	Merkez	100	1228	28,005			
	Bursa	Karacabey (45)	Sultaniye (15)	12.01	3,648.40		36,263	75
Hamidiye (15)			9.23	2,804.80	No			
Beylik (15)			7.91	2,401.30				
Mustafa Kemal Paşa(30)		Duruntay (10)	13.20	2,516.10	54,800		M.K.Paşa Kredi K.	
		Karaoğlan (10)	9.70	1,849.10				
		Merkez (10)	9.61	1,830.80				

Sampling plan (continued)

Province	Sub-province	Village	Area (%)	Area (da)	Population	Household	Coop.	PO's
İzmir	Torbalı (45)	Atalan	14.79	2,188.90	12,690	45		S.S.Torbalı Yaş Sebze ve Meyve Paz.
		Merkez	15.21	2,250.70				
		Tulum	14.32	2,119.10				
Mersin	Erdemli (25)	Kocahasanlı	30.65	4,681	102,180	50	Erdemli Tr. Kredi.	744 Erdemli Tar.Kredi
	Silifke (25)	Atayurt	10.95	1,673	91,524		No	A.Tekirçiftliği Tar.Kredi
Manisa	Akhisar (30)	Sazoba (10)	13.32	6,469	64,210	55	No	No
		Akselendi (20)	58.99					
	Merkez (25)	Güzelköy (15)	14.39	6,071	71,072			
		Merkez Muradiye (10)	12.23					
Çanakkale	Merkez (20)	Akçapınar (5)	14.20	526.9	28,395	40		Tarımsal Pazarlama Koop
		Aşağıokçular (5)	9.59	355.7				
		Kumkale (10)	28.52	1,058				
	Biga (20)	Gümüşçay (10)	26.27	1,704.5				
		Sinekçi (10)	5.06	328.4	49,620			
Total						400		

Appendix 2: Village survey questionnaire

Small and medium-sized Turkish farmers' access to dynamic national and regional markets

Village survey: Village leader and experienced farmer

Province _____

County _____

Town _____

Village _____

Respondent _____

Telephone number _____

Date _____

Enumerator _____

	Information about village labour force	Unit	2000	2006
	Number of households	Pers		
	Total population	Pers		
	Size of labour force (16 to 60 years old)	Pers		
	Workers with post-secondary education	Pers		
	Farmers working off-farm more than three months	Pers		
	Average wage for male worker	YTL		
	Workers specialized in marketing agri-products	Pers		
	Basic information about land			
	Total area	Da		
	Percentage of land that is hilly/mountainous	%		
	Soil type	Code		
	Infrastructure, marketing and information			
	How many wells are there for irrigation?	Number		
	Distance from village to province capital	km		
	Distance from village to county capital	km		
	Distance from village to township seat	km		
	Distance from village to nearest highway (county /provincial /national highway)	km		
	Distance from your village to nearest rural market	km		
	When was that market established?	Year		
	Distance from your village to nearest agricultural wholesale market	km		
	When was wholesale market founded?	Year		
	Cooperatives			
	Is there a rural development cooperative in your township?	Yes / No		
	If yes, when was it established?	Year		
	If yes, does it sell vegetables?	Yes/No		
	Is there a vegetable marketing cooperative in your township?	Yes / No		
	If yes, when was it established?	Year		
	If yes, does it sell vegetables?	Yes/No		
	Is there a rural credit cooperative in your township?	Yes / No		
	If yes, when was it established?	Year		
	If yes, does it sell vegetables?	Yes/No		

Appendix 3: Individual survey questionnaire

Small and medium-sized Turkish farmers' access to dynamic national and regional markets

Questionnaire for tomato producers

Province _____

Sub-province _____

Village or municipality _____

Respondent _____

Telephone number _____

Date _____

Enumerator _____

Farm and household characteristics

01. Where were you born? _____

02. How many people live/lived in your household:

a	in 2006 ?	
b	in 2002?	

03. Household description

	a	b	c	d	e	f	g	h	I	j	k	l
	Members of HH	gender	age	Education	Work on the farm?	Since when?	Work how many months per year?	Average working days per month?	Off-farm job?	Since when?	How many months per year?	Average working days per month?
	code	male/female	years	years	yes / no	year	months	days	yes / no	year	months	days
1)												
2)												
3)												
4)												
5)												
6)												
7)												
8)												

Note: Description of the Members of HH code must start with HH leader, then other people will be ranked according to their ages, old to young. (Codes: Father, Mother, Son, Daughter, Grandfather, Grandmother etc.)

04. Is anyone in your household trained in agriculture? If yes, how many?

Cooperatives

01. What kind of cooperatives or producer unions exist in your village?

		1)	2)	4)	5)	6)	7)
		Exist?	Since when?	Are you a member?	Are you active in the coop or prod. union?	Since when?	How much is the coop or producer union membership entry fee
		Yes / No	Year	Yes / No	Yes / No	Year	YTL
a	Agricultural development cooperative						
b	FFV marketing cooperative						
c	Agricultural credit cooperative						
d	Producer union						
e	Other: _____						

0.2. What services do you receive from the organizations above, whether you are a member or not?

		Yes	No
a	Technical assistance (advisory service)		
b	Access to inputs		
c	Equipment sales		
d	Equipment purchase on credit		
e	Credit		
f	Collection of your produce		
g	Grading/packing of your produce		
h	Processing of your produce		
i	Marketing of your produce		
j	Transport of produce or inputs		
k	Other (explain)		

Cropping pattern on cultivated land

Land property status

0.1. Land tenure forms:

	Year	Own	Rented	Tenancy	Share cropper	Share cropper rented	Land fallow	Registered land
a	2006							
b	2002							

0.2. If there is a sharecropper situation, what are the conditions of sharecropping?

0.3. How much does a decare of land cost in the area of your farm? (YTL)

		Low	Medium	High
a	in 2006 ?			
b	in 2002?			

0.4. How much does it cost to rent land in your region (per decare) or how much did you pay in annual rent (YTL/da)?

		Open field	Glasshouse with full equipment	Plastic house with full equipment
a	in 2006 ?			
b	in 2002?			

Production pattern and features

0.1. What are the three most important crops for you?

		1)	2)
		Based on area	Based on sales value
		Code	Code
A	in 2006		
B			
C			
D	in 2002		
E			
F			

0.2. How many da of vegetables do you grow? (da)

		Open field	Glass house	Plastic house	Plastic tunnel	Others
a	in 2006					
b	in 2002					

0.3. How many da of tomatoes do you grow? (da)

		Open field	Glass house	Plastic house	Plastic tunnel	Others
a	in 2006					
b	in 2002					

Irrigation

My source of irrigation water is:

Irrigation union	
Irrigation cooperative	
Municipality	
River	
Hand-dug well	
Deep well	
Doesn't know	

When was the irrigation installed on your farm? _____

Tomato production (2002 and 2006)

When did you start to grow tomatoes? _____

What was being grown on the plot before tomatoes? _____

How many seasons/cycles of tomatoes do you grow per year?

a	in 2006 ?	
b	in 2002?	

Monthly distribution of tomato production (tonnes)

Months	Single crop	Double crops: First season	Double crops: Second seasons	Open field	Average monthly selling price
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					

Varieties

0.1. Which of the following tomato varieties do you plant? (Y/N)

	Cherry	Salkim	Normal	Others
in 2006				
in 2002				

0.2. Which type of tomato seed or nursery do you use?

			Variety 1	Variety 2	Variety 3	Variety 4	Variety 5	Variety 6
a	2006	Name of variety						
b		Area share of variety	%					
c		Volume	tonnes					
d	2002	Name of variety						
e		Area share of variety	%					
f		Volume	tonnes					

0.3. Was there any change in varieties between 2002 and 2006? _____ Yes / No (based on the above table) If yes, why?

		Yes	No	Nknr
a	Good taste			
b	Good appearance			
c	Good price			
d	Buyer preferences			
e	Processable			
f	Storable or long shelf life			
g	Maturation			
h	Other _____			

Description of tomato plots

0.1 How many plots of tomatoes do you grow (2006)? _____

		a	b	c	d	e	f
	N° of plots	Area	Land tenure: -owner -rent -share	Distance from your house?	-Open field -Plastic greenhouse -Glass greenhouse -Higher plastic tunnel	-No irrigation -Gravity irrigation -Drip irrigation -Sprinkler irrigation	Number of cycles per year
		da		metres			
1)							
2)							

0.2 Do you have quality certification for your tomatoes? _____ Yes / No

If yes, what type of certifications?

		1)	2)		
		Certification	Since when?	How much do you pay for it?	Required or given by: - Supermarket - Exporter - Processor - NGO - Cooperative - Other
		Yes / No	year	YTL/ year	
a	Protected Cover Area seal (MARA)				
b	Organic certification				
c	Other? Name of the certification _____				

0.3 What do you do with tomatoes that fall to the ground?

Technical Operations (Note: If there are two production cycles, fill out this page twice)

	Stages	Which months	1.1.1.1.1.1.1.1 Labour			Production records	Inputs			
			Number of workers	Number of days	Total		Kind of product	Quantity	Price	Total
					day				YTL	YTL
A	Clean up and soil preparation					I	Plastic cover			
B	Soil preparation for planting					I	Cultivation			
C	Planting and transplanting					I	Seeds			
						II	Seedling			
	Fertilization					I	Animal			
						II	Chemical fertilizer			
						III	Chicken			
						IV	Folial fertilizer			
						V	Organic fertilizer			
	Spraying					I	Fungicides			
						II	Insecticides			
						III	Herbicides			
	Heating					I	Coal			
						II	Firewood			
						III	LPG Gas			
	Irrigation					I	Fuel			
						II	Electricity			
						III	Water Union			
	Product insurance (YTL/da)									
	Bee						Beehive			
	Weeding (manually/ mechanically)									
	Stick and tying					I	Tutors			
						II	Rope			
						III	Wire			
	Harvest					I				
	Box					I				
	Sorting and packing					I				
	Transportation and marketing					I				
	Other									

Technical Operations (for second production cycle)

	Stages	Which months	1.1.1.1.1.1.2 Labour			Production records	Inputs			
			Number of workers	Number of days	Total		Kind of product	Quantity	Price	Total
A	Clean up and soil preparation					I	Plastic cover			
B	Soil preparation for planting					I	Cultivation			
C	Planting and transplanting					I	Seeds			
	Fertilization					II	Seedling			
						I	Animal			
						II	Chemical fertilizer			
						III	Chicken			
						IV	Folial fertilizer			
	Spraying					V	Organic fertilizer			
						I	Fungicides			
						II	Insecticides			
	Heating					III	Herbicides			
						I	Coal			
						II	Firewood			
	Irrigation					III	LPG Gas			
						I	Fuel			
						II	Electricity			
	Product insurance (YTL/da)									
	Bee						Beehive			
	Weeding (manually/ mechanically)									
	Stick and tying					I	Tutors			
						II	Rope			
						III	Wire			
	Harvest					I				
	Box					I				
	Sorting and packing					I				
	Transportation and marketing					I				
	Other									

Technology adoption (glasshouse, irrigation, etc.)

A	Fertilizer	Compared to five years ago, change in trend of animal manure application	Increasing? Decreasing?	
B	Pesticide	Compared to five years ago, change in total pesticide use	Increasing? Decreasing?	
C	Irrigation method	2002	Code	
		2006	Code	
D	Field management	Transplant technology	Yes / No	
		Engraft technology	Yes / No	
		Pollination technology (bee or hormone)	Yes / No	
		Growth promoter	Yes / No	
		Seedling production	Yes / No	
		Anti-sunburn net	Yes / No	
		Anti-insect net	Yes / No	
		Insect trap	Yes / No	

Have you seen any fakes of the inputs below in the last five years?

		Yes	No	Nknr
a	Seed			
b	Fertilizer			
c	Pesticide			
d	Seedling			

Equipments and labour

0.1 What do you use to plough your land?

		1)	2)	3)			
		Yes /No /Nknr	Since when	- own - rented - borrowed - free service	If rented, how much do you pay per da?	If owned, when did you purchase it?	Current value
			year		YTL/da	year	
a	Tractor						
b	Draught animals						
c	Manual						
d	Anchor machine						

0.2 How many permanent workers does work in tomato production?

a	in 2006	
b	in 2002	

0.3 How many seasonal workers work in tomato production?

a	in 2006	
b	in 2002	

0.4 How much do you pay workers per day (YTL/day) for tomato production and harvesting?

		Female	Male
a	in 2006		
b	in 2002		

0.5 Which one of the following equipment do you need for tomato production?

	Yes	No	Nknr
Tractor			
Motor plough			
Draught animals/livestock			
Seeder			
Sprayer			
Fumigation backpacks (motorized)			
Manual fumigation pumps			
Weeder (mechanical)			
Well			
Packing table in field			
Other buildings			
Car			

Marketing channels for tomatoes in 2002 and 2006

0.1 When did you start to sell tomatoes? _____

0.2 Do you keep:

		Yes	No	Nknr
A	Detailed production records?			
B	Simple production records?			
C	Selling records?			

0.3 How far is your farm from the road ? _____

0.4 How far is your farm from the nearest wholesale market? _____

0.5 How far is your farm from the provincial wholesale market? _____

0.6 How many wholesale markets are there in your region (near by)?

0.7 Is there a 'packing house' or 'storage house' in your village? (number)

		Storage house	Packing house
a	in 2006		
b	in 2002		

Wholesale market agent

0.1 How many wholesale market agents do you work with? _____

0.2 Description of your main wholesale market

			First	Second	Third
	Number of agents	N°			
a	What percentage of your total product goes to commissioner	%			
b	Which wholesale market do you use?	Name		Questions for main commissioner only	
c	How far is it?	Km			
d	How long has he worked there?	Year			
e	When did you start working with him?	Year			
f	Where does he come from?	Town			
g	Is he also a producer?	Yes / No			
h	What is his main product?	Code			
i	How many producers are working with him?	Number			
j	Where does he buy from?	Region			
k	Where does he sell?	Region			
l	Who does he sell to?				
m	How long has he been selling to this buyer?	Year			
n	Percentage of first quality of commissioner sales	%			
o	Who is responsible for transportation?	You / him			
p	Who is responsible for grading?	You / him			
r	Who is responsible for packing?	You / him			
s	When does he pay?	Day			

u	Is there any privilege?	Yes / No		
t	Does he give offer advance payment?	Yes / No		
x	If yes, what kind?	Cash/ cheque/ in kind		
y	Do you receive other benefits?	Yes / No		
To which one of the following buyers do you sell directly?				
a	Directly to exporter			
b	Directly to manufacturer			
c	Cooperative			
d	Merchants			
e	Supermarket			
f	Directly to street market sellers			

0.3 What is the most important criteria for choosing your buyer ?

Sold to the person in past year, trust in them	
Pays best	
Comes first	
Long-term working relationship	
He has been working in here for a long time	
Advance payment	
Make transport/ come to collect	
Well known in the village	
Relatives / friends	
Relatives / friends/ neighbours sell to him	
Honesty	
Competence	
Fast payment	

Advance payments

0.1 Do you receive and payments in advance?

		Yes/No	From whom?	What for? -input purchase - agri investment - non-agri investment	How many time per year?	How much per year?	Since when?	Do you sometimes have to refund money?	If yes, How long do you need to refund payments?
						YTL	Year	Yes/ No	month
a	in 2006								
b	in 2002								

Price information

0.1 How do you get information about price?

	Yes	No	Nknr
Directorate of wholesale market (announcement by loudspeaker)			
Cooperative			
Relatives/friends/neighbours			
Wholesale market agent			
Brokers (commissioner)			
Local market			
Government			
Media			
NKR			

Services

Input purchase

0.1 Where do you buy your inputs?

		1)	2)	3)
		Private shop	Cooperative	Other
		Yes / No	Yes / No	Yes / No
a	in 2006			
b	in 2002			

Technical assistance

Do you receive technical assistance ? _____ Yes / No

Who provides you with technical assistance for tomatoes?

		1)	2)	3)	4)	5)
	Source of technical assistance	Yes/No	Since when?	As an individual or in a group?	Is it free or do you have to pay?	How often do they visit you at the farm in a month?
			Year	Individual / group	Paid / free	
A	Agronomists or technicians from the group, association. or cooperative					
B	Agronomist or technician from the government					
C	Agronomist or technician from the input suppliers					
D	Agro-industry					
E	Wholesale market agents that buy for supermarkets					
F	Agronomist or supermarket technician					
G	Merchants					
H	Neighbours					
I	Other person or organization					
J	Private adviser					
K	Commodity exchange					

Credit

0.1 Who provides you with credit (for your crops or any other reason)?

		1)	2)	3)	4)	5)	6)
	Source of credit	2002	How much?	2006	How much?	Interest rate	Duration
		Yes / No	YTL	Yes / No	YTL	%	Month
a	Bank						
b	Supermarket procurement unit						
c	Company that buys your products for the supermarket						
d	Association, cooperative, or group						
e	NGO or project						
f	Government						
g	Agro-chemical suppliers						
h	Agroindustry						
i	Intermediaries (buyers)						
j	Neighbours or local lenders						
k	Other people or organizations						

0.2 If you need to expand your vegetable production, which person's or institution's support do you prefer?

	Yes/No	Why?
Agricultural bank		
Agricultural credit cooperative		
Merchant		
Wholesale market agent		
Other bank (.....)		
Other (.....)		

Income

From cropping

	Gross Income		1)	2)	3)
a	Yield	tonnes			
b	Area	da			
c	Or production	tonnes			
d	% sold	%			
	Variable inputs				
	Sterilization (plastic covers and pesticides included)	YTL/da			
	Soil cultivation	YTL/da			
	Animal manure	YTL/da			
	Seeds or seedling (type of seedling:)	YTL/da			
	Chemical fertilizer	YTL/da			
	Chicken manure	YTL/da			
	Foliar fertilizer	YTL/da			
	Organic fertilizer	YTL/da			
	Lime	YTL/da			
	Drip irrigation, fertilizer, and pesticide	YTL/da			
	Bees (Beehives used per da)	YTL/da			
	Water Union payment (water price)	YTL/da			
	Crop insurance	YTL/da			
	Heating (firewood, coal, or LGP)	YTL/da			
	Electricity (for deep well water)	YTL/da			
	Labour (family)	YTL/da			
	Labour (hired)	YTL/da			
	Used (fuel oil, oil)	YTL/da			
	Transportation (hire or fuel oil)	YTL/da			
	Plastic box (eco. Life:...,Price:....YTL, Capacity:.....kg)	YTL/tonne			
	Fixed inputs				
	Rent of land (without greenhouse, open field rent)	YTL/da			
	Rent of land (area under crop or greenhouse)				
	Price of land (without greenhouse, open field price)	YTL/da			
	Plastic cover (economic life :.....)	YTL/da			
	Glass cover (economic life :.....)	YTL/da			
	Well digging (economic life :.....)	YTL/da			
	Diver for well (economic life :.....)	YTL/da			
	Pipe for well (economic life :.....)	YTL/da			
	Drip irrigation system (economic life :.....)	YTL/da			
	Greenhouse construction (full investment cost if there is information)	YTL/da			
	- Amelioration and levelling of land	YTL/da			
	- Soil transfer	YTL/da			
	- Iron	YTL/da			
	- Concrete	YTL/da			
	- Wire	YTL/da			
	- Stove (three per da (economic life:.....)	YTL/da			
	- Timber (economic life:.....)	YTL/da			
	- Labour for construction (without cover)	YTL/da			
	- Labour for glass cover	YTL/da			
	- Labour for plastic cover	YTL/da			
	- material (paint, screw ect)	YTL/da			

	Drainage system (economic life:.....)	YTL/da			
	Other (pipe for irrigation system for open field)	YTL/da			
	Tractor (age:..., second hand price:.....YTL)				
	Big sprayer (age:..., second hand price:.....YTL)				
	Back sprayer (age:..., second hand price:.....YTL)				
	Other agricultural equipments (name:.....age:..., second hand price:.....YTL)				

Other income sources

		YTL /year
A	Agricultural income from on-farm agricultural activities	
B	Income from off-farm agricultural labour	
C	Off-farm agricultural work using own tractor	

Household assets

Does your family have?:

		Yes	No	Nknr
A	Electricity			
B	Running water/potable water in your house			
C	Telephone in your house			
D	TV			
E	Mobile telephone			
F	Car (current second-hand price)			
G	Washing machine			

What kind of investments have you made with your profit from growing tomatoes?

Final questions and perspectives

To finish, I would like to ask you which marketing channels do you prefer from the options below, and why.

		a	b	c	d	e	f	g
		Supermarket	Exporters	Processors	Coop.	Intermediary in the region	The closest wholesale market (municipality or sub-province)	Nknr
1)	Price							
2)	Reliability and continuity in market							
3)	Quantity of tomatoes sold							
4)	Accept rejected							

	product							
5)	Required quality for tomatoes							
6)	Technical assistance							
7)	Credit							
8)	Ease of selling process							
9)	Business seriousness of buyer							
10)	Respect payment agreements							
11)	Fast payments							
12)	Other benefits to producer							

Final question: Do you know anybody in your village who sold his products directly to supermarkets before you sold to supermarkets?

Appendix 4: Tomato production and marketing

Table A4.1: Marketing channel choices and location

	Supermarkets (%)	Industry (%)	Traditional (%)	Total number
Bursa	5.3	88	6.7	75
Canakkale	16.2	37.8	45.9	37
Manisa	0	100	0	50
Izmir	0	100	0	50
Antalya	29.7	0.7	69.4	131
Mersin	0	0	100	50

Table A4.2: Household characteristics

		Mean	cv	min	max	gini
a) Age						
	Supermarkets	42.60	0.17	25	62	
	Industry	47.05	0.23	23	80	
	Traditional	43.89	0.21	19	71	
	Total	46.38	0.22	19	80	
b) Education of family head						
	Supermarkets	7.08	0.48	1	15	
	Industry	6.01	0.44	1	16	
	Traditional	6.71	0.41	0	15	
	Total	6.16	0.44	0	16	
c) At least one family member working off-farm						
	Supermarkets	0.47	1.08	0	1	
	Industry	0.10	2.96	0	1	
	Traditional	0.38	1.27	0	1	
	Total	0.15	2.39	0	1	
d) Non-farm income relative to agricultural income						
	Supermarkets	0.19	3.05	0	4	0.926
	Industry	0.008	6.73	0	0.90	0.839
	Traditional	0.052	4.58	0	2	0.929
	Total	0.022	7.34	0	4	0.933
e) Total income (off-farm + agricultural)						
	Supermarkets	64,361	1.89	5,000	555,000	
	Industry	75,380	1.49	29.5	983,000	
	Traditional	58,158	1.41	0	560,000	
	Total	72,228	1.50	0	983,000	
f) Gross revenue per unit tomato area						
	Supermarkets	10.87	1.03	0.27	44	
	Industry	0.69	0.58	0	16.25	
	Traditional	10.92	0.61	0.15	55	
	Total	2.69	1.98	0	55	

Table A4.3: Tomato production, technologies, practices

	Channel	Mean	cv	min	max	gini
a) Total land area (da)						
	Supermarkets	3.32	1.07	0.12	12	
	Industry	14.30	1.69	0.4	160	
	Traditional	2.13	2.70	0	80	
	Total	11.96	1.86	0	160	
b) Proportion of total land area allocated to tomato production						
	Supermarkets	0.46	0.72	0.05	1	0.364
	Industry	0.42	0.65	0.007	1	0.415
	Traditional	0.61	0.56	0.007	1	0.362
	Total	0.45	0.66	0.007	1	0.283
c) Proportion of land used for tomato production under glasshouses						
	Supermarkets	0.26	1.57	0	1	0.851
	Industry	0		0	1	0.563
	Traditional	0.28	1.42	0	1	0.99
	Total	0.054	3.83	0	1	0.775
d) Proportion of land used for tomato production in open field						
	Supermarkets	0.32	1.49	0	1	
	Industry	0.99	0.02	0	1	
	Traditional	0.12	2.69	0	1	
	Total	0.84	0.45	0	1	
e) Number of seasonal workers						
	Supermarkets	4.91	1.10	1	30	
	Industry	11.75	0.56	2	60	
	Traditional	4.03	1.09	1	30	
	Total	11.03	0.61	1	60	
f) Type of tomatoes produced						
<i>Cherry</i>						
	Supermarkets	0		0	0	
	Industry	0		0	0	
	Traditional	0.03	5.75	0	1	
	Total	0.005	14.66	0	1	
<i>Cluster tomatoes</i>						
	Supermarkets	0.25	1.76	0	1	
	Industry	0		0	1	
	Traditional	0.16	2.27	0	1	
	Total	0.035	5.24	0	1	
<i>Normal tomatoes</i>						
	Supermarkets	0.93	0.27	0	1	
	Industry	0.77	0.55	0	1	
	Traditional	0.94	0.26	0	1	
	Total	0.80	0.50	0	1	
g) Proportion of producers who are sorting tomatoes						
	Supermarkets	0.48	1.06	0	1	
	Industry	0		0	1	
	Traditional	0.59	0.83	0	1	
	Total	0.11	2.83	0	1	
h) Proportion of producers that report production and selling records (resp PR, SR)						
		Detailed PR	Simple PR	SR		
	Supermarkets	9	17	29		
	Industry	14	68	45		
	Traditional	20	60	93		
	Total	43	145	167		

Table A4.4: Credit and investment

	Channel	Mean	cv	min	max	Gini
i) Proportion of producers who have credit						
	Supermarkets	0.41	1.22	0	1	
	Industry	0.46	1.09	0	1	
	Traditional	0.37	1.31	0	1	
	Total	0.44	1.13	0	1	
j) <i>From banks</i>						
	Supermarkets	0.39	1.28	0	1	
	Industry	0.54	0.92	0	1	
	Traditional	0.38	1.27	0	1	
	Total	0.51	0.98	0	1	
k) <i>From cooperatives</i>						
	Supermarkets	0.29	1.59	0	1	
	Industry	0.21	1.93	0	1	
	Traditional	0.15	2.35	0	1	
	Total	0.21	1.97	0	1	
l) <i>From suppliers</i>						
	Supermarkets	0	.	0	1	
	Industry	0.021	6.80	0	1	
	Traditional	0.013	8.61	0	1	
	Total	0.019	7.17	0	1	
m) Proportion of producers who get advanced payment						
	Supermarkets	0.43	1.17	0	1	
	Industry	0.28	1.59	0	1	
	Traditional	0.59	0.83	0	1	
	Total	0.34	1.40	0	1	
n) Variation of land area allocated to glasshouses between 2002 and 2006 (Investment in glasshouses building)						
	Supermarkets	0.027	0.21*	-1	1	
	Industry	0	0*	0	0	
	Traditional	-0.011	0.233*	-1	1	
	Total	-0.007	0.101*	-1	1	
o) Variation of land between 2002 and 2006						
	Supermarkets	0.16	2.68	-0.64	2.3	
	Industry	0.18	2.95	-0.73	6.6	
	Traditional	0.25	3.15	-0.7	4.7	
	Total	0.18	3.03	-0.73	6.6	

* Standard deviation

Perceptions and information

Table A4.5: What is the most important criteria for choosing your buyer(%)

	Total	Super	Ind	Trad
Sold to the person in year past, trust them	28.41	25.64	52.75	13.48
Pays best	36.90	10.26	40.66	41.84
Comes first	2.21	0	5.49	0.71
Long-term working relationship	3.69	12.82	1.10	2.84
Has been working here for a long time	0	0	0	0
Advanced payment	8.12	2.56	0	14.89
Arranges transport /comes to collect	0.37	0	0	0.71
Well known in the village	0.37	0	0	0.71
Relative / friend	3.69	2.56	0	6.38

Relatives / friends/ neighbours sell to him	1.48	5.13	0	1.42
Honest	11.44	25.64	0	14.89
Competent	2.21	7.69	0	2.13
Fast payment	1.11	7.69	0	0

Table A4.6: Information collected by producers through various means

Source of price information	Yes, percentage		Supermarket	Industry	Traditional
Wholesale markets (directorate)	156	39.49	19	1	136
Cooperatives	9	2.27	1	5	1
Relatives	56	14.14	3	38	14
Wholesale market agent	96	24.24	28	5	63
Broker (commissioner)	107	27.02	6	89	12
Local market	36	9.09	4	29	3
Government	2	0.51	1	0	1
Media	1	0.25	0	0	1

Table A4.7: Average prices according to the marketing channel

	Mean	Std	Cv	Min	Max
Total	0.21	0.30	1.42	0.07	3.2
Supermarkets	0.70	0.39	0.56	0.1	1.5
Industry	0.09	0.04	0.45	0.07	1
Traditional	0.71	0.39	0.55	0.107	3.2

Table A4.8: Proportion of producers reporting their preferred marketing channel with regards to the price and the reliability of the transaction (continuity) (%)

Price	Total	Supermarkets	Industry	Traditional
	Supermarkets	16	7	0
Exporters	83	23	21	39
Processors	90	0	90	0
Cooperatives	8	1	5	0
Intermediaries	47	5	17	25
Closest wholesale market	91	8	1	81
Reliability				
Supermarkets	6	2	0	4
Exporters	47	14	15	18
Processors	95	2	90	3
Cooperatives	19	2	9	6
Intermediaries	38	4	6	28
Closest wholesale market	112	20	1	90

Appendix 5: Descriptive statistics (endogenous and exogenous variable of the regressions in Section 6)

Table A5.1: Descriptive statistics (endogenous and exogenous variable of the regressions in Section 6)

	Obs	Mean	Std	Min	Max
Endogenous variables					
Industrial marketing channel	393	0.5394402	0.4990774	0	1
Modern marketing channel	212	0.2311321	0.4225545	0	1
Gross income per decare	392	6.058194	7.682563	0.00733	55
Farm size					
Percentage tomato 2002	372	0.5175976	0.4243063	0	1
Total land 2002	396	70.43851	143.1349	0	1,500
Incentives					
Ratio off-farm/agricultural income	394	0.0994969	0.3412969	0	4
Distance to road	396	1,021.574	1,810.917	0	10,000
Distance to road squared	396	431,4755	1.49e+07	0	.00e+08
Distance to wholesale market	395	87.82532	941.2567	0.2	18,000
Distance to wholesale market squared	395	89,1434.4	1.63e+07	0.04	3 .24e+08
Risks					
Number of children	396	1.002525	0.9181675	0	5
Bank credit 2002	382	0.3455497	0.4761708	0	1
Household characteristics					
Age	395	44.61013	10.19007	19	80
Age squared	395	2,093.638	963.7194	361	6,400
Experience	392	16.04082	9.990193	0	43
Experience squared	392	356.8571	376.766	0	1,849
Assets					
Car	379	0.6094987	0.4885076	0	1
Shifters					
Cooperative	396	0.6060606	0.4892398	0	1
Technical assistance from the government	386	0.1088083	0.3118027	0	1
Technical assistance from the cooperative	389	0.0899743	0.2865134	0	1
Region					
IVI					
Proportion owned land in 2002	365	0.7640491	0.3315628	0	1
Cost of renting land	396	7,739.435	10,264.36	400	55,000

Regoverning Markets

Regoverning Markets is a multi-partner collaborative research programme analysing the growing concentration in the processing and retail sectors of national and regional agrifood systems and its impacts on rural livelihoods and communities in middle- and low-income countries. The aim of the programme is to provide strategic advice and guidance to the public sector, agrifood chain actors, civil society organizations and development agencies on approaches that can anticipate and manage the impacts of the dynamic changes in local and regional markets. The programme is funded by the UK Department for International Development (DFID), the International Development Research Centre (IDRC), ICCO, Cordaid, the Canadian International Development Agency (CIDA), and the US Agency for International Development (USAID).

Agrifood Sector Studies

These studies look at specific agrifood sectors within a country or region. Research studies have been carried out in China, India, Indonesia, Mexico, South Africa, Turkey, Poland and Zambia covering the horticulture, dairy and meat sectors. Part A describes the observed market restructuring along the chains. Part B explores the determinants of small-scale farmer inclusion in emerging modern markets. Using quantitative survey techniques, they explore the impacts on marketing choices of farmers, and implications for rural development.

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