ÇANKAYA UNIVERSITY

GRADUATE SCHOOL OF SOCIAL SCIENCES

MASTER'S THESIS

"TURKEY'S FRESH FRUITS AND VEGETABLES EXPORTS: AN ECONOMETRICAL IMPLICATION"

SEDA SOYGÜR

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This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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TÜRKİYE'NİN YAŞ MEYVE SEBZE İHRACATI: BİR EKONOMETRİK UYGULAMA

ÖZET

Türkiye sahip olduğu iklim şekli, tarıma uygun toprak yapısı ile meyve ve sebze üretiminde oldukça yüksek üretim miktarına sahiptir. Yüksek düzeyde meyve ve sebze üretiminin ülke içerisinde yapılıyor olması tek başına yeterli olmamakla birlikte, bu üretilmiş olan ürünlerin ihracatının yapılarak uluslararası pazarların oluşması da Türkiye açısından oldukça önemlidir. Türkiye'nin yaş meyve sebze ihracatı incelendiğinde istenilen düzeyde olmadığı görülmektedir. İhracatın ekonomik büyüme üzerindeki etkisi ise yadsınamaz bir gerçektir.

Bu çalışmada, reel yaş sebze-meyve ihracatı ile ekonomik büyüme arasındaki nedensellik ilişkisi, 2004-2015 dönemi Türkiye'si için çeyrek veriler kullanılarak incelenmiştir. Çalışmada kullanılan serilerin zaman yolu grafikleri incelendikten sonra Genişletilmiş Dickey-Fuller (ADF), Phillips-Perron (PP) ve Kwiatkowski, Phillips, Schmidt, Shin (KPSS) birim kök sınamaları kullanılarak durağanlık araştırması yapılmış, VAR analizi ile birlikte Johansen eşbütünleşme sınamasına yer verilmiştir. Johansen eşbütünleşme sınaması sonucunda, Türkiye'de reel yaş sebze-meyve ihracatı ve ithalatı ile ekonomik büyüme arasında uzun dönemli bir denge ilişkisinin olduğu sonucuna ulaşılmıştır. Değişkenler arasında uzun dönemli bir ilişkinin bulunması bir vektör hata düzeltme modeli (VECM) oluşturulmasını olanaklı hale getirmiştir. VECM Granger Causality/Block Exogeneity Wald Tests ve Pairwise Granger Causality Tests sınamaları yapılmış ve bu sınamalar sonucunda kısa dönemde ekonomik büyüme ile reel yaş sebze-meyve ihracatı ve ithalatı arasında bir nedensellik ilişkisinin olmadığı sonucuna ulaşılmıştır. Nedensellik sınamalarından sonra çalışmada etki-tepki analizlerine ve Varyans ayrıştırmasına yer verilmiştir. Etki-tepki analizlerinde ekonomik büyümenin reel toplam yaş sebze-meyve ithalatındaki artışa paralel olarak azaldığı, reel toplam yaş sebze-meyve ihracatındaki artışa paralel olarak ise arttığı sonucuna ulaşılmıştır. Varyans ayrıştırması sonuçlarına göre ekonomik büyümede meydana gelen değişikliğin son dönemde % 60'ının büyümenin kendisi, % 23'nün reel toplam yaş sebze-meyve

ithalatı ve %17'sinin ise reel toplam yaş sebze-meyve ihracatı tarafından açıklandığı sonucuna ulaşılmıştır.

Elde edilen bu sonuçlara göre yaş meyve sebze ihracatının arttırılması Türkiye açısından oldukça önemlidir. Bu bakımdan, ihracat yapılan ülkelerin belirlemiş olduğu özelliklerin ve buna bağlı olarak kalitenin sağlanabiliyor olmasının, zirai ilaç kalıntısının en aza indirilebilmesi için gerekli olan önlemlerin ve kontrollerinin yapılabiliyor olmasının, güçlü ve sürdürülebilen pazarlama yapısının oluşturulmasının, AR-GE kaynaklarının geliştirilmesinin ve bu alandaki ihracat teşviklerinin arttırılmasının gerekliliği önem arz etmektedir.

TURKEY'S FRESH FRUITS AND VEGETABLES EXPORTS: AN ECONOMETRICAL IMPLICATION

ABSTRACT

Turkey with its climate and arable soil structure has high potential for production rates in fruit and vegetable production. Hence it is not only sufficient to produce fresh vegetables and fruits within the country, it is also crucial to be present in international markets for Turkey. When Turkey's exportation rates of fresh fruit and vegetables are examined it is seen that the exportation rates are not in the expected level. Thus it is an incontrovertible fact that exportation has a crucial effect on economic growth.

Present study aims to investigate the causal relationship between fresh vegatable and fruit exportation and economic growth via using quartile data of 2004-2015 of Turkey. After the timeline graphics of data sets are investigated, stability tests were conducted by using augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski, Phillips, Schmidt, Shin (KPSS) unit root tests, Johansen cointegration test is conducted with VAR analysis. As the resutls of data gained by Johansen cointegration test, it is concluded that there is a long term balanced realtionship between Turkey's real fresh vegetable and fruit export and import and economic growth. Due to the existence of a long term relationship between the variables, it is possible to create a Vector Error Correction Model (VECM). VECM is created via Granger Causality/Block Exogeneity Wald Tests and Pairwise Granger Causality Tests and as a result of these tests it is concluded that there is no short term causal realtionship between real fresh vegetable/fruit export and import and economic growth. After the causal research is conducted, present study investigated impulse-response analysis and variance analysis. According to the results of impulse response analysis it is concluded that economic growth is decreased in parallel to real total fresh vegetable-fruit import whereas it is increased in parallel to real total fresh vegetable-fruit exportation. According to the variance analysis results this growth

stem from 60% of growth itself, 23% of real total fresh vegetable-fruit import and 17% of real total fresh vegetable-fruit export.

According to the gathered data for the present study, it can be concluded that raising exportation rates of fresh fruit and vegetables is substantial for Turkey. In order to achieve these rates it is important to achieve the quality standards of the countries that are being exported, being able to control and take precautions to minimize the pesticide residue, create a strong and sustainable marketing structure, improve research-development resources and the necessity to increase export incentives in this area.

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ABBREVIATIONS

AKİB	Mediterranean Exporter Associations
DİE	Turkish Statistical Institute
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GAP	Good Agricultural Practices
Re & De	Research and Development
TSI	Turkish Standards Institude
TOBB	The Union Of Chambers and Commodity Exchanges of Turkey
GDP	Gross Domestic Product
GNP	Gross National Product

INTRODUCTION

As a result of the increase of world population, clean water resources and natural food products started to decrease both in quantity and quality hence agricultural lands started to be spoiled. Agricultural sectors began to more important with the issues of global warming, inorganic fruit and vegetables, problems of obtaining healthy products. Therefore, 14 European food retailers[1] that cared about food quality and safety created EUREP-GAP protocol in 1999 and started the application of "Good Agricultural Practices" (GAP). Good Agricultural Practices ensured that environmental damages are avoided as well as human and animal health safety is considered primary factors in the process of food production and stressed on sustainability.

Scientific research shows that fruit and vegetables contained crucial vitamins and beneficial compounds for human health, besides they build up immune system against diseases. Therefore it can be said that fruit and vegetables can be considered as a crucial product group for human health, hence the production rates of fruit and vegetables should be increased in accordance with the population growth. Besides vegetable and fruits are as important to the national economics as they are for human health.

Fresh vegetable and fruit trade concerns the producers that produce these products, production unions and cooperatives, carriers, mediators and commisioners, wholesalers and retailers, exporters and importers, local and central public administrations and most importantly a vast majority of people that are in the position of consumer of these products. From European Union's perspective Turkey's vegetable production is 20% of total EU nation's production and fruit production is 40% (TÜİK, 2015). Although this production rate is significant, only 7-8% of this production could be exported.

[1] Tesco, MetroGrup, Marks&Spencer, Norma, McDonalds, Coop, Conad, Somerfield, Waitrose, Lidl, Ahold, Asda,Migros, Sainsbury's, Tengelmann.

Fresh vegetable and fruit production has an important place in Turkey's agricultural economy. It can be said that fresh fruit-vegetable production continues all year in Turkey due to the feasible soil and convenient climate. Although production rates of fresh fruit-vegetable is high in Turkey, as it can be seen from the data the loss of quantity and quality after production stage is highly considerable. Hence, the loss of quality in the delivery stage from producer to consumer creates negative results for both producer and consumer. Therefore it is crucial to develop more suitable marketing chains in order to stablize delivery systems for fresh fruit and vegetables.

As mentioned above certain problems can be detected in product marketing and organization in fresh fruit-vegetable sector in Turkey. This sector is mainly controlled and determined by the consumers/buyers hence certain losses can be seen in productions. Another main problem in Turkey's fresh fruit-vegetable production is the costs. The production costs in Turkey for fresh fruit-vegetable are considerably high compared to other countries that produce the same kind of products. Because the prices of inputs such as energy, fertilizers, pharmaceuticals which are included in fixed cost are very high.Therefore it becomes more difficult to compete against other countries. In that sense, the production costs should be decreased.

The aim of present study is to evaluate fresh fruit-vegetable production and exportation in Turkey according to the present data; to reveal the effects of fresh fruit-vegetable exportation on the economic growth by using econometric methods; determining main problems of the sector and presenting solutions to these problems. The main difference of present study from previous studies is that present study only about the relationship between fresh vegetable-fruit exportation and economic growth via econometrical analysis discarding total exportation rates.

The reasons for choosing this subject for this study can be considered as; production of fresh fruit and vegetables and also exportation is made at that region, so it is the main source of livelihood for the farmers and exporters who live in this region. Therefore a significant amount of farmer and exporter employment is observed in this region.

Present study consists of six sections. First section of the study aims to explain Turkey's fresh vegetable-fruit production and gives brief information about

exportation rates of fresh vegetable-fruits. The factors that affect fresh vegetable-fruit production is discussed in the second section and the third section consists of literary review about the subjects discussed in the prior sections. The fourth part is questioning the existence of an existing relationship between the economic growth and foreign trade based on the definition of economic growth.In the fifth section of the study econometrical analysis, ampirical study and evolution of the data gained from the analysis is presented. The last section of the study includes the conclusion and solution recommendations.

SECTION 1

1. PRODUCTION & EXPORTATION OF FRESH FRUIT AND VEGETABLE IN TURKEY

Turkey has a high potential in fresh fruit and vegetable production thanks to its climatic characteristics and it is one of the most significant fresh fruit and vegetable producer countries. According to the data of the Turkish Statistical Institute, Turkey's total fresh fruit and vegetable production in Turkey was 46.7 million in 2014. 17.1 million of it came from fresh fruit production and 28.6 million of it came from fresh vegetable production (TSI, 2015). Turkey is among the leader of fig, apricot, cherry and quince producers in the world and it is the third biggest producer of tomato, pepper and cucumber.

In this section, fresh fruit and vegetable production in Turkey between the years 2002-2014 will be studied in details in parallel with the statistical data.

1.1.Fresh Fruit Production Amount

Table 1 shows the rates of almond, hazelnut, walnut, chestnut, and pistachio production between the years of 2002-2014 are presented.

Table 1: Nuts (Fresh, Tons)

Year	Almond Production	Hazelnut Production	Walnut Production	Chestnut Production	Pistachio Production
2002	41 000	600 000	120 000	47 000	35 000
2003	41 000	480 000	130 000	48 000	90 000
2004	37 000	350 000	126 000	49 000	30 000
2005	45 000	530 000	150 000	50 000	60 000
2006	43 285	661 000	129 614	53 814	110 000
2007	50 753	530 000	172 572	55 100	73 416
2008	52 774	800 791	170 897	55 395	120 113
2009	54 844	500 000	177 298	61 697	81 795
2010	55 398	600 000	178 142	59 171	128 000
2011	69 838	430 000	183 240	60 270	112 000
2012	80 261	660 000	203 212	57 881	150 000
2013	82 850	549 000	212 140	60 019	88 600
2014	73 230	412 000	180 807	63 762	80 000

Source: http://www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=71

Table 1 presents thatwith respect to fresh nuts production, hazelnut production is the first and fresh walnut production is the second. Hazelnut production was 600.000 tonnes in 2002 and the amount of production kept fluctuating through the years. In 2008, hazelnut production reached its peak with 800.791 tonnes. The lowest amount of production was made in 2014 as 412.000 tonnes. When the 2002-2014 period is considered in general, we see a 31% decrease in hazelnut production. Walnut production, which is the second biggest production, increased in general since 2002 and reached its highest level in 2013 with 212.140 tonnes. Between the years 2002-2014, there is a 51% increase in fresh walnut production. Between the years 2002-2014, the highest rate of production increase is observed in pistachio production with a rate of 129% and almond comes the second with 79%. The rate of increase in chestnut production is 36%.

Table 2: Other Fresh Fruits and Olive Production (Tons)

Year	Apple Production	Pear Production	Medlar Production	Quinces Production	Loquats Production	Olive Production
2002	2 200 000	340 000	4 600	110 000	11 800	1 800 000
2003	2 600 000	370 000	5 000	110 000	12 000	1 676 000
2004	2 100 000	320 000	4 200	80 000	9 250	1 600 000
2005	2 570 000	360 000	4 300	100 000	12 000	1 200 000
2006	2 002 033	317 750	4 471	106 214	12 310	1 766 749
2007	2 457 845	356 281	4 217	95 015	12 415	1 075 854
2008	2 504 494	355 476	4 310	95 395	12 619	1 464 248
2009	2 782 365	384 244	4 205	96 282	12 986	1 290 654
2010	2 600 000	380 003	4 362	121 085	12 112	1 415 000
2011	2 680 075	386 382	4 323	127 767	12 093	1 750 000
2012	2 888 985	442 646	4 606	136 577	12 105	1 820 000
2013	3 128 450	461 826	4 651	139 311	12 902	1 676 000
2014	2 480 444	462 336	4 134	107 243	12 900	1 768 000

Source: http://www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=68
www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=1073

Table 2 shows thatapple production is the biggest in the category that includes other types of fruits and it is followed by pear, quince, loquat, and medlar respectively. Apple production was the biggest in 2013 and the lowest in 2006. We see an increase of 12% from 2002 until 2014. The highest rate of increase in production between the years 2002-2014 is observed in pear with a rate of 36%. Whereas the increase in loquat is 9%, there is a 10% decrease in medlar production and 2.5% decrease in quince production.

37 countries in the world produce olives. 95% of the 9.8 million hectares of olive production areas of the world are found in the Mediterranean region. Considering the distribution of the world's Dane olive production of around 13 million tonnes, following Spain, Italy, and Greece Turkey has its place in the fourth rank with its more than 1 million tone of Dane olive production (www.zae.gov.tr). Olive production was the biggest in 2012. We see a 1.8% decrease in olive production between the years 2002-2014.

Table 3 presents 2002-2014 data concerning "grape, banana, kiwi, avocado and fig" included in the other fruits category and "orange, tangerine, lemon, and grapefruit" included in the citrus fruits category.

Table 3: Other Fresh Friuts and Citrus Fruits (Tons)

Year	Grape Production	Banana Production	Kiwi Production	Avocado Production	Fig Production	Orange Production	Tangerine Production	Lemon Production	Grapefruit Production
2002	3 500 000	95 000	2 500	400	250 000	1 250 000	590 000	525 000	125 000
2003	3 600 000	110 000	5 500	370	280 000	1 250 000	550 000	550 000	135 000
2004	3 500 000	130 000	4 000	400	275 000	1 300 000	670 000	600 000	135 000
2005	3 850 000	150 000	8 000	475	285 000	1 445 000	715 000	600 000	150 000
2006	4 000 063	178 205	10 962	492	290 151	1 535 806	791 255	710 401	179 988
2007	3 612 781	189 107	15 242	931	210 152	1 426 965	744 339	651 767	162 621
2008	3 918 442	201 115	19 530	958	205 067	1 427 156	756 473	672 452	167 765
2009	4 264 720	204 517	23 689	1 169	244 351	1 689 921	846 390	783 587	190 973
2010	4 255 000	210 178	26 554	1 207	254 838	1 710 500	858 699	787 063	213 768
2011	4 296 351	206 501	29 231	1 316	260 508	1 730 146	872 251	790 211	218 988
2012	4 234 305	207 727	37 247	1 463	275 002	1 661 111	874 832	710 211	226 738
2013	4 011 409	215 472	41 635	1 599	298 914	1 781 258	942 226	726 283	228 799
2014	4 175 356	251 994	31 795	1 824	300 282	1 779 675	1 046 899	725 230	229 555

Source: www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=65
www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=66
www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=67

According to Table 3, grape is the most produced fruit between the years 2002-2014 and it is followed by orange. 2011 is the year in which grape was produced the most. The rate of increase in the production of grape is 19% between the years 2002-2014. In terms of percentages, the highest rates of increase in production are observed in kiwi and avocado productions between the years 2002-2014. As for the increases observed in the productions of other types of fruits; these are followed by banana (165%), grapefruit (84%), tangerine (77%), orange (42%), lemon (38%) and fig (20%) respectively.

Table 4 presents TSI data concerning the amounts of production (in tonnes) between the years 2002-2014 for bitter orange, mulberry, pomegranate, strawberry, Trabzon persimmon, locust, raspberry, and blueberry included in the other fresh fruits category. Blackberry has been produced in Turkey since 2012 and blueberry since 2013. The biggest amount of production in this category in 2014 is observed in pomegranate. Pomegranate is followed by strawberry, mulberry, Trabzon persimmon, locust, raspberry, blackberry, bitter orange, and blueberry.

Table 4: Other Fresh Fruits

Year	Bitter Orange	Berry Production	Pomegranate Production	Strawberry Production	Persimmon Production	Carob Production	Raspberry Production	Blackberry Production	Billberry Production
2002	3 000	55 000	60 000	145 000	15 000	13 500	1 850	-	-
2003	2 650	55 000	80 000	150 000	15 000	14 000	1 950	-	-
2004	2 500	50 000	73 000	155 000	17 000	14 000	2 200	-	-
2005	3 000	55 000	80 000	200 000	18 000	12 000	2 200	-	-
2006	2 985	51 558	90 737	211 127	19 297	12 388	1 997	-	-
2007	2 972	61 665	106 560	250 916	23 713	12 097	2 103	-	-
2008	3 090	65 140	127 760	261 078	24 302	14 413	2 050	-	-
2009	2 901	67 986	170 963	291 996	25 281	14 003	1 976	-	-
2010	2 346	75 096	208 502	299 940	26 277	14 172	1 980	-	-
2011	2 170	76 643	217 572	302 416	28 295	13 978	2 059	-	-
2012	2 132	74 170	315 150	351 834	32 392	14 166	4 080	2 363	-
2013	2 592	74 600	383 085	372 498	33 232	14 261	3 942	2 403	170
2014	2 158	62 879	397 335	376 070	33 470	13 985	4 587	2 402	180

Source: www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=67
www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=70

According to Table 4, there is an increase in the production of all fresh fruits except for bitter orange between the years 2002-2014 in terms of percentages. There is a 28% decrease in bitter orange production. The highest production increase is observed in pomegranate and this is followed by strawberry, raspberry, and persimmon respectively. The lowest production increases between the years 2002-2014 are observed in mulberry production with a rate of 14% and in locust production with a rate of 4%.

Table 5: Stone Fruits (Tons)

Year	Peach Production	Plum Production	Apricot Production	Wild apricots Production	Cherry Production	Sourcherries Production	Cornel Production	Oleaster Production	Jujube Production
2002	455 000	200 000	315 000	37 000	210 000	100 000	11 000	4 700	-
2003	470 000	210 000	460 000	39 000	265 000	145 000	11 900	5 000	-
2004	372 000	210 000	320 000	30 000	245 000	138 000	12 000	4 900	-
2005	510 000	220 000	860 000	34 000	280 000	140 000	11 500	5 000	-
2006	552 775	214 416	460 182	23 277	310 254	121 499	9 303	4 312	-
2007	539 435	240 874	557 572	32 160	398 141	180 917	9 722	4 324	-
2008	551 906	248 736	716 415	34 159	338 361	185 435	11 010	4 686	-
2009	547 219	245 782	660 894	34 470	417 694	192 705	14 472	4 697	-
2010	539 403	240 806	450 000	26 132	417 905	194 989	12 517	4 600	-
2011	545 902	268 696	650 000	26 138	438 550	182 234	12 427	4 905	-
2012	611 165	300 046	760 000	35 483	470 887	186 443	12 368	4 896	-
2013	637 543	305 393	780 000	31 609	494 325	179 752	11 838	4 666	142
2014	608 513	265 490	270 000	38 210	445 556	182 577	10 982	4 093	248

Source: www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=69

Table 5 presents the amounts of production between the years 2002-2014 for hard seed fruits (peach, plum, apricot, wild apricot, sour cherry, cranberry, silverberry, jujube). Jujube production in Turkey has started in 2013 in Turkey just like the blue berry. According to data for 2014, the greatest amount of production in hard seed fruits category is observed in peach. Peach is followed by cherry, apricot, plum, sour cherry, wild apricot, cranberry, silverberry, and jujube respectively. Considering the percentages, we see a decrease from 2002 to 2014 in apricot, cranberry, and silverberry productions. Particularly apricot production is the lowest in 2014. Unfavourable climatic conditions have significant effect on this decrease. The biggest rate of increase between the years 2002-2014 is observed in cherry with a rate of 112% and in sour cherry with a rate of 82%.

Considering all fresh fruit and vegetable productions presented in the tables, grape is observed to be the most produced fruit in 2014, just as the previous years. This product has a production volume of over 4 million tonnes and its share in total production is 22%. Second comes the citrus group (orange, tangerine, lemon, grapefruit) with a production of 3.7 million tonnes and a share of 20%. Apple is the third most produced fruit with approximately 2.5 million tonnes of production.

1.2.Fresh Vegetable Production Amount

Table 6: Production Amount of Fresh Fruits Cultivated for the Fruits (Tons)

Year	Tomato Production	Cucumber Production	Pepper Production	Okra Production	Eggplant Production	Squash Production	Pumpkin Production	Melon Production	Water Melon Production
2002	9 450 000	1 670 000	1 750 000	31 000	955 000	280 000	65 000	1 820 000	4 575 000
2003	9 820 000	1 783 120	1 790 000	35 500	935 000	295 000	73 000	1 735 000	4 215 000
2004	9 440 000	1 725 000	1 700 000	43 000	900 000	292 000	72 000	1 750 000	3 825 000
2005	10 050 000	1 745 000	1 829 000	36 000	930 000	294 000	74 000	1 825 000	3 970 000
2006	9 854 877	1 799 613	1 842 175	36 843	924 165	288 336	76 632	1 765 605	3 805 306
2007	9 936 552	1 670 459	1 757 226	36 992	863 737	267 142	70 740	1 661 130	3 796 680
2008	10 985 355	1 682 776	1 796 177	37 543	813 686	279 451	80 915	1 749 935	4 002 285
2009	10 745 572	1 735 010	1 837 003	38 432	816 134	307 419	82 552	1 679 191	3 810 205
2010	10 052 000	1 739 191	1 986 700	36 748	846 998	314 340	89 368	1 611 695	3 683 103
2011	11 003 433	1 749 174	1 975 269	36 662	821 770	317 705	93 099	1 647 988	3 864 489
2012	11 350 000	1 741 878	2 042 360	36 001	799 285	302 374	93 612	1 688 687	4 022 296
2013	11 820 000	1 754 613	2 159 348	33 545	826 941	293 709	95 076	1 699 550	3 887 324
2014	11 850 000	1 845 749	2 232 308	33 103	827 380	299 858	93 672	1 707 302	3 885 617

Source: www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=62

Considering the fresh vegetable production composition of Turkey for the year 2014, it is observed to have a share of 83% in the ‘vegetables grown for their fruits” category which includes products such as tomato, cucumber, pepper, aubergine, and watermelon. Tomato is the most produced vegetable in the year 2014 with a production volume of 11.8 million tonnes and its share in total vegetable production is 42%. This product is followed by watermelon with a production of 3.9 million tonnes and pepper (sauce, bell and green peppers) with a production of 2.2 million tonnes (Table 6).

Table 7: Legumes, Edible Tuber Crops (Tons)

Year	Green Pea Production	Bean Production	Cowpea Production	Broad Beans Production	Calavance Production	Onion Production	Garlic Production	Leek Production	Carrots Production
2002	69 000	515 000	15 000	44 000	43 000	2 260 000	96 000	290 000	235 000
2003	54 000	545 000	14 000	44 000	52 000	1 970 000	125 000	305 000	405 000
2004	58 000	582 000	13 000	49 000	54 000	2 247 000	109 000	295 000	438 000
2005	122 000	555 000	13 500	49 000	54 000	2 270 000	109 000	326 000	388 000
2006	89 632	563 763	16 077	48 721	55 837	1 966 271	96112	320 091	394 725
2007	87 743	519 968	14 101	43 273	58 710	2 044 582	98195	256 397	641 953
2008	88 828	563 056	14 983	42 885	59 392	2 175 341	104970	252 286	591 538
2009	95 046	603 653	15 955	44 389	69 051	2 018 853	105363	251 120	593 628
2010	90 191	587 967	16 591	41 929	70 614	2 065 478	98170	244 812	533 253
2011	103 787	614 948	19 967	41 962	78 871	2 295 196	100648	246 144	602 078
2012	101 959	621 036	20 566	40 471	84 134	1 886 785	105201	229 359	714 280
2013	107 549	632 301	21 336	40 243	76 751	2 058 324	114967	240 391	569 855
2014	105 279	638 469	19 353	39 502	77 051	1 938 255	116089	223 303	557 977

Source: www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=62
www.turkstat.gov.tr/PreIstatistikTablo.do?istab_id=1209
www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=63

Table 7 shows thatonion, which is included in the eatable root and tuber crops group, comes the first in the group with a production of over 1.9 million tonnes and it comes the fourth considering the other fresh fruit and vegetable productions given in Table 6. Considering the data in the table 7, it is observed thatthe highest increase in the rate of production between the years 2002-2014 is in carrot production (137%). This is followed by kidney bean with an increase of 79%, green peas with an increase of 53%, cow peas with an increase of 29%, beans with an increase of 24% and garlic with an increase of 21%. There is an increase in the production of broad bean and leek in the same period.

Table 8 presents the amounts of production for tuberous root vegetables and vegetables with eatable leaves, namely; radish, turnip, celery, cabbage, lettuce, artichoke, spinach, and chard plants between the years 2002-2014.

Table 8: Tuberous Vegetables and Leafy Vegetables (Tons)

Year	Radish Production	Turnip Production	Redbeets Production	Celeriac Production	Cabbages Production	Lettuce Production	Artichokes Production	Spinach Production	SwissChard Production
2002	175 000	1 600	-	-	720 000	345 000	27 000	220 000	7 000
2003	173 000	1 500	-	-	721 000	340 000	28 000	220 000	7 300
2004	170 500	1 000	5 000	16 500	700 950	377 000	30 000	213 000	7 000
2005	170 000	2 300	6 000	21 000	675 900	424 000	36 000	238 000	6 500
2006	168 588	7 680	9 599	15 593	687 112	441 242	35 007	242 231	6 110
2007	155 811	1 628	8 564	15 348	647 678	428 059	33 807	235 731	6 497
2008	161 863	1 892	8 106	16 537	674 617	439 641	36 320	225 746	6 480
2009	158 029	1 787	8 048	16 890	706 855	438 038	34 859	225 343	6 396
2010	155 673	1 693	7 861	14 758	693 002	419 298	29 070	218 291	5 211
2011	157 588	1 494	7 815	14 659	710 056	424 252	33 460	221 632	5 184
2012	146 442	1 537	7 540	17 049	701 465	419 066	32 173	222 225	5 953
2013	178 250	1 938	7 286	16 265	720 257	436 785	34 014	220 274	6 207
2014	192 988	1 509	7 161	14 791	733 081	468 513	34 576	207 676	6 060

Source: www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=63
www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=64

When the fresh vegetable production rates for the year 2014 which are presented in Table 8 are studied, it is observed thatthe highest rate of production belongs to cabbage and it is followed by lettuce, spinach, and radish. The lowest rate of production is observed in turnip. The highest rate of production increase between the years 2002-2014 is observed in lettuce with a rate of 35% and it is followed by artichoke with a rate of 28% and radish with a rate of 9.7%.

Table 9 presents the amount of production between the years 2002-2014 in terms of purslane, parsley, rocket, peppergrass, mint, dill, cauliflower, broccoli, and mushroom productions.

Table 9: Leafy Vegetables (Tons)

Year	Purslane Production	Parsley Production	Rocket Production	Cress Production	Mint Production	Dill Production	Cauliflower Production	Broccoli Production	Mushroom Production
2002	2 000	44 000	1 400	1 450	5 500	1 600	90 000	-	-
2003	2 200	45 000	1 500	1 400	6 000	1 400	108 000	-	-
2004	2 000	47 000	2 400	1 500	6 500	1 500	110 000	6 500	15 000
2005	2 750	57 000	2 750	1 600	7 750	2 000	117 000	8 500	17 000
2006	4 232	53 189	2 497	1 924	9 591	2 456	136 098	16 178	21 833
2007	3 311	48 972	2 557	1 952	9 376	2 637	135 145	17 360	23 426
2008	3 815	52 346	2 940	1 922	9 824	2 677	150 843	19 890	26 526
2009	3 690	58 145	3 592	2 143	10 998	2 837	157 051	20 541	19 501
2010	4 936	56 332	4 058	2 380	11 772	2 978	158 579	26 493	21 559
2011	5 501	54 956	4 524	2 750	12 160	2 836	162 134	29 076	27 058
2012	6 945	56 614	7 689	4 476	12 598	2 901	169 097	30 807	33 750
2013	7 102	57 619	8 962	7 371	14 143	3 806	158 996	34 649	34 494
2014	5 797	58 351	8 791	8 732	14 700	4 603	161 331	40 818	38 767

Source: http://www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=64

When the vegetables with edible leaves presented in Table 9 for the year 2014 are studied, it can be observed thatthe highest rate of production belongs to cauliflower and it is followed by parsley, broccoli, and mushroom respectively. The rate of increase in production concerning the products in this group is higher than the fresh vegetables in the other groups.

In the study, the export of fresh vegetables and fruits in period of 2002-2014 is being examined in the next stage after the production of fresh vegetables and fruits in Turkey is examined.

In 2002, fresh fruit and vegetable exportation of Turkey was 545 million dollars in 2002, it reached up to 2.4 million dollars in 2014 (Table 10). In 2014, around 37% of the total production of the citrus group including lemon, orange, tangerine, and grapefruit was exported (TSI, 2015).

Note: The export quantities of the following products are presented enclosed.

Table 10: 2002-2014 Fresh Fruit and Vegetable Production Amount

Groups	2002		2003		2004	
	Quantity (Kg)	Value US($)	Quantity(Kg)	Value US($)	Quantity(Kg)	Value US($)
Fresh Vegetable	566.209.000	139.220.000	705.249.000	197.303.000	609.002.000	218.710.00
Fresh Fruit	1.048.198.000	405.914.000	950.552.000	498.746.000	1.014.370.000	585.494.000
Total Amount	1.614.407.000	545.134.000	1.655.801.000	696.049.000	1.623.372.000	804.204.000
Groups	2005		2006		2007	
	Quantity (Kg)	Value US($)	Quantity (Kg)	Value US($)	Quantity (Kg)	Value US($)
Fresh Vegetable	563.565.000	273.409.000	694.768.000	340.828.000	1.007.837.000	553.063.000
Fresh Fruit	1.240.464.000	695.211.000	1.414.805.000	810.336.000	1.186.777.000	918.520.000
Total Amount	1.804.029.000	968.620.000	2.109.572.000	1.151.164.000	2.194.614.000	1.471.583.000
Groups	2008		2009		2010	
	Quantity (Kg)	Value US($)	Quantity (Kg)	Value US($)	Quantity (Kg)	Value US($)
Fresh Vegetable	1.052.000	672.000	1.055.711.515	653.478.303	1.046.064.649	720.190.275
Fresh Fruit	1.284.000	1.087.000	1.715.477.982	1.294.068.109	1.856.451.672	1.454.383.642
Total Amount	2.336.000	1.759.000	2.771.345.747	1.947.546.412	2.902.516.321	2.174.573.917
Groups	2011		2012		2013	
	Quantity (Kg)	Value US($)	Quantity (Kg)	Value US($)	Quantity (Kg)	Value US($)
Fresh Vegetable	1.090.393.818	688.132.353	1.078.986.278	645.608.444	1.242.180.420	691.838.548,85
Fresh Fruit	2.118.528 835	1.640.283.331	1.941.625.138	1.525.961.157	2.097.801.623	16.388.273
Total Amount	3.208.922.653	2.328.415.685	3.023.893.470	2.171.569.601	3.339.982.043	2.333.066.584,93
Groups	2014					
	Quantity (Kg)	Value US($)				
Fresh Vegetable	1.166.584.109	710.183. 63,13				
Fresh Fruit	2.359.877.416	1.662.658.799,30				
Total Amount	3.526.461.525	2.372.842.462,43				

Source: http://www.akib.org.tr/tr/ (Mediterranean Exporter Associations, Evaluation report of fresh fruit and vegetable production, 2002/2014)

The rate of fresh fruit and vegetable exportation between the years of 2002 and 2014 increased 118%. The rate of fresh vegetable exportation was the highest in 2013 and the lowest in 2002; the rate of fresh fruit exportation was the highest in 2014 and the lowest in 2003. Comparing the fresh fruit and vegetable exportations, it seems that the rate of fresh fruit exportation is higher (Table 10).

The analysis of the exportation amounts of fresh fruit and vegetable (Kg) shows that Russian Federation is observed to be the first in 2006. It is followed by Ukraine, Romania, and Saudi Arabia respectively (Annex Table 1). Just as 2006, Russia was the first at the top 20 list of fresh vegetable-fruit exporting countries in 2007, too and it was followed by Romania, Iraq, and Ukraine (which came the second the previous year) respectively (Annex Table 2).

As for Turkey's fresh fruit and vegetable exportation in 2008, Russian Federation is the first just as in 2006 and 2007. Iraq comes the second, Ukraine comes the third and Bulgaria the fourth (Annex Table 3). According to the quantity of Turkey's exportation of fresh fruit and vegetable, Russian Federation is again the country that Turkey most exports to, second comes Iraq, Bulgaria, and Ukraine has exchanged their ranks compared to the previous year (Annex Table 4). Fresh fruit and vegetable exportation composition of Turkey in 2010 is the same with the year 2008. Russian Federation comes the first, Iraq comes the second, Ukraine comes the third and Bulgaria comes the fourth (Annex Table 5). Data for 2011 shows thatthe first three countries Turkey most exports to, were the same as the previous year (Russian Federation, Iraq, Ukraine) and yet, Saudi Arabia left Bulgaria behind and found its place in the fourth rank (Annex Table 6).

The rank of the countries Turkey most exported doesn't change in 2012 and it is the same as the year 2011 (Russian Federation, Iraq, Ukraine, and Saudi Arabia). The first three countries are again Russian Federation, Iraq, and Ukraine in 2013 and yet, Saudi Arabia, which comes the fourth in 2011 and 2012, is observed to go back to the 7^{th} rank and give place to Syria, instead (Annex Table 7-8).

When Tables 1-8 presented in Annex part of the research are studied it can be observed that the countries Turkey least exported to were Belgium and Italy in 2006

and 2007; Italy and France in 2008 and 2009; France and Sweden in 2010 and 2011; Czech Republic and Italy in 2012 and France and Belgium in 2013.

Table 11: Top 20 Countries That Fresh Fruit and Vegetable Exported in 2014

No	Country	2014	
		Quantity (Kg)	Value US ($)
1	Russian Federation	1.337.753.812	940.017.891
2	Iraq	677.378.519	293.671.286
3	Ukraine	258.194.928	158.760.500
4	Bulgary	164.746.484	106.272.098
5	Germany	114.006.824	181.992.415
6	Romania	107.291.656	75.854.385
7	Georia	105.744.565	34.807.422
8	Saudı Arabia	100.585.741	57.125.057
9	Bellarus	59.029.916	42.186.245
10	Syria	53.180.882	20.512.049
11	Poland	45.713.185	34.882.089
12	Holland	44.851.440	48.032.947
13	Moldovia	44.488.301	25.603.905
14	Azerbaıjan-Nakhchıvan	40.840.345	16.705.451
15	United Kingdom	31.794.860	38.404.561
16	Serbia	25.408.127	16.453.216
17	Egypt	21.870.284	9.964.077
18	Italy	21.631.664	45.657.756
19	France	11.193.505	17.691.331
20	Belgium	6.074.764	16.332.994

Source: http://www.akib.org.tr/tr/ (Mediterranean Exporter Associations, Evaluation report of fresh fruit and vegetable exportation, 2013/2014 January to December)

The fresh fruit and vegetable exportation for the year 2014, it can be observed that Russian Federation is the first again, as it is the case since 2006. The ranking is the same as the year 2013 and Russian Federation is followed by Iraq and Ukraine. France and Belgium are the countries Turkey least exported to, just as the year 2013. Considering the 2006-2014 period in general, it can be said that Russian Federation is the country which Turkey exports fresh fruit and vegetable the most. On the other hand Italy and France are the countries that Turkey exports fresh fruit and vegetable the least. The amount of fresh fruits and vegetables that Turkey exported the most are respectively lemon, tangerine, tomato and orange in 2006. Marrow and mushroom were the products that were exported the least whereas tomato, lemon and tangerine preserved their leadership in 2007, and orange took the fourth rank instead of potato. The first three products at the table of the most exported fresh fruits and vegatebles did not change in 2008 but only potato was replaced by onion. Pear, fig and mushroom were the products that were exported the least in 2007 and 2008. The fresh fruits and vegetables that were exported the most in 2009 were the same as the ones exported in 2006, only with a change in ranking. Whereas lemon was the first in the table of 2006, then it was replaced by tomato in 2009. Just as the 2007, fig and mushroom were the products that were exported the least. The first three products that were exported the most did not change in 2010 and grape was the fourth product. Marrow and fig were the least exported fresh fruit and vegetable. The most exported fresh fruit and vegetable in the 2011-2013 period were tomato, lemon, tangerine, and orange just same as the year of 2006. Chestnut and tea are observed to be the least exported fresh fruit and vegetable (Annex Table 9-16).

Table 12: Top 20 Products That Were Exported in 2014

No	Product	2014	
		Quantity (Kg)	Value US ($)
1	Tangerine	646.108.647	369.104.096,83
2	Tomatoe	591.830.761	430.223.859,79
3	Lemon	414.051.198	286.355.373,07
4	Orange	344.078.607	190.013.188,32
5	Grape	260.466.350	203.418.175,38
6	Onion	225.331.529	37.140.532,70
7	Grapefruit	181.230.483	96.739.059,57
8	Pomegranate	140.070.128	109.297.772,85
9	Apple	116.793.089	42.047.586,15
11	Cucumber	103.808.805	77.548.864,60
12	Pepper	82.759.133	80.463.535,98
13	Squash	54.246.919	34.610.500,62
14	Cherry-Sourcherry	50.521.786	144.323.706,67
15	Peach	40.065.459	35.302.414,86
16	Aprıcot	27.198.065	27.753.637,78
17	Eggplant	20.864.911	14.044.779,78
18	Fig	18.029.000	42.748.372,75
19	Strawberry	14.624.025	17.137.425,05
20	Chestnut	11.621.966	40.406.544,51

Source: (Mediterranean Exporter Associations, Evaluation report of fresh fruits and vegetable exportation in 2014)

SECTION 2

FACTORS AFFECTING THE FRESH FRUIT AND VEGETABLE PRODUCTION

This section focuses on the factors affecting the fresh fruit and vegetable production in Turkey. Some of these factors are seeds, seedling-sapling, the use of hormones, agricultural pesticides and the problem of residues, smallness of agricultural facilities, marketing problems and so on.

Plant growing stage starts from the seeds. Seed is significant in terms of quality and fertility. The number of cultivation sites in our country and in the world is decreasing day by day. In Turkey, the strategy of increasing the number of cultivation sites to increase the amount of production is not applied. The most important way to increase the amount of production is, using the inputs efficiently. Thus; the quality of the seeds is very important (The Union of Turkish Agricultural Chambers, 2008).

Fruit seedling cultivation in Turkey has developed significantly. Selection of the saplings to be used from fruit trees is a very important process. In order to receive abundant, high quality and healthy products from the selected saplings, they must be vaccinated and protected against viruses. There are some deficiencies in Turkey with regards to the use of certified saplings. There is no sufficient control in sapling sales. Research institutes and agricultural faculties must work in coordination in order to ensure that the seedlings-saplings to be grown are resistant against diseases and in harmony with the climatic and soil conditions. Seedling-sapling producers must be guided by knowledgeable and competent institutes (The Union of Turkish Agricultural Chambers, 2008).

Greenhouse cultivation enables that the amount and quality of products are better compared to fruits and vegetables grown outside and that, products are available in the market at all times. The plant produces hormones it its own body. On the other

hand; hormones that are called as plant growing regulators are widely used in greenhouses. Pollens are not produced in the low temperature and low light of greenhouses, even if they are produced, their fertility is not good. This is why hormones are used for pollination and fertilization. As the prices of energy are high in our country, there is no sufficient heating for the fruits and vegetables that are cultivated in greenhouses. Heating is only for protecting against frost. When the sufficient and necessary amount of heating is applied, the costs are rather high. When the hormones used in greenhouse cultivation are applied in proper amounts, the fertility and quality of products increase and the product becomes exportable. The use of hormones is supervised and certified by the Ministry of Agriculture and Rural Affairs. These hormones are analysed in the laboratories that are under the control of the Ministry of Agriculture and Rural Affairs and the amount of pesticide residues is detected. Unless the weather is too cold or unless it is necessary the use of hormones must be avoided in our country (The Union of Turkish Agricultural Chambers, 2008).

The fruits and vegetables exported by Turkey or that find place in the domestic market have the problem of chemical material residues due to pest control measures. Producers and exporters are aware of this problem. In order to protect our foreign trade activities, high quality checks are performed and then the products are exported to several countries such as Russia and the EU. Low risk pesticides are preferred in the EU and in the USA in order to give the least harm to human and environmental health. EU countries do not allow the use of certain chemicals. That's why they analyse the products cultivated in our country. If they find any such residues in their laboratory examinations, they send the products back to our country. Today, there are on-going studies about the number of pesticide drops, the differences among the chemicals used in pest control, the amount of chemicals that reach the target when sprayed on the product, the ways to improve fertility by applying pesticides and decreasing the costs of application of pesticides (The Union of Turkish Agricultural Chambers, 2008).

The problem of smallness of facilities causes a problem in terms of agriculture and exportation in Turkey. Recommendations and ways of solutions are sought for the development of agricultural facilities. Whereas the problem of smallness of facilities

is discussed to be resolved with an amendment in the law of inheritance, the settlement, education, social security and the lives of agricultural workers continue in rural areas. Agricultural workers and the society living in rural areas is very important for the production that must be provided with advantages in terms of income, welfare and social security. Since the input prices of agricultural enterprises are high, the larger the company is in scale the production and marketing costs are insomuch lower. (Aksoy, Barış 2013)

Deterioration in the quality of the product created by the mentioned factors and thus the failure in complying with international standards in quality brings also marketing problems. When considered that the production and marketing stages are the complements of each other, it is possible to say that these problems experienced in marketing cause the agricultural enterprises to be affected negatively.

When the marketing problems in production are examined, the exporter companies face with problems such as product and service variety, quality and new product development strategies (Keegan and Green, 2011). In the international market, it is an important stage to determine which products the countries need. The producer companies are required to develop their product policies and to provide continuity in the international market. (Keegan ve Green, 2011).

It is seen that the competition is very strong in marketing stage of the produced products. It is seen that the companies follow a price cutting policy as a result of the competition. The companies, which market their products in international markets, are required to give importance to quality first of all, they proceed with the strategy of quality products-high price or quality products-reasonable price. Foreign companies use the methods such as value engeneering, activity based costing in order to reduce the costs and to produce quality products at the same time.(Doğan, Marangoz, Topoyan, 2003)

It is not possible to provide transportation conveniently to every other country from Turkey, also the product transport is quite expensive. Exporter companies' delivering the products on time, even before the time specified for delivery in the transit process will bring forth to gain an advantage over the competitor companies. It is required to make production schedule of the product correctly, to plan the transportation process

properly and to use inventory methods for the completion of transit operation smoothly. (Doğan, Marangoz, Topoyan, 2003).

Companies are required to pay attention to quality control in order to maintain their presence in the international market. The level of quality is required to be checked in production stages. In these periods when the international competition environment extremely increase, the level of quality cannot be fully achieved. For exporting countries, the quality of the products is extremely important. The reasons such as using poor quality materials for the purpose of reducing the costs, inefficient use of manpower factor, incorrect or incomplete preparation of the product to be exported, inadequate operating of R & D (Research & Development) department, incomplete or incorrectly sharing of the information between the production department and sales department causes the quality to be low. In order to produce quality products, it is required to increase the controls of official operations and laboratories. (Doğan, Marangoz, Topoyan, 2003)

It is an important factor to deliver the products, which are produced and will be exported, to the buyers. Supply of the products in shorter time than the time of production will enable to become more advantageous over the competitors. When change demands occur in product, the demand will be met without any problems about time. (Doğan, Marangoz, Topoyan, 2003)

Along with the globalization, the standardization in international trade is becoming important day by day. Standardization is important also in terms of producers, consumers, wholesalers, and retailers, as well. When the production is made quality and planned, losses in the product become minimal. In our country, problems are experienced in implementation of standards. The producers are required to produce the products accordance with the criteria of the countries to which the export will be made. Turkish Standards Institute has stated the conditions for the packaging, labeling and sampling related to the product to be marketed in domestic market and foreign market.(Albayrak, 2009)

We encounter the packaging problem in the international market. Since the packaging increases the the price of the product to be placed on the market, the producers prefer cheap and poor quality of packaging. The package to be made is

required to be made pursuant to the product and the purpose of product. Producer companies give more importance to the labeling of the products with the legal regulations in the country. Labelling provides information about products and producer company. Producer companies are required to continue the packaging and labeling within the framework of legal regulations in order to maintain their continuity in the international market. (Emeksiz, Albayrak, Özer, Güneş, Taşdan, Özçelik, 2005)

SECTION 3

LITERATURE REVIEW

Turkey has a significant position in the world in terms of variety in fresh fruit and vegetable market. Fresh fruit and vegetable market contributes much to agricultural production and national income. Turkey is among the top 10 countries in fresh fruit and vegetable exportation, therefore Turkey is quite significant in terms of the exportation of agricultural products. Considering the agricultural products that are exported, fresh fruits and vegetables have high rates. In this section, Turkish and international research about fresh fruit and vegetable production, exportation and the ones that are revealing out the relation between economic growth and fresh fruit and vegetable exportation are given place.

Koç (1990) concluded at the end of his research that there were some problems in sales and marketing and that fresh fruit and vegetable exportation was low compared to production. He attributed this to the restrictive practices of the European Union and the fact that, the Mediterranean countries were exporting similar products.

Güllenoğlu (1993) conducted economic analysis on fresh fruit and vegetable production, transportation, and cold storing performed in the Marmara Region and told about the economic effects of cold storing.

Güneş (1968) stated in his research that the spoilage time for fresh fruits and vegetables was fast and thus, exporters had difficulties and he emphasized the significance of storing. In another research, Güneş (1970) stated that there were some problems in final stage for the products to take their place in the market and in delivering the agricultural products to consumers or exporters.

Başkonuş (1982) made research about the exported fresh fruits and vegetables, marketing cost analysis and exportation of legumes. He studied the incentives and

measures used in exportation. He also made research about fresh fruit and vegetable production, exportation, importation and, the marketing costs of facilities.

In his article themed as "Agricultural Products Market Regulation Rules in Common Market Community and the Analysis of the Issue with respect to Turkish Fresh Fruit and Vegetable Exportation", Baumeister (1984) stated that if the population of countries that were a member to the common market community decreased, the amount of consumption and the amount of fresh fruit and vegetable consumption would also decrease in these countries. He mentioned that there were several countries exporting fresh fruits and vegetables and that Turkey needed to be different from its competitors. Baumeister (1984) further stated that brand and advertising were important and moreover packaged products with high quality would always be preferred over the others.

Blanckertz (1984) discussed the fresh fruits and vegetables exported from Turkey to Germany in terms of quality checks and results, the faults made, and the measures to eliminate these. He stated that the market to be exported had to be studied first and the standards had to be conformed within the framework of the conditions of competition. Exportation had to take place according to the quality and taste in order to meet the demands of that country.

Emeksiz (1988) gave information about the marketing and development of the citrus fruits production in Turkey and also he mentioned the ways to develop citrus fruits exportation.

Şenyurt (1994) analysed the agricultural products, the structure and development of foreign trade in Turkey. He studied the foreign trade and exportation activities, trade structure and developments in Turkey between the years of 1980-1992. He evaluated the developments of the period within the framework of cause-effect relation. He stated that, production of agricultural products including fresh fruits and vegetables increased after 1980 and there was a significant improvement of foreign trade market and volume. He further said that the Southern Africa, Australia, Sweden, North Korea, Canada, Indonesia, TRNC, India, Algeria, Morocco, South Korea, and Yugoslavia were important markets which were developing more concerning the agricultural products exportation of Turkey.

In his research themed as “The Effects of EU Harmonized Packaging Labelling Standards on Turkey’s Fresh Fruit and Vegetable Exportation” Küçükkoca (1996) conducted studies for flawless fresh fruit and vegetable exportation of Turkey. EU harmonized packaging and labelling standards and the significance and effects of these criteria were emphasized in this research.

Özdoğan (1997) emphasized that Turkey had problems in packaging, standardization, storing, and transportation with respect to fresh fruit and vegetable exportation and he offered some solutions for these problems.

In his research, Türkmen (1998) mentioned of the problems observed in Turkey’s fresh fruit and vegetable market practices and offered some solutions for these problems. In details he explained the problems about certain marketing stages such as shipping, storage, and transportation which is followed by the fresh fruit and vegetable production stage.

Akyıldız (1999) expressed his opinions about the markets which frozen fresh fruit and vegetable exportation had to be directed to and about the characteristics, structure and opportunities of the markets to be exported to and he studied the Japanese market in details.

Özcan and Akbulut (1999) focused on the Black Sea Region in their research and stated that the fruit and vegetable market was suffering from storage problem which was the lack of qualified cold stores that are leading to spoilage of products and reduction of quality. And eventually producers faced loss because of amount and product price were effected by the low quality.

In his research themed as “Fresh Fruit and Vegetable Trade in Turkey and Wholesales Markets Practices”, Bayuk (2000) gave information about the structure of Trabzon Wholesales market and its trading practices. He studied trading and condition of fresh fruit and vegetable in Turkey and the condition of the wholesales markets among the markets.

Mutlu, S. Yurdakul (2003) studied the exportation structure concerning the citrus fruits in Çukurova Region. They gave information about the production of citrus groups in Turkey and in the world, exportation practices and figures and the factors

affecting exportation. Mutlu submitted the results of the analysis of the factors which were affecting exportation to relevant exportation units. In his research, he also included the problems faced by the companies which were exporting citrus groups in Çukurova Region. He concluded that apart from the exporters, incentives also had to be granted to the producer farmers.And at the end of the research, the supporting policy was chosen the most important factor affecting the exportation of citrus fruits and also he emphasized the importance of quality of the product and packaging for the development of exportation.

In his research, M. Emre Akkılıç (2003) studied the procurement of the production-related factors regarding fruit and vegetable trade and the demands regarding the preference of local producers in the purchase process.

Karadeniz and Özkan (2004) claimed that there are some problems in Antalya region regarding the exportation of citrus fruits. They stated that there had to be coordination between the customer and the exporter and also there should be an organization for marketing and distribution of the products.

Karahocagil and Tonalıoğlu (2004) also stated that Turkey experienced some difficulties now and then regarding its exportation of fruits and vegatables. They emphasized the importance of physical appearance, shape and packaging of the citrus fruits for competition with other countries and stated that the stages from production until exportation had to be supported.

Öztürk et al (2004) analysed the problems of companies exporting fresh fruits and vegetables and reported that there were certain agricultural factors and some problems caused by exportation. According to Öztürk et al; as the facilities are small and dispersed in form, there is no coordination among fruit and vegetable producers and because of the lack of sufficient knowledge, there emerge some agricultural problems. The other problems mentioned in the research are; financial problems, non-coordination of companies, short-term orientation of companies, insufficient quality and fertility of the products which are exported, inability to produce the same products without the use of pesticides or the problem of residues, problems faced in the freight market, insufficient number and quality of cold stores, problems faced in packaging and the insufficiency of technology.

Sayın et al (2004) stated that the purpose of the study called as EUREPGAP in the EU, which is uttered as GLOBALGAP recently, was to investigate the effects of fresh fruit and vegetable exportation.

Turhan et al (2004) reported that leader fresh fruit and vegetable retailers of the European market prioritized the GLOBALGAP protocol and that Turkey would also conform to the GLOBALGAP protocol. As there were many small-sized facilities in Turkey, it would be rather costly for them to receive GLOBALGAP and thus, it would be more appropriate for them to receive certificates as producer groups. They stated that associations had to be founded to support producers in order to facilitate competition in fresh fruit and vegetable exportation and offer them consultancy service regarding the GOBALGAP protocol.

In his research themed as "Organic Agriculture and Foreign Trading in Turkey and in the World and Turkey's Harmonization with the EU", Çetin (2005) mentioned about the significance of organic production within the scope of agricultural production. Çetin investigated the condition and market of organic agricultural products in Turkey and in the World. He stated that legal regulations in Turkey had to be in conformity with the EU regulations in order to make exportation to the countries in the European Union.

Akbay et al (2005) emphasized the importance of branding agricultural products and stated that contracted agricultural practices had to be applied more in Turkey in order to gain competitive advantage against the other countries regarding fresh fruit and vegetable exportation. They also stated that demand for organic products growing more and more each day and that domestic organic agriculture had to be improved further.

Özsü (2005) compared Turkey and EU in fruit and vegetable trade and emphasized the differences.

In his research, Tuncer (2005) stated that fresh fruits and vegetables produced in Turkey were offered both in domestic and foreign markets, but the lost of freshness leads to loss of quality during transportation. So, it was necessary to improve the level of the transportation system used in delivering the products to consumers and to protect the producers with the improvement of labour standards in this way.

In their research, Atış and Artukoğlu (2005) investigated the fresh fruit and vegetable production in Turkey and in the EU. In addition to this, they made research about the EU common fruit and vegetable markets. And then they offered some recommendations for the improvement of Turkey's competitive power in the fruit and vegetable market.

Özsu (2005) claimed that as Turkey's various climatic regions and vegetation ensures a significant place in fresh fruit and vegetable production in the world. That fresh fruit and vegetable production, eventually lead to high exportation rates which contributed to the national income.

In his research titled as "The change of Turkey's Structure of Exportation and its Relation with Development: Co-integration and Causality Test Application", where he included fresh fruit and vegetable exportation as well, Erdoğan (2006) discussed the relation between exportation and development and emphasized the significance of exportation for Turkey. He also reported that there was no causality relation between exportation and development before 1980 but that a mutual causality relation emerged after 1980.

In his research titled as "Current Condition and Problems of Companies Exporting Citrus Fruits in Hatay and the Ways to Improve Exportation", Gökçek (2006) studied the exportation and production stages for citrus fruits in Hatay. Gökçek also evaluated the quality of the products exported by Turkey and investigated the developments observed in production stage. Gökçek further investigated the licenses and certificates required for exportation to EU countries and discussed the condition of the exportation of citrus fruits and the factors affecting exportation.

According to Korkmaz et al (2011), Turkey differs from other agricultural countries in that cultivation can be made four seasons in Turkey. Fruit and vegetable production in Turkey shows differences on regional basis and also production differs among cities.

Yulafçı and Cinemre (2007) states that there are some difficulties in marketing of fresh fruit and vegetable in Çarşamba Plain, such as storing, cooperation area, and lack of necessary areas in production process.

In his research themed as “The Structure of Fresh Fruit and Vegetable Exportation in Hatay and the Ways to Improve It”, Tahhuşoğlu (2007) mentioned about the significance of fresh fruit and vegetable production and the necessity of granting incentives for the improvement of exportation.

Gürbüzler (2008) reported about the problems faced in fresh fruit and vegetable exportation in Turkey. He stated that the rate of exportation was rather low compared to production amount and that it was necessary to improve the quality in production of the fruits and vegetables. He also drew attention to the necessity of the resolution of problems such as carrying and storing.

Özdemir (2008) stated that the EU applies some restrictions against Turkey in fresh fruit and vegetable exportation according to EU import regulations. He describes these restrictions as technical restrictions arising from policies.

According to Yılmaz (2008); fresh fruit and vegetable consumption in Turkey is abundant and the country’s ecological structure is suitable for agriculture. In his research, he presents the problems in Turkey. These are; the structural problems, lack of organisations in agricultural functions, insufficiency of good agricultural practices, problems faced in the product marketing stage, and the quality loss faced until the products are delivered to the consumers.

Çetin (2009) claimed that fresh fruits and vegetables could get spoilt easily and thus, it was necessary to develop storing systems and Albayrak (2009) investigated the marketing methods of fresh fruit and vegetable trade.

Polat (2010) stated that despite the high production of fresh fruit and vegetable in Turkey, the rate of exportation is low. It is necessary to take relevant measures in order to improve fresh fruit and vegetable exportation in Turkey. An efficient program must be developed for the stages from production to marketing of the products and it must be aimed to improve the rate of exportation in terms of value and amount. Negative factors that affect the fresh fruit and vegetable exportation must be eliminated. Loss of quality and amount during transportation must be reduced in order to preserve the quality of the products. Polat also mentioned the improvement of quality and reliability is a crucial factor in order to improve

international exportation and to gain competitive advantage against other companies which are producing fresh fruits and vegetables.

Canik and Alparslan (2010) stated that many of the fresh fruit and vegetable producers in Turkey are small-sized producers with low capitals and insufficient production technologies. Fresh fruits and vegetables are mainly offered into the market directly by their producers and thus, market opportunities cannot be used properly. According to them, an association should be founded which will play an effective role for the producers and consumers as a solution.

Niyaz and Demirbaş (2011) stated that the fruits and vegetables are produced in Turkey's regions which have warm climatic conditions. Grape, apple, pear, peach, apricot, and plum are among the most produced fruits in Turkey. Fresh fruit production is mainly performed in İzmir, Manisa, Aydın, and in the Mediterranean and Aegean regions on the regional basis.

Sayılı and Civelek (2012) stated that Turkey is one of the leader countries in the world in fresh fruit and vegetable production but the exportation rate is low compared to production. They attribute this to the insufficiency of ensuring the quality condition for exportation of the products.

Emeksiz et al (2014) discussed product marketing on the basis of agricultural production and exportation in Turkey. They claimed that improvement is needed in fresh fruit and vegetable exportation in terms of packaging, labelling and high quality production that conforms to the European Union standards and they emphasized the necessity for taking relevant measures for these in Turkey.

SECTION 4

ECONOMIC GROWTH

Economic growth is a very important concept for both developed and developing countries. It is seen that many definitions of economic growth are made in literature of economics. Economic growth, with a simple definition, may be defined as the expansion in goods, services and production capacity. In other words, it is the increase in production capacity of the economy. Economic growth is measured based on the increase in the Gross Domestic Product (GDP) or the Gross National Product (GNP) or income per capita. (Parasız, 1997: 4). There are factors such as labor force, natural resources, capital among the factors affecting the economic growth. (Ülgener, 1976: 409).

While the countries with developed economy consider the change in the real GDP (Gross Domestic Product) within the years, the developing countries dwell upon the concept of economic development. Economic development includes also economic growth.(Seyidoğlu, 2006: 829).

The growth is measured in two ways. Firstly, economic growth is calculated by current accounts. The economic growth calculated by using GDP is called nominal growth. While, the economic growth calculated by using real GDP is called real growth.

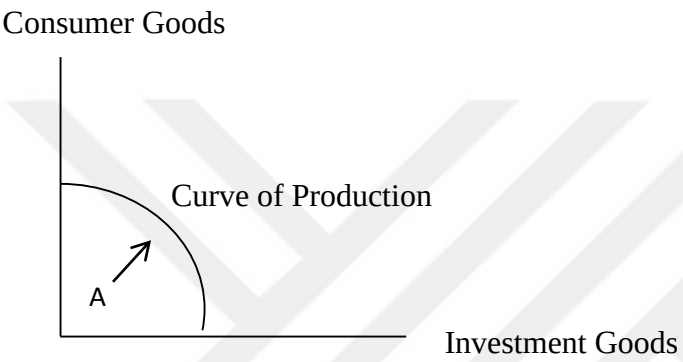
$$t \text{ year in grow rate} = g = 100 \times [(GDP\ t - GDP\ t-1) / GDP\ t-1]$$

As seen in the above equation, the economic growth is calculated by using a country's GDP and the percentage change within the year.

There are factors such as technological developments, increase in level of education and health level, productive increase in the products among the factors affecting the

economic growth. Each factor affects the growth with different situations. (Kıraçlar, Kaya, 2005).

The development of goods and services shows change from country to country. Each economy has production limits. It is possible to show this limit mentioned by the curve of economic possibilities as can be seen in the following table.



Any point to be found on the curve shows the short term marginal benefit obtained by using all existing factors. As seen in the above table, if the economy the p is at the point A, it is required to increase up to the curve of production possibilities, thus production capacity will increase and the growth will occur. For speaking about economic growth, the increases in GDP per capita in the country are required to be continuous and real. real change results of GDP (Gross Domestic Product) of the, enables us to make decisions on whether the economy grows (Cesur 2006). It is also known that, a long-term economic growth will occur along with the development of existing technologies and the introduction of new goods and services into the sector if full employment has been provided in economy of the country. (TEK, 2003).

Exports is required to be supported in order to enable the economic growth to ocur fast and stably. When exports is supported, the production of goods will be promoted, the economic development will also be affected from this, as well. Economic growth will be developed as a result of increase in export and production.Export growth will provide foreign currency income to the country.

Increasing the production facilities in the country will support the production of quality goods. (Mc Kinnon, 1964; Findlay,1973 ve Kindleberger, 1964).

Export is required to increase in order to increase the rate of economic growth in a country. When export increases, the demand for products increases, thus will the production will also increase. The Export-Led Growth Hypothesis is shown as (ELGH) in the literature (Şimşek, 2003:1). For the countries to develop an export-led strategy, they are required to make production in that field, in which they have a comparative advantage in the terms of free trade. Maintaining the continuity of trade without separating the country's economy from the international trade indicates that the products produced are required to be determined not only by domestic market but also by the demands of foreign markets. (Kazgan, 1988: 32– 38).

When we compare the economic growth among countries – it is not at the same level for each country. While some countries have been developing very quickly, some countries have been developing slowly, and some countries could not develop at all. Some growth models have been developed in the literature in order to examine the difference in economic growth. The most important ones of these models are exogenous economic growth models, Harrod-Domar and Neo-classical (traditional) growth models, endogenous economic growth models, R & D and technology-based growth models. (Berin, 2007) Technology has a very important role in the economic growth functions. (Adak, 2007).

Production is quite important factor for the realization of economic growth. The growth is realized by economic production (Bocutoğlu, Berber, Çelik, 2000). Output production is realized as a result of using the inputs of "Capital (Capital) Labour Force/Effort (Labor)". Increase in labor force and capital increases in connection with the technology.

When the country economy is examined, if the unemployment rate is high and there is not any increase in employment despite the economic growth has been realized, the economic approaches are required to be examined again. (Ok, 2008).

The development of industry proceeds along with the development of economy. Beside the development of the industry, also the agricultural sector is a part of

economic development. During the economic development, the agricultural and industrial sectors are required to develop in parallel. (Aydemir ve Pıçak, 2008).

Foreign currency income is required for the development of countries and the realization of economic growth. Foreign currency inflow is realized by export. When importance is given to the export, the foreign currency inflow which enters the country will continue to increase, as well, and both export and economic growth will develop because of this policy. (Takım, 2010: 2).

Economic growth plays an important role in determining living standards of the countries. When the economic growth in the country is compared with the economic growth realized in other countries, it is seen that it plays an important role in political elections and the realization of social welfare in the country.

The biggest impact of the economic growth is the material welfare relationship, which the people living in the country by being affected from and they continue in their lives. What makes the economic growth the most effective is the material element. (Aghion and Howitt, 2009). Determination of material welfare is one of the matters that are required to be given the most attention. Economic growth changes depending on the increase in production realized in the country. Production growth may not develop the living standards which the people have spiritually.Çepni, 2008).

In literature of economics, the presence of the relationship between foreign trade and economic growth is a matter of debate. The debate is regarding whether there is a relationship between economic growth and foreign trade as well as the direction of the relationship, if there is a relationship. In this research, the causality relation between real fresh fruit and vegetable exportation and economic growth was studied using quarter data for Turkey for the period between the years 2004-2015.

SECTION 5

5. ECONOMETRIC ANALYSIS

5.1. Econometric Method

The concept of stability has a significant role in time series analysis. In order to achieve meaningful relations among the variables used in the analysis, the series have to be stationary or homogenous at the same level. Stability means that the average and variance of a time series are stationary and the covariance between these two values is related to the difference between the two time values rather than the time studied (Korkmaz and Uygurtürk, 2008:125).

When calculating the regression between the time series, a high R^2 value may commonly appear even if there is no significant relation between the variables. This is called as 'fake regression'. The high R^2 value that may appear as a result of the similarity in trends, does not reflect a real relation. In order to eliminate this problem, it is necessary to check whether the series are stationary or not (Gujarati, 2009). In other words; it is necessary to determine the degree of stability for the series through unit root tests. If the series are stationary at the same degree, this is a real relation and the regression is also real. These series are called 'co-integrated' series. Thus; the series have to be co-integrated series, i.e. same-level homogeneous series for the regression to be a real regression.

If a time series become stationary after taking difference for d times, this series is stated to be integrated at d level and this is expressed as I(d) (Gujarati, 2001: 726).

Unit root tests are made in order to determine the stability of series. If a series include a unit root, it is not stationary and it has to be made stationary (Gujarati, 2009).. Augmented Dickey-Fuller (ADF) (1981), Phillips-Perron (PP) (1988) and Kwiatkowski, Phillips, Schmidt, Shin (KPSS) (1992) unit root tests are used in this research in determining whether the series have unit roots or not.

5.1.1. Augmented Dickey Fuller (ADF) Unit Root Test

In stability test, it is checked whether the series have unit roots or not. The ADF (Augmented Dickey Fuller) test was used for the first time to investigate whether the series included in this research had unit roots or not. Constant, constant-free and trend procedure are followed in ADF test. According to that if the series has become stationary in a trend process, this value is taken as basis without looking at the other processes. If the series has not become stationary, constant term testing, if stability is still not achieved, constant term free testing is performed and the value that brings the series stationary is taken as basis at the end of this process (Enders, 1995: 256). As Dickey and Fuller (DF) (1979) decision criterion, corrected t table

named as τ (tau) is used in test since the t-statistics is deviated. Equations formed in DF test are the following:

$$\Delta y_t = \gamma y_{t-1} + u_t \quad (1)$$

$$\Delta y_t = \alpha_0 + \gamma y_{t-1} + u_t \quad (2)$$

$$\Delta y_t = \alpha_0 + \alpha_1 t + \gamma y_{t-1} + u_t \quad (3)$$

Δ is the first difference processor; u_t is the error term and y_t is the series used. There is only stochastic trend in equation no (1). Stochastic trend and the constant term (α_0) are modelled together in equation no (2) and both the constant term and the stochastic and deterministic trend (t) in equation no (3). The most significant assumption in DF (1979) test is that error terms are assumed to have White Noise process[2]. Yet; if there is a relation in the subsequent values of the error term in

[2] White noise is a type of significant stationary stochastic process used in econometrics. This process is zero averaged with σ^2 fixed variance and without autocorrelation. The error term is assumed to be distributed in classical normal regression models and is expressed as $u_i \sim NBD(0,\sigma^2)$.

regression analysis in case of auto-correlation, test is developed for soundness of the Least Squares estimations. This test is also named as Augmented Dickey Fuller (ADF) unit root test. Equations formed in DF test are as the following in ADF test:

$$\Delta y_t = \gamma y_{t-1} + \sum_{i=1}^{N} \Psi \Delta y_{t-i} + u_t \quad (4)$$

$$\Delta y_t = \alpha_0 + \gamma y_{t-1} + \sum_{i=1}^{N} \Psi \Delta y_{t-i} + u_t \quad (5)$$

$$\Delta y_t = \alpha_0 + \alpha_1 t + \gamma y_{t-1} + \sum_{i=1}^{N} \Psi \Delta y_{t-i} + u_t \quad (6)$$

N term included in the equations express the lag number of the dependent variable determined by the criteria of Akaike Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwartz Criterion (SC), BayesianInformation Criterion (BIC), Hannan-QuinnCriterion (HQ) or Campel-Perron. Null and alternative hypothesis related to ADF unit root test is formed as the following:

H_0: The series is not stationary (includes unit root).

H_1: The series is stationary (doesn't include unit root).

ADF test depends on the estimation of γ parameter and its t statistic. Null hypothesis is rejected if it is negative and significantly different from zero in statistical terms.

On the other hand; inclusion of the differences of the terms in the test equation into the model may create a problem in ADF test. This is because it can result in loss in the degree of freedom and decrease in the power of test procedure. Thus; Phillips-Perron (PP) (1988) unit root test is performed in addition to the ADF test. PP unit root test considers the presence of unknown shaped of autocorrelation and the

conditional variance condition of the error term. Furthermore; it makes use of a non-parametric correction for series relation (Enders, 2004:251).

5.1.2. Phillips-Perron (PP) Unit Root Test

Another unit root test used in this research is PP unit root test. In DF test, as stated before, error terms are assumed to be independent in terms of statistics and to have fixed variance. So, in order to use DF test, one needs to be sure that there is no correlation between the error terms and that they have fixed variance. In their research, Phillips and Perron (1988) extended this assumption about error terms, i.e., they drew back from restrictive assumptions about error terms. The reason for this is the use of error terms or their past values as the moving average (MA)[3] So, in PP test, the autoregressive (AR) process[4] in the Dickey-Fuller test was transformed into ARMA[5] process.

Beginning of the use of MA process enables more powerful testing of the trend stability concept. Particularly in series including trends, Phillips-Perron test is more powerful than the Dickey-Fuller test when MA processes are on the rise. On the (Perron, 1990).

PP unit root test depends on the addition of the Correction Factor (CF) into the ADF process. Asymptotic distribution of the test statistics is the same as the ADF test. Null and alternative hypothesis of PP test also correspond to ADF unit root test.

H_0: The series is not stationary (includes unit root).

H_1: The series is stationary (doesn't include unit root).

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[3] If the lagged error term of the series is affecting the current error term, MA process is defined. In a moving average process, estimation value of the variable is related to the estimation value of the error terms. MA process can be expressed as; $x_t = e_t - a_1 e_{t-1} -\ldots\ldots, t=1,2\ldots n$

[4] The dependant variable in AR model is the function of its past value. Many time series data also includes this process. This condition can be expressed as: $x_t = a_0 + a_1 x_{t-1} + a_2 x_{t-2} + a_3 x_{t-3} +\ldots..+\varepsilon$. Whereas a_0 refers to the constant term here, coefficients such as a_1 , a_2 , $a_{3\ldots..}$shows the relation between lagged values and the current value.

[5] Many time series may include both AR and MA processes. Such process is defined as ARMA. The equation $x_t = a_0 + a_1 x_{t-1} + \ldots. + a_p x_{t-p} + e_t - b_1 e_{t-1} -\ldots\ldots+ b_q e_{t-q}$ shows the ARMA process.

5.1.3. Kwiatkowski, Phillips, Schmidt, Shin (KPSS) Unit Root Test

The final unit root test used in this test is KPSS unit root test suggested by Kwiatkowski, Phillips, Schmidt and Shin (1992). The purpose of this test is to clear the deterministic trend in the observed series to stabilize the series (Kwiatkowski et al 1992: 159). The variable taken as time series in KPSS test includes components; a rational terms, a constant disruptive term (Sycewska, 2010:4). According to that when t is the deterministic trend, φ is the rational process and ε_t is the error term, it is expressed as;

$$yt = \beta_t + \varphi_t + \varepsilon_t \quad (7)$$

The rational process in the equation (φ_t) is expressed as;

$$\varphi_t = \varphi_{t-1} + u_t \quad (8)$$

The error term u_t included in the rational process is assumed to be $(0, \sigma_u^2)$ with independent and mono distribution properties. In this case, stability of the series is tested with $\sigma_u^2 = 0$ null test. When the variance of error term is zero, then the error term needs to be (u_t) constant and thus, stationary in φ_t process described as a rational process (Kwaitkowski, Phillips, Schmidt, Shin, 1992: 162-163). KPSS test is actually the testing of the hypothesis claiming that a rational term possesses zero variance with the Lagrange Multiplier (LM) (Kwaitkowski, Phillips, Schmidt, Shin, 1992:159).

The hypothesis formed in KPSS test, are different from ADF and PP tests in that

H_0: The series is stationary (doesn't (include unit root).

H_1: The series is not stationary (includes unit root).

If LM test statistics is absolutely smaller than KPSS test critical values at 1%, 5% or 10% significance levels, H_0 hypothesis cannot be rejected and the series is determined to the stationary or not and including unit root or not.

5.1.4. Vector Auto-regression Analysis (VAR)

VAR analysis is one of the methods used in analysing the dynamic effects of casual shocks in interrelated time series analysis and variables system. In VAR analysis, it is possible to reveal out the unexpected shocks of variables on error terms. According to Sims (1980), VAR analysis aims detection of the relations among the variables instead of parameter estimation. On the other hand; the main purpose is not only to detect the one-sided relation among the variables but to reveal out the forward and backward connection among the variables, as well (Kearney and Monadjemi, 1990: 197-217). VAR analyses are much more flexible than the single variable AR models. This is because VAR analyses consider the lagged values of other variables as well as the variable's own lagged values (Bozdağlıoğlu and Özpınar, 2011).

VAR models are commonly used in time series as they can reveal out the dynamic relations without exposing any restriction on the structural model (Tarı and Bozkurt, 2006: 4-5). The reason why the VAR model is more powerful in its estimations compared to single-equation time series models is that the shocks given in the model can be interpreted (Ceylan, 2006: 39). A significant advantage of the VAR model is the non-necessity of seeking for significance in t tests for each of the variables (Enders, 1995: 25). Another reason why the VAR model is an important technique is that it presents the interrelations of the variables included in the model, as a system (Kargı and Terzi, 1997:29).

A simple VAR model formed with two variables as z and z can be expressed as;

$$x_t = a_{10} + \sum_{i=1}^{p} a_{11,i}\, x_{t-1} + \sum_{i=1}^{p} a_{12,i}\, z_{t-1} + \varepsilon_{it} \qquad (9)$$

$$z_t = a_{20} + \sum_{i=1}^{p} a_{21,i}\, x_{t-1} + \sum_{i=1}^{p} a_{22,i}\, z_{t-1} + \varepsilon_{t} \qquad (10)$$

Here, a_{i0} is the constant term[6]; $a_{ij.k}$ is the parameter belonging to k lag of j variable in i equation; ε_{it} is the rational error term and p is the lag number. VAR model can be expressed as the following as a matrix,

$$\begin{bmatrix} x_t \\ Z_t \end{bmatrix} = \begin{bmatrix} a_0 \\ a_0 \end{bmatrix} + \sum_{i=1}^{p} \begin{bmatrix} a_{1i} \\ a_{2i} \end{bmatrix} \begin{bmatrix} a_{1i} \\ a_{2i} \end{bmatrix} \begin{bmatrix} x_{t-i} \\ z_{t-i} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \quad (11)$$

$$y_t = c + \sum_{i=1}^{p} A_i y_{t-i} + \varepsilon_t \quad (12)$$

In a more general way, the VAR model can be expressed as in equation 13 for *k* number of variables.

$$y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \ldots\ldots\ldots + A_p y_{t-p} + \varepsilon_t \quad (13)$$

Here, y_t, is (kx1) size variable vector; c is the (kx1) size constant terms vector; ε_t is (kx1) size rational error terms vector and A_i is (kxk) size parameter matrixes. VAR model is described as p degree VAR model considering the lag number p and is shown as VAR(p). All the variables in the model are assumed as internal variables (Davidson and Mackinnon, 1993: 685). This brings a great convenience to the model. Only the lag values of internal variables are available on the right side of the model.

An important assumption in VAR model is the absence of relation between errors and their own lag values. This assumption does not pose any restriction on the model. On the other hand; when the correlation between errors is non-zero, i.e. when they are interrelated at a certain point in time, then a change observed in one of the errors affects the other at a certain point in time (Özgen and Güloğlu, 2004:96).

[6] The constant term is included in the model when the variables have non zero averages.

5.1.5. Co-integration

Co-integration is a technique developed in order to investigate the correlation between two non-stationary time series. Test can be conducted for co-integration vectors using Johansen-Juselius (1990) co-integration test and maximum probability estimations can be obtained for adjustment parameters. Johansen-Juselius (JJ) co-integration technique is made of the VAR estimation which includes the differences and levels of non-stationary series.

Let's consider two series (X and Y) that are not stationary at their levels. In this case, where there is a vector that includes Z, X and Y series, the VAR model formed for JJ estimation will be as expressed in equation no (14).

$$\Delta Z_t = \Gamma_1 \Delta Z_{t-1} + \ldots\ldots\ldots + \Gamma_{k-1} \Delta Z_{t-k+1} + \Pi Z_{t-k} + \varepsilon_t \qquad (14)$$

Here, Γi is the matrix of the parameters that show the lags of the first difference of (i = 1, 2, ...,k-1) Zt vector; Π is the parameter matrix related to the levels of the variables and ε is the residue values of the VAR model. As ΠZ matrix includes linear combinations related to the levels of the variables included in vector Z, it would be possible to consider this matrix to gain knowledge about the long-term properties of the model. The co-integration relations among the variables for which long-term relations are sought for, are investigated using "Trace" and "Maximum Eigenvalue" test statistics. These statistics are formulated as the following (Brooks, 2008: 351):

$$\lambda_{trace}(r) = -T \sum_{i=r+1} \ln(1 - \lambda_i) \qquad (15)$$

$$\lambda_{max}(r, r+1) = -T \ln(1 - \lambda_{r+1}) \qquad 0 \leq r \leq p \text{ (p internal variable number)} \qquad (16)$$

Trace test statistics investigate the coefficients matrix (matrix Π) of the vector which includes the level values of the variables. It tests hypothesis H_0, which claims that matrix rank is equal to *r* (co-integrated vector number) or is smaller than *r*. Maximum eigenvalue tests statistics tests H_0 hypothesis, which claims co-integrated

vector to be *r*, against its alternative which claims it to be *r*+1. Critical values of both test statistics are given by Johansen and Juselius (1990). If the rank of matrix Π is zero, it is concluded that the variables forming matrix *Z* are not co-integrated, i.e. they do not act together in the long-term. If the rank of the same matrix is at least "one", it is concluded that the two variables in matrix *Z* act together in the long-term.

5.1.6. Error Correction Model (VECM)

According to Engle and Granger (1987), if a long-term relation is found among the variables, there is at least one-sided causality among these variables. In this case, the error correction model (VECM) could be used. If the first degree stationary [I(1)] variables group is co-integrated, not including the error correction term determined in VAR model in the vector error correction model could lead to specification error in causality tests. This problem can be eliminated by including error correction terms (ECT) in the VECM model where each variable is taken as independent variable in order to determine the direction of the potential causality in VAR structure. It is very important to differentiate short and long term causality relations in VECM model. The lag values in independent variables represent the short term causality effects and the error correction term represents the long term causality effects (Love and Chandra, 2005: 136)

The error correction model can be expressed as the following:

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta Y_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta X_{t-i} + \beta_3 ECT_{t-n} + \varepsilon_i \quad (17)$$

$$\Delta X_t = \beta_4 + \sum_{i=1}^{n} \beta_{5i} \Delta X_{t-i} + \sum_{i=0}^{n} \beta_{6i} \Delta Y_{t-i} + \beta_7 ECT_{t-n} + \varepsilon_i \quad (18)$$

ECT_{t-n} in equations shows error correction term and n shows the lag number. β_3 and β_7 are the coefficients of error correction terms presenting the long term relation of

ΔY and ΔX, respectively. β_3 and β_7 are the error correction coefficients that force the variables to approach to the balance value in the long term. If this coefficient is significant in terms of statistics, deviation from balance is in question. The speed for approaching to the balance value in the long term is determined based on the largeness of this coefficient. In other words, deviations from balance will be corrected based on the largeness of the error correction coefficient. For approaching to the balance value in the long term, the coefficient is expected to be negative and significant. If the error correction coefficient is negative yet insignificant, it means that the significance of the dynamics among the variables is not reflected well. If the coefficient is positive, it means balance cannot be retrieved when there is deviation from long term balance value.

ΔY_{t-i} and ΔX_{t-i} show the short term dynamics. Coefficients are the short term coefficients showing the direct effect on the dependent variable and when the total F statistics or the t statistics of the error correction coefficient is significant, this indicates the presence of causality (Kasman, 2006: 96). In other words; in order to detect the source of causality according to VECM, one must look at the Wald test applied to all coefficients of the explanatory variables together and the t test applied on the coefficients of the one period lagged error correction terms obtained through long term co-integration relation. It can be concluded that if at the end of the Wald test the coefficients of the explanatory variables are statistically significant as a group according to F statistic, short term causality is valid. Furthermore; if coefficients of the error correction terms are significant according to t statistics, long term causality is in question.

5.1.7. Impulse-response Functions

İmpulse-response functions reflect the effect of a standard error shock in a one of the rational error terms on the present and future values of the internal variables. In other words, impulse-response analysis means the analysis of the effect of a causal shock that appears in a variable on the other variables of the model. Thus; impulse-response functions can be stated to have a significant function in guiding economic policies (Özgen and Güloğlu, 2004:97).

5.1.8. Variance Decomposition

Variance decomposition is obtained from the moving averages part of the VAR model. It shows the percentages of the sources of shocks that occur in the model's own variables and in other variables. In other words, it shows in what percentage a change that occurs in the variables used is arising from their own and in what percentage it is arising from other variables. If a great amount of the changes that occur in a variable are arising from its own shocks, this means, that variable is moving externally. Variance decomposition also gives information about the degree of the causality relations among the variables (Enders, 1995: 311).

5.2. DATA AND AMPIRICAL FINDINGS

In this research, the causality relation between real fresh fruit and vegetable exportation and economic growth was studied using quarter data for Turkey for the period between the years 2004:Q1-2015Q4. In this application, Eviews 6.1 program was used. The reason why the series start from 2004 is the lack of data related to the previous years. The series used in the research are cleared of seasonality through the "Tramo-Seats Options" method and are used in real logarithmic form. All data are obtained from Turkish Standards Institude, TOBB (The Union of Chambers and Commodity Exchanges of Turkey) ve Turkish Republic Central Bank electronic data distribution system on US $ basis.

Below are the definitions of the variables used in research:

M =Real logarithmic fresh fruit and vegetable importation total (freed from seasonality factor)

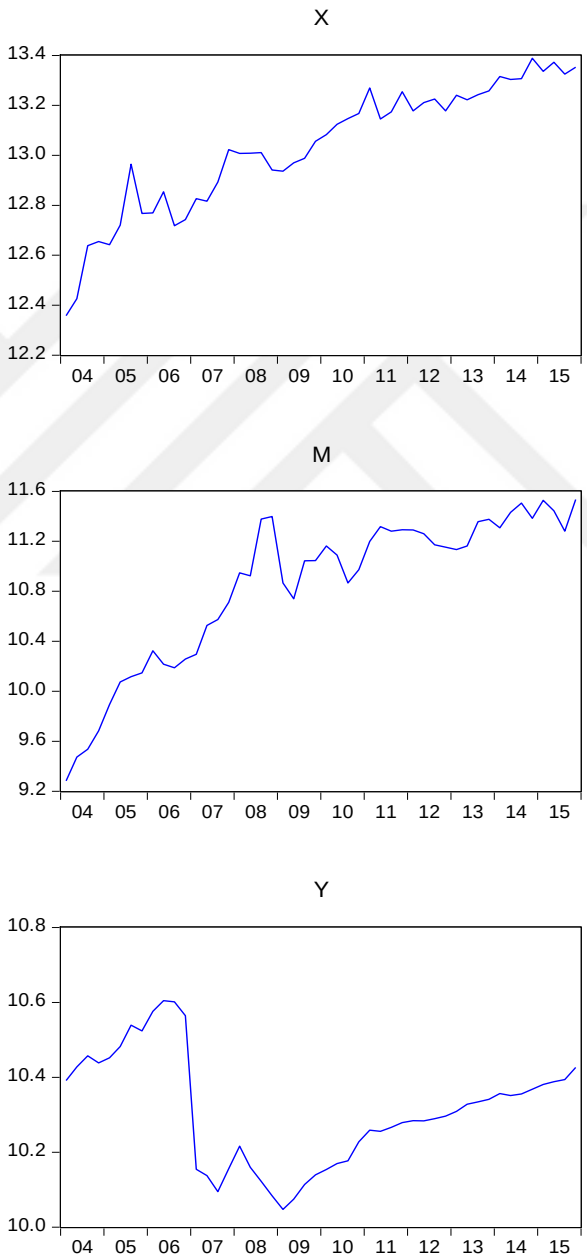
X = Real logarithmic fresh fruit and vegetable exportation total (freed from seasonality factor)

Y = Real logarithmic GDP per person (freed from seasonality factor)

In the research, the time trace graphics were studied at first in order to gain more information about the structure of the variables to be used in the model, then they were assessed through unit root tests in order to check whether they met the stationary condition or not.

Graphic 1 presents the time related progress of the series used in the research.

Graphic 1: Time Trace Graphics of X, M and Y Series



Graphic 1 shows that the series has a trend structure. Though the real logarithmic fresh fruit and vegetable importation (M) and exportation (X) totals (freed from

seasonality factor) have a rather fluctuating structure, they have an upward trend in general. Real logarithmic GDP per person (freed from seasonality factor) is also observed to have a fluctuating structure but with a general upward trend since 2008.

Once the time trace graphics of the series used in the research are studied, time series are needed to be tested as the second step in order to check whether they are stationary or not. Augmented Dickey-Fuller (ADF) (1981), Phillips-Perron (PP) (1980) and Kwiatkowski, Phillips, Schmidt, Shin (KPSS) (1992) unit root tests are used in determining whether the series included in this research have unit roots or not. The reason for giving place to all the three tests at the same time is to support the results of the stationary test.

Table 1 presents the ADF and PP unit root test results belonging to the variables used in this research. The values given in brackets show the length of lag. Schwarz (SIC) information criterion is used in determining how many period lags of the dependent variable will take place on the right side of the regression equation in unit root tests.

Table 1: ADF and PP Unit Root Test Results

Variable	ADF test statistics		Fixed, Trend	Phillips-Perron test statistics		Fixed, Trend	Result
X	-3,221026 (3)	P=0.0936	Fixed, Trend	-2,712611(4)*	P=0.0795	Fixed	Has unit root
M	-2,760379 (0)	P=0.2186	Fixed, Trend	-2,657756(4)*	P=0.2581	Fixed, Trend	Has unit root
Y	-1,323074 (0)	P=0.8698	Fixed, Trend	-1,468302(0)*	P=0.5407	Fixed	Has unit root
DX	-8,149013 (5)	P=0.0000	Fixed	-8,752090(4)*	P=0.0000	Fixed	Doesn't have unit root
DM	-6,297177 (1)	P=0.0000	Fixed	-6,391700(5)*	P=0.0000	Fixed	Doesn't have unit root
DY	-5,666533 (0)	P=0.0000	Fixed	-5,726651(3)*	P=0.0000	None	Doesn't have unit root

Note: If p-value is higher than 0.05 at the end of the tests, it means unit root is detected; otherwise, it means there is no unit root. *Bandwidth (Newey-West using Barlett kernel) Phillips-Perron.

The results of the ADF and PP unit root tests applied on the levels of the variables showed that the variables were not stationary. The results obtained when the same tests were applied on the first degree difference of the variables show that the

difference of the variables is stationary. Furthermore; KPSS trend stationary test was performed in order to support that the difference of series was stationary. KPSS test results are presented in Table 2.

Table 2: KPSS Test Results

Variable	LM-Stat	Fixed, Trend	Asymptotic Critical Value (%5)	Result
X	0.166028	fixed, trend	0.146000	not stationary (has unit root)
M	0.210771	fixed, trend	0.146000	not stationary (has unit root)
Y	0.178179	fixed, trend	0.146000	not stationary (has unit root)
DX	0.244730	fixed	0.463000	Stationary (doesn't have unit root)
DM	0.298277	fixed	0.463000	stationary (doesn't have unit root)
DY	0.140277	fixed	0.463000	Stationary (doesn't have unit root)

In Table 2, LM test statistics belonging to the levels of the variables show that there is %5 significance level; they are not stationary as KPSS test is absolutely higher than the critical values and they have unit roots. The results obtained when the variables of the same test are applied on the first degree difference show that the difference of variables is stationary.

It is possible to proceed with VAR analysis following the stationary testing. Considering the variables to be included in the model, all of them are observed to be stationary at the same degree, that is, at the first degree. This also enables the performance of co-integration analysis together with the VAR analysis.

The most significant condition in establishing VAR model is the accurate estimation of VAR lag length determined by the information criteria. As the variables to be included in the model are co-integrated at the same degree, the levels of these variables are used in VAR analysis. Table 3 presents the VAR lag length.

Table 3: Determination of VAR Lag Length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	40.62478	NA	3.77e-05	-1.672213	-1.551768	-1.627312
1	149.3313	198.0875	4.49e-07	-6.103615	-5.621838	-5.924013
2	158.2585	15.07707	4.53e-07	-6.100379	-5.257270	-5.786077
3	169.2834	**17.14975***	**4.21e-07***	**-6.190372***	-4.985931	-5.741369
* indicates lag order selected by the criterion LR: sequential modified LR test statistic (each test at 5% level) FPE: Final prediction error AIC: Akaike information criterion SC: Schwarz information criterion HQ: Hannan-Quinn information criterion						

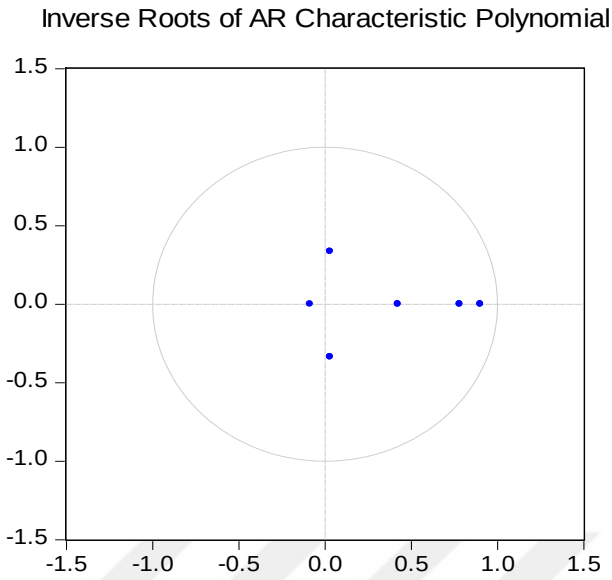
As seen in Table 3; LR, FPE and AIC information criteria indicate 3 lags. So, VAR lag length is determined as three. Stability of the 3 lagged VAR model is tested through the following tests.

Table 4: Inverse Roots of AR Characteristic Polynomial

Root	Modulus
0.902028	0.902028
0.781617	0.781617
0.422735	0.422735
0.030563 - 0.335875i	0.337263
0.030563 + 0.335875i	0.337263
-0.087513	0.087513
No root lies outside the unit circle. VAR satisfies the stability condition.	

As can be seen in table 4, no modulus value is outside reference range. This shows that the established VAR model is stable. Inverse Roots of AR characteristic polynomial in Graphic 2, which enables the interpretation of the same analysis through graphic, must be assessed in unit circle analysis.

Graphic 2: Inverse Roots of AR Characteristic Polynomial



No AR root is outside the unit circle according to Graphic 2, which most obviously supports that the established VAR model is stationary.

Table 5: Serial Correlation LM Test

Lags	LM-Stat	Prob
1	6.620883	0.6765
2	7.559964	0.5790
3	11.36886	0.2513
4	10.04953	0.3465
5	5.179368	0.8184
6	24.31769	0.0038
7	11.97025	0.2150
8	6.895879	0.6480
9	12.67166	0.1780
10	2.717579	0.9744
11	8.255163	0.5087
12	3.876247	0.9194
13	5.984362	0.7415
14	5.062409	0.8288

When the probability values in LM test given in Table 5 are studied, the null hypothesis claiming that there is no serial correlation in the series, cannot be rejected.

After completing the analysis which claims that the VAR model is structurally consistent, co-integration analysis was performed. JJ co-integration test results are given in Table 6.

Table 6: Co-integration Analysis

Unrestricted Co-integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.590278	53.23791	35.01090	0.0002
At most 1	0.235804	13.97772	18.39771	0.1863
At most 2	0.047576	2.144774	3.841466	0.1431
Trace test indicates 1 co-integration geqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.590278	39.26019	24.25202	0.0003
At most 1	0.235804	11.83295	17.14769	0.2511
At most 2	0.047576	2.144774	3.841466	0.1431
Max-eigenvalue test indicates 1 co-integration geqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values				

According to Table 6; the null hypothesis, which claims the absence of no co-integration, was rejected by trace and maximum eigenvalue test statistics and one co-integration relation was found in the model. So it can be said that there is a long term relation among X, M and Y variables.

The long term relation among the variables makes possible the establishment of a vector error correction model (VECM) that obviously includes the error correction term obtained though co-integration regressions and thus, it was aimed to find the source of causality. Test results belonging to vector error correction model are given in Table 7.

Table 7: Error Correction Model Test Results

		Dependant Variables	
	(1)	(2)	(3)
Independant Variables	D(Y)	D(M)	D(X)
ECT(-1)	**-0.401067**	**-1.119922**	-0.178774
	[-2.68813]	**[-4.04981]**	[-1.26101]
D(Y(-1))	0.386122	-0.065327	0.058267
	[2.16641]	[-0.19775]	[0.34405]
D(Y(-2))	0.150134	0.542819	-0.069997
	[0.94770]	[1.84867]	[-0.46500]
D(Y(-3))	-0.098681	0.200183	-0.285080
	[-0.63061]	[0.69019]	[-1.91723]
D(M(-1))	0.170685	0.642322	0.152262
	[1.48974]	[3.02470]	[1.39860]
D(M(-2))	0.144114	-0.059796	0.016255
	[1.57552]	[-0.35270]	[0.18702]
D(M(-3))	0.104371	0.276894	0.036000
	[1.38677]	[1.98497]	[0.50340]
D(X(-1))	-0.782479	-1.545888	-0.771176
	[-2.17130]	[-2.31441]	[-2.25209]
D(X(-2))	-0.395766	-1.015657	-0.543841
	[-1.34771]	[-1.86604]	[-1.94901]
D(X(-3))	-0.349373	-0.413629	0.119869
	[-1.61960]	[-1.03453]	[0.58480]
C	0.010351	0.060766	0.028298
	[0.75059]	[2.37745]	[2.15963]
R-squared	**0.717120**	**0.877325**	**0.649674**
F-statistic	2.532475	4.507420	2.696446
Log likelihood	64.14138	36.99079	66.38893
Akaike AIC	-2.415517	-1.181399	-2.517679
Schwarz SC	-1.969470	-0.735352	-2.071631
Mean dependent	-0.000274	0.042050	0.015869
S.D. dependent	0.068942	0.162420	0.072973
Determinant resid covariance (dof adj.)	2.11E-07		
Determinant resid covariance	8.91E-08		
Log likelihood	169.8258		
Akaike information criterion	-6.082989		
Schwarz criterion	-4.623198		

ECT (-1) is the error correction term obtained through long term co-integrated relation and it shows the size of the past imbalance. In practice, error correction coefficient is expected to be negative and statistically significant. According to the test results of the error correction model, the mark of error correction coefficients is negative for all three equations. On the other hand; for the first two equations, it is statistically significant according to 5% significance level and it is insignificant in the final equation. In Equation no (1), the error correction coefficient between the real GDP per person and the real fresh fruit-vegetable exportation and importation increase is around -0.40 and it is statistically significant at 5% significance level. This means, there is a long term causality relation extending from real fresh fruit-vegetable exportation and importation towards GDP per person. The error correction coefficient in equation no (2) is around -1.12 and it is statistically significant at 5% significance level. This means, there is a long term causality relation extending from real fresh fruit-vegetable exportation and GDP per person toward real fresh fruit-vegetable importation.

The equation no.3 was left out of the study because the coefficient of ECT (-1) variable was meaningless. When R^2 values of related to equitation no.1 and 2 of the equation, it is seen that these values are close to 1. That R^2 value is close to 1 shows that equitation's goodness of fit is high. According to the equitation no.1, it is possible to say that 72% of the changes in GDP per capita is explained by a change in its own values in the past and a change in export and import of fresh vegetables and fruits. While, when looked at the equitation no.2, approximately 88% of the changes in import of fresh vegetables and fruits is explained as the changes in import of fresh vegetables and fruits is explained with a change in its own values in the past and a change in export of fresh vegetables and fruits and a change in GDP per capita.

Table 8: VECM Granger Causality/Block Exogeneity Wald Tests

Dependent variable: D(Y)			
	Chi-sq	df	Prob.
D(M)	3.977791	3	0.2639
D(X)	5.896758	3	0.1167
All	7.100293	6	0.3117
Dependent variable: D(M)			
	Chi-sq	df	Prob.
D(Y)	4.463568	3	0.2156
D(X)	6.311215	3	0.0974
All	10.19712	6	0.1166
Dependent variable: D(X)			
	Chi-sq	df	Prob.
D(Y)	4.512182	3	0.2112
D(M)	2.324387	3	0.5079
All	8.011947	6	0.2372

According to these results, there is no causality relation among short term real GDP per person, real fresh fruit-vegetable exportation and real fresh fruit-vegetable importation. In order to support the results of the Wald test performed for the VECM model, Pairwise Granger Causality Test was also performed. The results obtained through this test are presented in Table 9 and these are consistent with the Wald test results. This means, there is no short term causality relation among the variables.

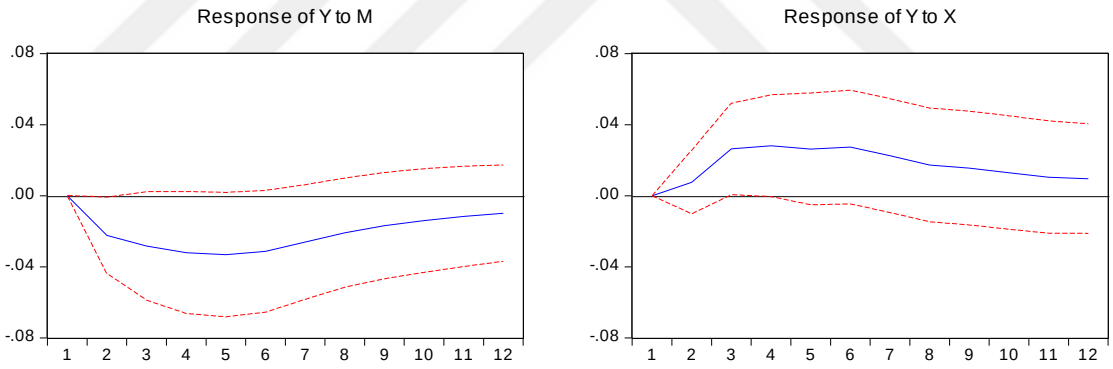
Table 9: Pairwise Granger Causality Tests

Pairwise Granger Causality Tests Sample: 2004Q1 2015Q4 Lags: 3			
Null Hypothesis:	Obs	F-Statistic	Prob.
DM does not Granger Cause DY	44	0.51243	0.6762
DY does not Granger Cause DM		1.05435	0.3801
DX does not Granger Cause DY	44	0.96845	0.4179
DY does not Granger Cause DX		2.25245	0.0984
DX does not Granger Cause DM	44	2.29633	0.0937
DM does not Granger Cause DX		0.25987	0.8538

Null hypothesis is not rejected at 5% significance level.

Following causality tests, impulse-response analysis are given place in this section. The dashed lines in graphics indicate the confidence limits of "one" standard error whereas the straight lines indicate the point estimations.

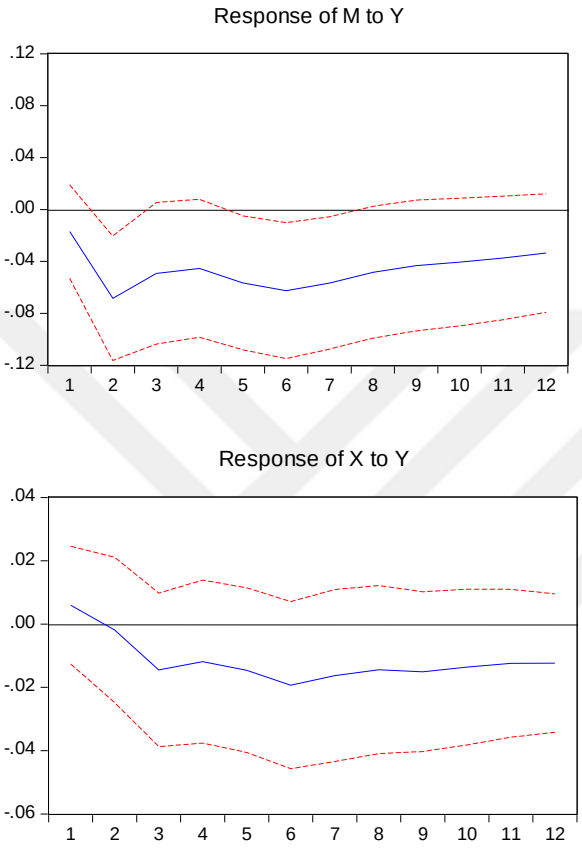
Graphic 2: Impulse Response Analysis (Response of Y to M and X)



Graphic 2 shows, how "one" standard error shock that occurs in real total fresh fruit-vegetable importation and exportation affect the change in real GDP per person which represents the economic growth. As can be seen in graphic, the effect of real total fresh fruit-vegetable importation on the economic growth is negative whereas the effect of real total fresh fruit-vegetable exportation is positive. So it can be said that economic growth decreases in parallel with the increase in real total fresh fruit-vegetable importation whereas it increases in parallel with the increase in real total

fresh fruit-vegetable exportation. The effects are still observable after the 12th period, which supports the relation obtained through VAR analysis for long term.

Graphic 3: Impulse-Response Analyses (Response of M, Response of X to Y)



Graphic 3 shows, how "one" standard error shock that occurs in real GDP per person affects the change in the real total fresh fruit-vegetable importation and then the change in the real total fresh fruit-vegetable exportation. As can be seen in graphic, the effect of economic growth on real total fresh fruit-vegetable exportation is positive only at the first period and it is always negative afterwards. The effects are still observable after the 12th period, which supports the relation obtained through VAR analysis for long term.

Another method used in the residue analysis in VAR model, is the variance decomposition. Numerical effects of statistical shocks on variables are tested through this method.

Table 10: Variance Decomposition Test Results

Variance Decomposition of Y:				
Period	S.E.	Y	M	X
1	0.063925	100.0000	0.000000	0.000000
2	0.092389	93.49325	5.831055	0.675698
3	0.117221	85.09682	9.450111	5.453070
4	0.132836	78.09137	13.17334	8.735292
5	0.143102	72.35829	16.74681	10.89490
6	0.150882	67.53815	19.37439	13.08746
7	0.155786	64.65538	20.98044	14.36417
8	0.158650	63.01597	21.95555	15.02848
9	0.160663	61.89947	22.51557	15.58496
10	0.162072	61.17657	22.87117	15.95226
11	0.163035	60.70982	23.11688	16.17330
12	0.163769	60.35758	23.27322	16.36920
Variance Decomposition of M:				
Period	S.E.	Y	M	X
1	0.121686	1.940974	98.05903	0.000000
2	0.159249	19.57791	74.64931	5.772774
3	0.179737	22.86505	59.11585	18.01910
4	0.194580	24.95109	51.88728	23.16163
5	0.207183	29.44819	45.83685	24.71497
6	0.220834	33.95364	40.80018	25.24617
7	0.230998	37.04410	37.37124	25.58466
8	0.238160	38.97344	35.17348	25.85309
9	0.243877	40.30877	33.63235	26.05888
10	0.248749	41.40477	32.47961	26.11562
11	0.252812	42.27502	31.53844	26.18654
12	0.256148	42.90199	30.76943	26.32858
Variance Decomposition of X:				
Period	S.E.	Y	M	X
1	0.062609	0.903402	0.032183	99.06441
2	0.071868	0.755135	1.660137	97.58473
3	0.079824	3.919915	6.424566	89.65552
4	0.094395	4.392119	7.472762	88.13512
5	0.100780	5.954682	7.534458	86.51086
6	0.105063	8.862828	7.447542	83.68963
7	0.110183	10.24806	7.122210	82.62972
8	0.113362	11.29951	6.902658	81.79783
9	0.115587	12.56914	6.721340	80.70952
10	0.117911	13.40740	6.502993	80.08960
11	0.119705	14.08479	6.336249	79.57896
12	0.121099	14.80213	6.210631	78.98724

Whereas according to the results of variance decomposition all the changes observed in real GDP per person (in economic growth) in the first period are explained through the variable itself, this condition has presented differences in future periods. In the final period, 60% of the change is explained through the variable itself, 23% of

it is explained through real total fresh fruit-vegetable importation and 17% of it is explained through real total fresh fruit-vegetable exportation.

SECTION 6

6. CONCLUSION

In this research, the causality relation between real fresh fruit and vegetable exportation and economic growth was studied using quarter data for Turkey for the period between the years 2004-2015. At the end of the Johansen co-integration test, it was concluded that there was a long term balance relation between the real fresh fruit-vegetable exportation and economic growth in Turkey. At the end of the VECM Granger Causality/Block Exogeneity Wald Tests and Pairwise Granger Causality Tests, it was concluded that there was no causality relation between economic growth and real fresh fruit-vegetable exportation in short term. According to the results of the error correction model, approximately 72% of the changes in GDP per capita is explained by a change in its own values in the past and a change in export and import of fresh vegetables and fruits. In addition, it is seen that approximately 88% of the changes in import of fresh vegetables and fruits is explained with a change in own values in the past of import of fresh vegetables and fruits and a change in export of fresh vegetables and fruits and a change in GDP per capita.

In ımpulse-response test performed after the causality tests, it was concluded that economic growth decreased in parallel with increase in real total fresh fruit-vegetable importation and it increased in parallel with the increase in real total fresh fruit-vegetable exportation. According to the results of the variance decomposition, it was concluded for the change observed in the economic growth in the final period that 60% of it was explained through the growth itself, 23% of it was explained through real total fresh fruit-vegetable importation and 17% of it was explained through real total fresh fruit-vegetable exportation.

According to these results, it is seen that the VECM and variance decomposition results are consistent with each other. When only fresh vegetables and fruits export and import is considered and under the assumption that the other products produced

and exported did not change, it is possible to say that fresh vegetables and fruits import and export itself and its past values affect the economic growth in long term.

The scope of this study is limited to the total effect of export and import of fresh fruit and vegetable to the economic growth in the long term. Whether this effect is positive or negative is left out intentionally.

As a reason for seeing the effects of changes in fresh vegetables and fruits to economic growth in long term instead of short term, it is possible to express that it results from the delay of impacts of incentives and credits provided to producers and exporters on production process.

According to these results, it is very significant for Turkey to increase the level of fresh fruit and vegetable exportation. In order to facilitate fresh fruit and vegetable production and exportation, particular measures should be taken and solutions should be developed for the current problems.

The following suggestions may be made in order to increase fresh vegetables and fruits export required for growth of Turkey. Quality and standardization related demands of the countries to be exported to shall be communicated to the producers to ensure exportation of products that conform to such market demands. Packaging is very significant for gaining competitive advantage in Turkey and in the export market. Packaging shall be prioritized for the physical appearance and health of the product. This is why necessary discounts shall be applied on the prices of packaging materials. The countries Turkey exports to, give much priority to food safety and quality. Thus; relevant measures and practices shall be applied more for the empowerment of food safety and quality. Re & De activities shall be given priority in fresh fruit and vegetable exportation and the products shall be marketed through a well-structured marketing organization and strategy. Storing is not a common practice in Turkey. It shall be attempted to increase storage capacity and the number of cold stores. Thus, freshness of fruits and vegetables can be preserved for a while. More government supports and credits shall be granted in order to be able to compete with the other countries in fruit and vegetable exportation.

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APPENDIX[7]

Annex Table 1: Top 20 Countries that fresh vegetable-fruit are exported in 2006

		Quantity (Kg)	Value US ($)
No	Country	2006	
1	Russian Federation	616.036.456	336.085.233
2	Ukraine	202.286.050	94.358.513
2	Romania	197.118.948	83.484.606
4	Saudi Arabia	169.069.157	65.976.908
5	Iraq	134.515.055	27.875.418
6	Germany	125.867.758	138.884.400
7	Bulgaria	56.696.522	16.669.889
8	Mersin Free Zone	54.921.921	28.330.452
9	Holland	51.743.782	45.856.488
10	Greece	41.409.105	24.071.134
11	Moldovia	41.352.134	19.712.885
12	Polonia	36.813.830	18.016.100
13	Serbia	35.262.188	13.913.312
14	Austria	30.340.960	25.395.635
15	Unıted Kingdom	21.675.934	38.053.286
16	Bellarus	21.078.041	10.665.944
17	France	16.248.566	14.844.620
18	Czech Republic	13.995.002	7.670.029
19	Belgium	12.498.329	16.211.768
20	Italy	11.678.219	19.251.732

[7] All data that are presented in this section is gathered from TUİK and Meditteranian Exporters' Union. Data is aligned due to Fob ($) values.

Annex Table 2: Top 20 Countries that fresh vegetable-fruit are exported in 2007

		Quantity (Kg)	Value US ($)
No	Country	2007	
1	Russian Federation	713.379.008	501.065.039
2	Romania	201.683.823	130.352.660
3	Iraq	185.294.282	28.882.349
4	Ukraine	153.083.477	98.752.213
5	Saudı Arabia	136.609.079	66.771.862
6	Germany	127.354.182	163.970.807
7	Bulgaria	110.370.663	48.351.741
8	Mersin Free Zone	48.976.776	29.656.036
9	Poland	47.370.332	40.409.566
10	Moldovia	37.555.333	21.007.463
11	Holland	33.393.209	40.590.269
12	Greece	29.680.098	19.600.009
13	Avusturia	24.578.874	26.521.815
14	Bellarus	23.762.104	14.953.246
15	Serbia	22.761.083	13.608.339
16	United Kingdom	21.581.199	38.715.445
17	Czech Republic	16.394.232	13.178.633
18	France	11.134.978	17.079.006
19	Italy	11.074.991	16.897.849
20	Belgium	8.385.921	16.507.323

Annex Table 3: Top 20 Countries that fresh vegetable-fruit are exported in 2008

		Quantity (Kg)	Value US ($)
No	Country	2008	
1	Russian Federation	755.295.774	633.135.931
2	Iraq	231.757.877	50.051.310
3	Ukraine	223.778.707	145.692.191
4	Bulgary	193.428.600	121.812.423
5	Romania	185.609.396	132.484.629
6	Germany	122.467.581	175.073.229
7	Saudi Arabia	104.554.995	69.706.210
8	Moldovia	40.719.622	21.622.129
9	Polonia	37.461.233	30.729.521
10	Mersin Free Zone	29.998.154	22.980.126
11	Holland	29.274.270	33.952.247
12	Greece	27.988.911	22.857.679
13	Czech Republıc	22.014.355	16.261.423
14	Serbia	21.721.419	15.707.090
15	Georgia	20.860.573	10.877.667
16	Bosnia-Herzegovina	18.095.613	12.015.036
17	United Kingdom	15.968.971	31.033.999
18	Persia (Islam Rep.)	15.791.350	8.311.107
19	France	10.727.647	17.125.690
20	Italy	10.527.051	19.282.126

Annex Table 4: Top 20 Countries that fresh vegetable-fruit are exported in 2009

		Quantity (Kg)	Value US ($)
No	Country	2009	
1	Russian Federation	830.926.092	624.905.029
2	Iraq	386.268.573	126.039.194
3	Bulgaria	284.106.987	215.398.969
4	Ukraine	240.333.162	154.739.061
5	Romania	171.226.449	108.808.582
6	Saudı Arabia	150.429.871	88.572.399
7	Germany	131.069.713	181.600.685
8	Polonia	45.525.977	34.408.289
9	Persia (Islam Rep.)	45.226.620	25.480.784
10	Georgia	38.961.236	14.490.753
11	Holland	33.312.270	38.368.848
12	Azerbaijan-Nakhchivan	29.120.127	12.476.287
13	Unıted Kingdom	27.223.446	35.746.992
14	Serbia	26.467.210	16.933.067
15	Moldovıa	25.841.027	14.664.006
16	Czech Republic	21.098.906	16.543.710
17	Bellarus	14.317.376	12.150.115
18	Avusturia	12.573.990	14.158.578
19	Italy	11.270.470	20.315.639
20	France	9.004.359	15.489.795

Annex Table 5: Top 20 Countries that fresh vegetable-fruit are exported in 2010

		Quantity (Kg)	Value US ($)
No	Country	2010	
1	Russian Federation	988.635.353	788.470.053
2	Iraq	360.063.754	153.928.964
3	Ukraine	254.610.008	166.128.358
4	Bulgaria	210.336.635	167.191.807
5	Romania	188.942.992	124.899.790
6	Germany	150.561.555	203.064.554
7	Saudi Arabia	150.354.670	97.076.991
8	Polonia	54.633.601	45.859.575
9	Azerbaijan-Nakhchivan	47.006.150	23.107.506
10	Georgia	45.376.188	17.442.521
11	Persıa (Islam Rep.)	42.970.276	28.228.002
12	Holland	33.313.024	39.032.332
13	Moldavia	27.442.641	16.478.649
14	Serbia	27.104.536	18.265.899
15	Bellarus	25.083.553	20.766.753
16	Czech Republic	25.033.972	20.455.278
17	United Kingdom	22.247.212	31.296.773
18	Italy	11.009.156	18.728.545
19	France	9.968.595	15.392.849
20	Sweden	4.959.407	7.266.072

Annex Table 6: Top 20 Countries that fresh vegetable-fruit are exported in 2011

		Quantity (Kg)	Value US ($)
No	Country	2011	
1	Russian Federation	1.129.327.295	838.480.645
2	Iraq	498.152.979	265.638.363
3	Ukraine	285.192.629	188.078.196
4	Saudi Arabia	174.186.875	111.490.125
5	Bulgaria	160.021.306	116.412.594
6	Romania	156.387.842	105.247.903
7	Germany	133.251.644	197.833.156
8	Georgia	89.474.549	30.445.651
9	Persia (Islam Rep.)	81.507.575	61.043.366
10	Azerbaijan-Nakhchivan	57.471.317	25.354.739
11	Moldavia	52.316.620	35.384.546
12	Polonia	41.269.235	30.430.648
13	Serbia	28.080.741	18.406.601
14	Unıted Kingdom	27.482.076	35.876.999
15	Holland	27.278.781	32.580.746
16	Czech Republic	26.405.637	20.374.401
17	Bellarus	22.004.054	17.827.653
18	Italy	10.012.044	19.467.526
19	France	8.663.965	15.404.611
20	Sweden	7.093.865	12.160.060

Annex Table 7: Top 20 Countries that fresh vegetable-fruit are exported in 2012

		Quantity (Kg)	Value US ($)
No	Country	2012	
1	Russian Federation	1.072.062.336	795.466.597
2	Iraq	589.678.197	303.234.184
3	Ukraine	262.195.043	184.368.592
4	Saudi Arabia	126.462.990	70.847.395
5	Germany	126.227.827	195.925.533
6	Bulgaria	122.808.517	83.088.994
7	Romania	113.814.721	71.332.102
8	Georgia	59.619.008	23.102.328
9	Moldavia	41.402.241	28.689.029
10	Poland	39.672.885	29.664.874
11	Azerbaijan-Nakhchivan	38.493.360	23.371.350
12	Holland	29.173.559	36.381.836
13	Persia (Islam Rep.)	27.155.173	20.989.482
14	Bellarus	24.697.839	18.944.780
15	Serbia	24.547.603	16.900.273
16	Unıted Kingdom	23.740.099	33.818.264
17	Czech Republic	18.793.882	14.149.254
18	Italy	12.285.061	28.456.724
19	France	8.641.137	15.707.661
20	Belgium	4.712.144	12.000.747

Annex Table 8: Top 20 Countries that fresh vegetable-fruit are exported in 2013

		Quantity (Kg)	Value US ($)
No	Country	2013	
1	Russian Federation	1.085.789.393	876.072.426
2	Iraq	640.859.144	259.194.047
3	Ukraine	325.071.924	224.924.026
4	Syria	185.736.999	34.317.845
5	Bulgaria	149.568.377	97.429.069
6	Germany	119.355.660	201.400.969
7	Saudi Arabia	106.861.532	66.505.101
8	Romania	85.353.554	60.966.307
9	Georgia	63.050.323	29.217.980
10	Moldavia	50.422.038	32.605.816
11	Egypt	43.059.780	20.603.745
12	Polonia	40.186.712	30.301.082
13	Bellarus	36.115.741	28.601.710
14	Holland	35.968.445	44.542.921
15	Azerbaijan- Nakhchivan	32.151.176	19.810.313
16	United Kingdom	30.494.547	38.213.609
17	Serbia	27.114.642	18.180.671
18	Italy	12.940.201	24.477.074
19	France	9.668.846	17.730.539
20	Belgium	5.975.870	16.026.665

Annex Table 9: Top 20 Fresh Vegetable-Fruit Products that are Exported by Turkey in 2006

		Quantity (Kg)	Value US ($)
No	Product	2006	
1	Lemon	328.837.972	156.406.253
2	Tangerine	322.728.045	149.221.192
3	Tomato	306.033.411	176.835.774
4	Orange	246.275.797	102.289.507
5	Grapefruit	157.809.298	70.491.231
6	Grape	152.751.546	85.212.602
7	Onion	141.424.509	20.568.547
8	Pepper	59.503.458	55.997.464
9	Cherry-Sourcherry	54.086.998	132.496.593
10	Cucumber	51.963.242	30.758.744
11	Potato	50.951.786	8.417.100
12	Carrot-Radish	43.375.257	8.925.059
13	Peach	39.137.533	23.008.528
14	Watermelon	16.210.161	4.176.330
15	Apricot	13.972.522	11.845.898
16	Strawberry	11.795.123	11.885.745
17	Pomegranate	10.932.081	11.233.402
18	Fig	8.894.044	17.890.124
19	Marrow	7.227.622	5.745.099
20	Mushroom	1.328.464	12.014.937

Annex Table 10: Top 20 Fresh Vegetable-Fruit Products that are Exported by Turkey in 2007

		Quantity (Kg)	Value US ($)
No	Product	2007	
1	Tomato	394.235.295	316.925.441
2	Lemon	286.213.865	197.903.707
3	Tangerıne	252.489.269	155.401.367
4	Potato	232.502.950	37.773.115
5	Grape	172.139.096	133.019.669
6	Onion	171.824.517	36.396.876
7	Orange	165.739.054	89.086.823
8	Grapefruit	126.065.620	72.403.924
9	Cucumber	62.578.297	45.532.703
10	Pepper	60.075.853	70.226.468
11	Cherry-Sourcherry	57.071.453	146.572.031
12	Carrot-Radish	46.660.174	10.303.374
13	Watermelon	20.861.765	6.457.606
14	Peach	19.042.172	16.034.046
15	Strawberry	17.242.142	21.395.468
16	Apricot	14.902.386	15.080.915
17	Pomegranate	13.731.574	16.860.976
18	Marrow	10.024.057	7.961.267
19	Fig	7.506.188	18.029.141
20	Mushroom	415.806	6.466.884

Annex Table 11: Top 20 Fresh Vegetable-Fruit Products that are Exported by Turkey in 2008

		Quantity (Kg)	Value US ($)
No	Product	2008	
1	Tomato	483.281.847	426.407.228
2	Tangerine	313.832.927	203.957.036
3	Lemon	226.599.833	206.506.893
4	Onion	213.599.042	35.040.829
5	Grape	202.470.783	170.802.091
6	Orange	157.295.240	94.917.841
7	Grapefruit	128.614.858	82.006.525
8	Cucumber	88.526.237	65.413.509
9	Pepper	78.958.780	78.259.446
10	Carrot-Radish	47.356.491	10.650.058
11	Peach	43.040.451	37.033.538
12	Pomegranate	33.193.295	31.809.514
13	Cherry-Sourcherry	28.617.864	115.089.626
14	Strawberry	22.380.165	30.331.066
15	Apricot	22.098.496	32.138.696
16	Apple	19.888.118	12.233.907
17	Marrow	12.246.530	11.502.150
18	Fig	9.544.701	24.318.776
19	Pear	6.049.731	6.809.835
20	Mushroom	882.495	9.253.114

Annex Table 12: Top 20 Fresh Vegetable-Fruit Products that are Exported by Turkey in 2009

		Quantity (Kg)	Value US ($)
No	Product	2009	
1	Tomato	565.325.402	431.965.425
2	Lemon	412.089.168	282.140.639
3	Tangerine	369.140.569	259.096.215
4	Orange	266.371.053	171.386.364
5	Grape	189.882.189	156.853.686
6	Grapefruit	136.904.149	89.089.742
7	Onion	135.461.490	16.516.795
8	Cucumber	98.721.313	69.018.060
9	Pepper	68.391.630	65.484.150
10	Apple	60.666.447	23.122.242
11	Carrot-Radish	57.073.573	10.391.912
12	Cherry-Sourcherry	51.268.957	134.527.047
13	Pomegranate	41.938.979	40.024.761
14	Peach	32.380.369	24.044.114
15	Strawberry	23.235.652	25.434.184
16	Apricot	18.589.584	20.789.616
17	Marrow	14.202.316	11.580.618
18	Pear	13.443.001	8.953.765
19	Fig	12.915.670	26.136.493
20	Mushroom	1.076.996	12.354.208

Annex Table 13: Top 20 Fresh Vegetable-Fruit Products that are Exported by Turkey in 2010

		Quantity (Kg)	Value US ($)
No	Product	2010	
1	Tomato	574.723.558	482.654.937
2	Lemon	423.408.747	311.387.648
3	Tangerine	416.702.158	282.010.795
4	Grape	237.527.290	205.966.824
5	Orange	220.472.055	150.632.670
6	Grapefruit	154.598.971	101.268.392
7	Cucumber	103.681.628	74.892.184
8	Onion	96.346.633	16.089.909
9	Potato	84.829.545	9.472.074
10	Apple	81.941.794	33.779.036
11	Cherry-Sourcherry	65.414.901	150.001.414
12	Pomegranate	62.707.877	59.363.199
13	Pepper	61.091.886	69.332.567
14	Carrot-Radish	57.467.803	10.797.986
15	Peach	41.648.712	29.270.742
16	Watermelon	34.913.246	6.240.123
17	Strawberry	25.873.886	28.487.910
18	Apricot	25.870.012	26.761.732
19	Squash	25.375.484	19.146.945
20	Fig	13.703.903	27.218.988

Annex Table 14: Top 20 Fresh Vegetable-Fruit Products that are Exported by Turkey in 2011

		Quantity (Kg)	Value US ($)
No	Product	2011	
1	Tomato	581.189.163	439.390.858
2	Lemon	487.668.048	355.528.155
3	Tangerine	473.782.388	341.639.016
4	Orange	355.970.256	260.354.111
5	Grape	239.736.262	177.419.317
6	Grapefruit	158.150.788	110.262.652
7	Onion	121.664.270	22.371.163
8	Apple	88.507.601	37.053.502
9	Pomegranate	86.100.477	70.493.815
10	Cucumber	81.133.160	59.910.816
11	Pepper	69.329.505	78.189.516
12	Cherry-Sourcherry	46.697.113	133.504.120
13	Peach	33.002.279	21.870.374
14	Apricot	28.886.557	29.318.369
15	Squash	28.263.053	21.534.861
16	Strawberry	21.120.201	20.714.365
17	Fig	13.562.405	29.770.327
18	Plum	11.380.884	7.683.227
19	Chestnut	4.311.781	9.149.206
20	Tea	2.191.589	10.229.272

Annex Table 15: Top 20 Fresh Vegetable-Fruit Products that are Exported by Turkey in 2012

		Quantity (Kg)	Value US ($)
No	Product	2012	
1	Tomato	562.665.979	405.168.826
2	Tangerine	417.594.202	301.499.937
3	Lemon	375.837.158	273.200.642
4	Orange	326.326.788	230.176.751
5	Grape	210.074.652	163.201.060
6	Grapefruit	168.148.269	109.239.638
7	Onion	141.891.095	20.743.237
8	Cucumber	89.509.102	67.711.125
9	Pomegranate	86.216.219	74.989.581
10	Pepper	70.107.675	75.158.898
11	Apple	68.487.525	28.504.261
12	Apricot	56.772.039	42.336.948
13	Cherry-Sourcherry	56.639.050	159.557.576
14	Peach	44.389.285	28.524.579
15	Squash	34.636.812	23.670.564
16	Plum	26.182.917	14.430.923
17	Strawberry	21.715.575	20.303.260
18	Fig	14.387.510	29.816.171
19	Chestnut	5.420.105	16.258.821
20	Tea	3.282.054	12.151.137

Annex Table 16: Top 20 Fresh Vegetable-Fruit Products that are Exported by Turkey in 2013

		Quantity (Kg)	Value US ($)
No	Product	2013	
1	Tangerine	535.198.881	353.737.914,61
2	Tomato	485.966.827	392.581.131,55
3	Lemon	413.657.057	302.360.685,66
4	Orange	281.246.058	181.559.578,36
5	Grape	202.824.914	187.866.861,56
6	Onion	159.373.345	27.602.376,50
7	Grapefruit	141.042.787	92.915.577,55
8	Pomegranate	136.886.417	111.696.418,25
9	Apple	128.108.170	50.319.396,52
10	Cucumber	78.797.804	64.350.483,59
11	Pepper	68.807.741	82.483.906,04
12	Cherry-Sourcherry	54.678.185	155.437.899,43
13	Squash	43.157.310	32.931.841,92
14	Apricot	42.016.025	42.968.889,22
15	Peach	34.996.295	28.292.858,09
16	Strawberry	19.858.855	25.066.688,88
17	Fig	16.365.636	34.987.534,84
18	Eggplant	13.509.120	13.104.959,96
19	Chestnut	5.382.265	18.581.806,23
20	Tea	5.271.292	17.887.081,51

CV

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