THE EFFECTS OF
THE EU POLICY OF
DIFFERENTIATING BY ORIGIN
ON ISRAELI VEGETABLE PRODUCERS
OPERATING IN THE WEST BANK

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The effects of the EU policy of differentiating by origin on Israeli vegetable producers operating in the West Bank.

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Preface

This thesis represents the culmination of the Master study at the Department of Economics.

I would like to thank all teachers, professors and co-students at the University of Oslo for providing me with invaluable knowledge and experiences.

Specifically, I would like to thank Professor Karen Helene Ulltveit-Moe and Mr. Alfonso Irarrazabal for introducing me to the field of international trade. The relationship between trade and politics is of utmost interest of mine, and, through inspiring and motivating teaching, they have given me an enhanced understanding of these important topics and their relationship.

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Thomas Husby Sæther
Oslo, January 2011
Summary

On June 21, 2000, Israel and the member states of the European Union (EU) signed a trade agreement for products from Israel to be imported into the EU-countries at a preferential tariff rate. Theoretically, this agreement only applied to products of Official Israeli origin. Thus, products of firms operating in the West Bank were not intended to take advantage of the agreement. But soon after it was established, many firms located in the West Bank still labelled their products as being of Israeli origin. In response to this problem, the European Commission (EC) issued a technical arrangement to Protocol 4 in the EU-Israel Trade Agreement whereby Israeli firms exporting to the EU would have to acquire a certificate of origin for their products. Specifically, this meant that exporters would have to provide a proof of the precise location of the production facilities in order to claim the associated trade benefits. In addition, retailers in the EU selling Israeli products originating from the West Bank were expected to distinguish these products from products originating from Official Israel. This was implemented in all EU member countries, including the UK, from February 1, 2005.

The policy had two main effects on the profitability of Israeli vegetable producers operating in the West Bank. First, consumers in the EU-countries gained knowledge about the true origin of the products. This may have had an influence on demand and affected consumption choices. Second, because of the differentiation in place-of-origin (between Official Israel and the West Bank), the products were no longer qualified to take advantage of the EU-Israel Trade Agreement. This was, in effect, the same as imposing a tariff on the products. Although it is difficult (or even impossible) to separate the two effects and their individual impact on the value of exports, their total effect can be studied and analyzed in order to evaluate the impact of the EC policy.

It could be expected that conscious consumers which attach negative qualities to WB-originating products would reduce their demand as a consequence of the new policy of labelling by origin in subsequent months from February 2005. However, results from other similar studies of the effect of place-of-origin on consumer demand show that demand is not likely to change significantly due to new information on the origin of the products. In addition, the analysis also highlights the complicated mechanisms between perception and consumption. Further, the direct negative impact on the profitability of firms operating in the
West Bank may have been counteracted by the more beneficiary subsidization policy of the Israeli Government, which was implemented in April 2005. Hence, the Israeli Government’s policy of subsidizing these firms may have, in part, offset the negative effect of the expulsion from the Trade Agreement.

A large share of Israeli firms located in the West Bank produces vegetable products. Exports are the main source of income for these producers, since the small size of the country limits the scope to increase production for the domestic market. Hence, this industry is important for the existence of Israeli firms in the West Bank. Since changes in the value of exports are expected to reflect changes in the profitability of exporting firms, an analysis of the development of the value of vegetable exports is useful to establish whether the implementation of the amendment to Protocol 4 had any notable effect on these firms.

The figure shows the development of the trend value of vegetable exports to the UK from November 1997 to October 2007.

It is evident that in the beginning of 2005, the trend value of Israeli vegetable exports to the UK experienced a decline which seems incapable of being explained by or attributed to factors normally expected to be the driving forces of fluctuations in Israeli exports (economic growth, product and input prices, exchange rates and security considerations). Hence, it seems non-spurious that the implemented technical arrangement corresponds with this development.
Further, the magnitude of the decrease does not present conclusive evidence against the hypothesis that the development is due to the implementation of the new EU policy. The percentage decline in the trend value of exports from February 2005 to August 2005 was 7.19%. Comparing this to the expected share of vegetable exports originating from the West Bank, it is apparent that the size of the decline is within reasonable boundaries of the expected decrease in the vegetable exports originating from Israeli producers in the West Bank.

Several simplifying assumptions have been made. In particular, the analysis is crucially dependent on two important assumptions; the framework developed by Armington (1969) of differentiated products and monopolistic competition, and the assumption in Melitz (2003) of exporters distinguished by profitability. Although simplifying, they remain useful for studying and analyzing the information given by the time series. Another advantage with the approach is that there is no need to collect information on the level of sales of Israeli vegetable products from every single UK retailer.

In order to increase the understanding of the effects of trade policy involving the complicated relationship between the Israeli and Palestinian export industries, it is necessary to reduce the uncertainty of the data. Correct and accurate policy decisions require reliable data. Hence, transparency should be encouraged and resources should be spent on collecting data.
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1. Introduction

On June 21, 2000, Israel and the member states of the European Union (EU) signed a trade agreement for products from Israel to be imported into the EU-countries at a preferential tariff rate. Theoretically, this agreement only applied to products of Official Israeli origin. Thus, products of firms operating in the West Bank were not intended to take advantage of the agreement. But soon after it was established, many firms located in the territory still labelled their products as being of Israeli origin. In response to this problem, the European Commission (EC) issued a “technical arrangement” whereby Israeli firms exporting to the EU would have to acquire a certificate of origin for their products. Specifically, this meant that exporters would have to provide a proof of the precise location of the production facilities in order to claim the associated trade benefits. In addition, retailers in the EU selling Israeli products originating from the West Bank were expected to distinguish these products from products originating from Official Israel. This was implemented in all EU member countries from February 1, 2005.

This paper examines the effects of the EC policy of labelling products from Israeli firms located in the West Bank by their place of origin. This policy had two main effects on the value of exports from the West Bank. First, consumers in the EU-countries gained knowledge about the true origin of the products. This may have had an influence on demand and affected consumption choices. Second, because of the differentiation in place of origin (between Official Israel and the West Bank), the products were no longer qualified to take advantage of the EU-Israel Trade Agreement. This was, in effect, the same as imposing a tariff on the products. As suggested by the new empirical literature on the export behavior of firms, only the most productive and profitable firms would choose to participate in exporting activity. Thus, any change in the value of exports will reflect changes in the profitability of firms and, as a consequence, the fraction of exporting firms. Both these effects are examined in the paper.

1 The term “Official Israel” refers to the area which the European Commission acknowledges as the State of Israel (European Union, EU positions on the Middle East process).

2 It should be noted that the results should not be used as an indication for the share of exports originating from the West Bank. By doing this, one implicitly assumes that most consumers would stop buying products labelled as "Produce of the West Bank". This is not a likely scenario due to both the range of opinions regarding the validity of the products and the uncertain relationship between perception and consumption. Note that the specific impact of labelling by origin on the demand for these products is not documented in this paper.

3 Note that the products were neither able to take advantage of the preferential agreement between the EU and the Palestinian Authority (PA).

In general, several problems should be addressed when conducting economic analyses related to territories characterized by a high degree of political instability. First, researchers may have problems extracting reliable data. As a result, the conclusions may become inaccurate. Second, it is difficult to isolate one specific factor and its corresponding effect. Several papers examine the impact on trade flows of economic and political variables. Usually, economists use different estimation techniques to analyze variables and their effects on total exports. However, territories characterized by political dispute and economic instability may be subject to several factors contributing to changes in the data at the same time, causing spillovers and multiplier effects. This requires the use of advanced models and extensive data collection. The estimation may be subject to large biases because of data uncertainty. Further, certain variables which are expected to affect the value of exports are contingent on the use of a proper proxy in order to be included in the model. For example, positive or negative media attention regarding a specific country may be expected to affect the demand choices for products originating from that country. But a proper measure of the level of media attention is difficult to construct. Hence, the results from the comparative analysis may become biased or inconclusive.

In order to examine the impact of the EC policy on Israeli firms operating in the West Bank, both theoretical analyses and empirical results will be applied. Most economic data are extracted from the Israeli Central Bureau of Statistics (ICBS), the Bank of Israel and the OECD. Both ICBS and OECD publish data of the value of Israeli exports, but neither distinguishes between exports from Official Israel and the West Bank. As a consequence, a share of the published value of exports originates from the West Bank. The statistics itself do not reveal how much of the value originating from that territory. If it did, then it would have been sufficient to either compare the value of exports before and after the implementation of the technical arrangement or compare the value of labelled and unlabelled products, and thereafter conclude that the difference was due to the expulsion from the Trade Agreement. However, apparently, since the path of a student of economics is sometimes hindered with obstacles, an indirect approach has to be applied instead. By examining the impact of other possible factors affecting the value of exports, one should be able to evaluate the probability of the EC policy of differentiating by origin being the main driving force behind the development of the value of exports in the period after its implementation. Further, since

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changes in the value of exports are expected to reflect changes in the profitability of exporting firms, it is considered to be sufficient to analyze the development of the value of exports in order to study the impact of the EC policy on Israeli firms operating in the territory. The results should be appreciated when the correlation between the time of the implementation of the label requirement and the development of the value of export cannot be explained away as spurious.

The next section will explain the choice of the United Kingdom (UK) as the country of destination for Israeli exports and the choice of vegetables as the export sector of the analysis. Section 1.2 will give a brief overview of the legal aspects of the EU-Israel Trade Agreement, UK regulations, and other technicalities of relevance. The definition of “origin” will be discussed, which is important for differentiating between products eligible for the preferential tariff rate and products which are not. Chapter 2 presents the extensive literature and theories on the factors considered to be the most important determinants of the value of Israeli exports. This is necessary in order to analyze the empirical relationship between these factors and the value of exports. As noted above, the indirect approach requires a thorough study of possible factors affecting the value of exports. Further, it is important to understand the economic consequences of the policy of differentiating by origin. Therefore, chapter 3 will offer a theoretical analysis of the two specific effects of labelling by origin on the value of exports. In chapter 4, the empirical trade data published by the ICBS, the Bank of Israel and the OECD are reported and discussed. The analysis of this chapter will be of crucial importance in evaluating the probability of the introduction of the new label requirement being the main driving force of the development of the value of exports. The last chapter summarizes and concludes.

1.1 Case: Exports of vegetable products to the UK

In order for the analysis to be constructive, it is necessary to disaggregate the total value of exports. Israeli firms export to all countries in the EU. If the analysis was to include all export destinations, the conclusion would be subject to country-specific differences. These are difficult to identify and may weaken its credibility. For the purpose of this paper, the UK is considered to be the most appropriate country of destination for Israeli exports. There are several reasons for this. First, the UK is one of the most important markets for Israeli products within the EU. Second, the UK Government has been effective in implementing the directive
of labelling by origin. Third, the country has influential consumer interest groups which use resources on validating consumer information. To further simplify the matter, it is useful to disaggregate total exports by industry. The UK imports a range of products from Israel. Many of these products are not typical consumer products. In order to examine the effect on demand of labelling by origin, only products with a high degree of availability and label visibility should be considered. Vegetable products satisfy these requirements. They are typical consumer products which are sold in many stores all over the UK. Therefore, the development of the demand for these products should reflect the general preferences of the population.

In addition, a large share of Israeli firms located in the West Bank produces vegetable products. Exports are the main source of income for these producers, since the small size of the country limits the scope to increase production for the domestic market. Hence, this industry is important for the existence of Israeli firms in the West Bank.

In order to evaluate the magnitude of the effect of differentiating by origin on Israeli firms operating in the West Bank, it is necessary to comprehend a reference of the share of the total value of Israeli vegetable exports actually originating from Israeli activity in the West Bank. However, this is difficult because the official statistics do not distinguish between exports from the two territories. van Gelder and Kroes (2009) use statistics on the amount of hectare (ha) land cleared for agricultural production in the West Bank and Gaza as a percentage of the total ha land cleared for agricultural production in Israel (which include Official Israel, West Bank and Gaza) as a proxy for the percentage of agricultural exports from the West Bank and Gaza hidden in the statistics of total agricultural exports. They have extracted data from the ICBS’s Statistical Abstract of Israel Database, which reports the amount of ha land cleared in the West Bank and Gaza for vegetable, potato and melon production as a percentage of the total area cleared for the production of these products. The percentage of ha land cleared for production of these products was reported to be 5%. Thus, according to their approach, this would imply that the statistical chance of vegetable, potato and melon exports originating

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6 As a result, most retailers are expected to have complied with the EC requirements.
7 For example chemical products, textiles, agricultural products and machinery (Central Bureau of Statistics, Foreign Trade Statistics Monthly).
8 According to a report issued by the Ministry of Agriculture and Rural Development and The Israel Export and International Cooperation Institute in 2003 (Israel’s Agriculture: Innovations Make the Land Bloom, Part 1).
from the West Bank would be 5%. However, the method neglects several important points.\(^9\) First, the climate in the West Bank is particularly suitable for growing many types of vegetable products almost all year around. Hence, the productivity per ha of agricultural land may be higher in the West Bank than in Official Israel. Consequently, although the amount of land in the West Bank is only a small percentage of the total agricultural land, the share of total production may be significantly larger. Second, a relatively larger share of vegetable producers in the West Bank may produce for foreign markets, which is their main source of income.\(^10\) Vegetable producers in Official Israel may produce relatively more for the domestic market. Accordingly, even though the share of total cleared ha of land is small, the share of total vegetable exports is likely to be larger. Hence, although the share of land cleared for agricultural production is useful as a reference, it could be expected that the share of exports originating from the West Bank is somewhat larger.

1.2 Laws and regulations

The EU-Israel Trade Agreement (officially named the “Euro-Mediterranean Association Agreement”) was established June 21, 2000, between the State of Israel and all the member countries of the EU.\(^11\) Its economic aims were to improve and promote economic relations and cooperation and increase the trade in goods and services between the parties.\(^12\) In general, the Agreement prohibits any quantitative restrictions on imports (other than those already specified in the Agreement) or discrimination against imports.\(^13\) Further, Article 22 states that the importing country may take appropriate measures against anti-dumping behavior.\(^14\) This limits the possibility of Israeli exporters dumping their products in the UK. As a result, neither restrictions on imports or anti-dumping behavior should be expected to have occurred in such a degree as to have had much impact on the value of exports.

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\(^9\) In addition to the problems associated with aggregating vegetables, potatoes and melons into one category and the inclusion of land cleared for production in the Gaza Strip (evacuated for all Israeli economic activity in August 2005), which nonetheless make the proxy unsuitable for the analysis of this paper.  
\(^10\) According to the report issued by the Ministry of Agriculture and Rural Development and The Israel Export and International Cooperation Institute in 2003 (Israel’s Agriculture: Innovations Make the Land Bloom, Part 1).  
\(^11\) Which at the time included Austria, Belgium, Finland, France, Germany, Italy, Luxembourg, the Netherlands, Denmark, Ireland, United Kingdom (UK), Greece, Portugal, Spain and Sweden.  
\(^13\) The Euro-Mediterranean Agreement of 21.6.2000, L147/6, Article 16 and L147/7, Article 19.  
Regarding vegetable products, two specific protocols are of particular relevance. First, Protocol 1 lists the arrangements applicable to importation of Israeli products into the EU\textsuperscript{15}. The Protocol states that “Customs duties shall be either eliminated or reduced (…)”\textsuperscript{16}. The Annex to the Protocol specifies the reductions in the customs duty beyond the pre-Agreement level. It is clear that most vegetable products enjoy reduced tariff. Although the European Commission (EC) considers all Israeli economic activity in the West Bank as illegal, there is currently no law prohibiting products originating from the territory from entering the EU. However, since the EC distinguishes between Official Israel and the West Bank, a distinction is also made between products originating from the two territories. Thus, the definition of “Israeli originating products” is crucial. Protocol 4 states the origin criteria\textsuperscript{17}. Products originating from Israel are defined as “\textit{products wholly obtained in Israel within the meaning of Article 4 of this Protocol}”, and further, “\textit{products obtained in Israel which contain materials not wholly obtained there, provided that the said materials have undergone sufficient working or processing in Israel (…)}”. The first part of the definition is especially applicable to vegetable products, since many vegetable products do not go through any processing. Hence, Israeli vegetable exporters operating in the West Bank cannot be included in the Agreement by establishing a production facility in Official Israel and then claim that the product has undergone sufficient working or processing. According to Article 4, vegetable products must be harvested in Israel in order to be considered as wholly obtained in Israel\textsuperscript{18}.

Nevertheless, many firms operating in the West Bank were still enjoying a preferential tariff rate simply by stating that their products were originating from Official Israel\textsuperscript{19}. In response to these problems, in December 2004, the EU-Israel Customs Cooperation Committee approved a technical arrangement on the implementation of Protocol 4 to the EU-Israel Agreement, whereby Israeli exporters would have to provide a certificate on the origin of their products (Israel Tax Authority, 2005). This technicality was effectively implemented in all EU member

\textsuperscript{15} The specific vegetable products covered by the protocol are listed in its corresponding Annex. For notification, most vegetable products are included in the Agreement.


\textsuperscript{17} The Euro-Mediterranean Agreement of 21.6.2000, Protocol 4, L147/50, Article 2 and L147/51, Article 4.

\textsuperscript{18} The Euro-Mediterranean Agreement of 21.6.2000, Protocol 4, L147/51, Article 4

\textsuperscript{19} Article 32 of Protocol 4 states that the verification process should be carried out by the customs authority of the exporting State (Israel) whenever the importing State (the UK) have reasonable doubt as to the authenticity and validity of the originating status on the exporter’s declaration. Hence, an incentive problem seems to be present since the customs authorities of the exporting country are the ones verifying the exporters. Thus, the EC’s verification and enforcement policy were incapable of differentiating between products originating from Official Israel and the West Bank\textsuperscript{19}. This was confirmed by the EC Notice to Importers of November 23, 2001, regarding imports from Israel into the Community (2001/C328/04).
countries (including the UK) from February 1, 2005\textsuperscript{20}. The certificate should include a proof of the precise location of the production process and its associated postcode. This technicality involves two different set of regulations, one concerning “Country-of-Origin labelling” for the purpose of consumer information and one concerning “Rules-of-Origin” for the purpose of Customs classification. This is a typical source of confusion which should be clarified. The former affects trade flows through changes in consumers’ perceptions as a result of increased consumer information, while the latter affects trade flows through its impact on the tariff rate applied to these products when they are exported into the EU. The next two subsections will offer a brief walkthrough of the corresponding sets of regulations.

1.2.1 Country-of-Origin labelling

There are two especially important laws and regulations that apply to products from the West Bank exported into the UK; the EC Directive 2000/13 and the Food Labelling Regulations of 1996.

The EC Directive 2000/13 relates to labelling, presentation and advertising of food products (including vegetable products) in the EU Member States. The view of the EC is that “Detailed labelling, in particular the exact nature and characteristics of the product which enables the consumer to make his choice in full knowledge of the facts, is the most appropriate since it creates fewest obstacles to free trade”\textsuperscript{21}. Article 1 defines the concept of labelling as “labelling shall mean any words, particulars, trade marks, brand name, pictorial matter or symbol relating to foodstuff and placed on any packaging, document, notice, label, ring or collar accompanying or referring to such foodstuff”\textsuperscript{22}. Further, Article 2 states that “The rules on labelling should also prohibit the use of information that would mislead the purchaser to a material degree, particularly: (i) as to the characteristics of the foodstuff and, in particular, as to its nature, identity, properties, composition, quantity, durability, origin or provenance, method of manufacture or production; (...)”\textsuperscript{23}.

\textsuperscript{20} An examination by the Council of the European Union carried out in 2007 concluded that the arrangement was satisfactory implemented (as noted in the reply to a written question by the Working Party on General Affairs (P-6587/09) regarding the measures taken by the Council on the implementation of the arrangement).
Hence, imported products sold in stores in the EU should be labelled by the proper origin in order to increase consumers’ information\textsuperscript{24}.

The Food Labelling Regulations of 1996 requires the place of origin of a food to be clearly shown on the product if failure to do so might mislead the purchaser to a material degree as to the origin of the food\textsuperscript{25}. Notable, this does not necessarily involve labelling by country of origin. Instead, retailers in the UK might (in some cases, for example regarding products originating from the West Bank) be expected to label their food products with the place (and not country) of origin. Thus, since the West Bank is not considered by the EC to be part of Official Israel, products originating from the territory should be labelled as “Produce of the West Bank” instead of the former “Israeli produce”\textsuperscript{26}. Further, it states that place of origin should be easy to understand, clearly legible and easily visible\textsuperscript{27}. Because of the strict laws and enforcement policy in the UK, most retailers are expected to have abided by the rules-of-labelling. As a result, the consumers in the UK should be expected to have had sufficient information to distinguish between products originating from Official Israel and products originating from the West Bank.

\subsection*{1.2.2 Rules-of-Origin for Customs classification}

As explained in the walkthrough of the EU-Israel Trade Agreement and in accordance with the original definition of “origin” in Protocol 4 of the agreement, firms operating in both Official Israel and the West Bank were able to enjoy the preferential tariff rates specified in Annex 1 of Protocol 1 prior to February 1, 2005. Article 18 of Protocol 4 states that “The movement certificate EUR.1 shall be issued by the customs authorities of Israel if the goods to be exported can be considered as products originating in Israel (…)”\textsuperscript{28}. Hence, the customs authorities of Israel are responsible for issuing export certificates to Israeli exporters. Article

\textsuperscript{24} In the UK, the EC Directive is implemented through the Trade Description Act of 1968 and the Food Safety Act of 1990. Both specify the offence of falsely describing or presenting food and the punishment of the offences. The main difference between them is that the former refers to traded products in general while the latter refers specifically to food products.

\textsuperscript{25} The Food Labelling Regulations 1996: Guidance notes on place of origin, issued by the UK Department of Trade and Industry, December 1996.

\textsuperscript{26} According to the UK Department for Environment, Food and Rural Affairs’ advice to retailers on December 10, 2009, since 2005 the practice in the UK has been to label Israeli products from the West Bank as “Produce of the West Bank”.

\textsuperscript{27} The Food Labelling Regulations of 1996: Guidance notes on place of origin, issued by the UK Department of Trade and Industry, December 1996.

18 of Protocol 4 specifies the procedure of the issue of export certificate EUR.1\textsuperscript{29}. In order to receive the export invoice the exporter must fill out the EUR.1-form and its application. In addition, the exporter must be prepared to submit all proofs of origin and other requirements at the request of the customs authorities. In order to induce the Israeli customs authorities to improve the validity of the certificates regarding the originating status, the EU-Israel Customs Cooperation Committee approved a technical arrangement whereby Israeli exporters must provide a proof of the precise location of the production facilities (Israel Tax Authority, 2005). In addition to the requirements applying to the exporters, the EC Notice to Importers of January 25, 2005, specifies the offence of retailers which do not comply with the tariff regulations. It states that West Bank-originating products in free circulation in the EU-markets would give rise to a customs debt\textsuperscript{30}. Hence, both the exporter and the importer are obligated to ensure that the products are subject to the appropriate tariff rate.

\textsuperscript{29} The Euro-Mediterranean Agreement of 21.6.2000, Protocol 4, L147/55, Article 18 (1-8).
\textsuperscript{30} EC Notice to Importers of January 25, 2005: Imports from Israel into the Community (2005/C20/02).
2 Theory and literature

A theoretical analysis of the underlying forces of fluctuations is needed in order to properly understand the development of the value of exports. In 2006, The Israel Export and International Cooperation Institute (2006) identified the most important factors influencing Israeli exports. These were the development of economic growth, international trade, the security situation and exchange rates. This chapter will give a brief review of the extensive literature that exists regarding these factors and their effects on trade flows.

2.1 Product characteristics

In order to analyze how demand for traded products influences the number of exporting firms and the value of exports, some specifications are needed regarding the characteristics of the products. Several authors have developed different models to cope with this issue. Armington (1969) introduced a theory of demand for products distinguished by category and place-of-production. Hence, products were assumed to be imperfect substitutes. Dixit and Stiglitz (1977) presented a model with a single representative consumer demanding many varieties of a single differentiated product. Feenstra (2004) suggests that a model with monopolistic competition is the most suited framework for analyses of demand for traded products when increasing returns are present. In a monopolistic competition model, the market consists of many firms, each producing a unique variety of a differentiated product. Thus, consumers attach different values of quality to each product. The assumption of differentiated products is especially applicable to vegetable products, given the diversity of vegetable varieties and seasonal differences in harvest. Hence, vegetable products are expected to be differentiated by place-of-production. In this sense, because of the change in the practice of labelling products originating from the West Bank as “Produce of the West Bank” compared to the former “Israeli produce”, the products are differentiated. As an example, assume first that Israel exports two types of vegetables to the UK; avocados and tomatoes. Both types are labelled as “Israeli produce”. Accordingly, consumers in the UK view these products as two products: avocados from Israel and tomatoes from Israel. When introducing the technical arrangement of labelling-by-origin, some of the avocados and tomatoes are suddenly labelled as “Produce of the West Bank”. Consumers in the UK will now view these products as four differentiated products: avocados from Israel, tomatoes from Israel, avocados from the West Bank and tomatoes from the West Bank.
However, although there do not exist perfect substitutes for products differentiated by place-of-production, there may exist competition between *product classes* (Armington, 1969). To illustrate, consider in addition UK imports of vegetable products from Spain. Assume that the market for vegetable products in the UK consist of these two classes, Israeli vegetables and Spanish vegetables, each with a specific share of the total market. Following the adoption of the new labelling procedure, the total market of vegetables is suddenly divided in three, Spanish vegetables, Israeli vegetables and West Bank-originating vegetables (from now on referred to as WB-vegetables). Each market consists of two types of vegetables; avocados and tomatoes. Therefore, we have six differentiated products in the market: Israeli avocados, Israeli tomatoes, Spanish avocados, Spanish tomatoes, WB-avocados and WB-tomatoes. Armington (1969) assumes that each product’s market share is unaffected as long as the relative prices in that market is unchanged. According to this, the demand for Spanish vegetables is not affected by the new labelling procedure as long as the relative prices remain the same. As long as some consumers in the UK choose to buy WB-vegetables, this class will capture a share of the total market. Since the size of the total market is unchanged (holding all prices constant), a reallocation of the market shares is expected. The demand for Spanish vegetables is assumed to be constant unless some consumers in the UK in support of firms operating in the West Bank choose to substitute Spanish products for WB-products or if the relative prices changes. The demand for Israeli vegetables is subject to similar conditions. We know for certain that the total market share of Israeli vegetables has decreased, since a share of the former Israeli vegetables is now recognized as WB-vegetables, provided that some UK consumers demand these products. Accordingly, WB-vegetables will unambiguously capture a share of the total market for vegetables as long as relative prices are constant. Armington (1969) suggests two restrictions in order to further investigate the substitutability between products. First, he assumes that the elasticity of substitution between products in any of the three markets is constant. In other words, they don’t depend on market shares. Second, he assumes that the elasticity of substitution is the same between two products in the same market and any other pair of products in the market. When these two restrictions hold, then the specific product’s share of the corresponding market will depend on its price relative to the average price in the market. Or, in the context of the example, the market share of WB-

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Note that an explicit discussion of the UK production of vegetable products is omitted from the analysis. Usually, there is some degree of competition between imports and domestically produced products. However, when the assumption of differentiated products hold, then domestically produced products would not have any effect on the demand for imports, except through the relative prices (as in the case with Spanish vegetable products).
tomatoes will depend on its price relative to the prices of both Israeli tomatoes and Spanish tomatoes.

The simplifications made in this section may underestimate the complexity of consumer demand. A range of factors influencing consumption decisions should be considered. Armington (1969) noted further that the specific market’s share of the total market will depend on the level of income and preferences. The next section will discuss the link between income and demand for traded goods, while preferences are discussed in section 3.1 regarding demand for products originating from the West Bank.

2.2 Economic growth

Coyle et al. (1998) identified the major determinants of changes in the structure of global food trade. They analyzed patterns of world agricultural trade from 1980 to 1995. Several factors were highlighted as important determinants. These include food expenditure, factors of production, transport costs and trade policy changes. However, the study found that the most important factor explaining changes in food trade patterns over time was economic growth. New empirical literature normally uses gravity equations to estimate the effect of economic growth, as measured by growth in the gross domestic product (GDP), on trade flows. McCallum (1995) developed a version of the gravity equation where the value of exports was a function of the distance between the exporting and importing country and their corresponding GDP’s. The results from his estimation indicate that the GDP growth in both the importer country and the exporter country have a positive impact on the value of exports. Traditional theory of trade suggests that GDP growth in the importer country is expected to increase exports through its positive effect on the demand of consumers, while growth in the exporter country is expected to increase exports through its positive impact on profits and production capacities. Baier and Bergstrand (2001) derived an equation which expressed the growth of the total value of exports from country \( i \) to country \( j \) as a function of the changes in transport costs, changes in the GDP’s of the two countries, changes in relative country size, and changes in the prices in each country. The estimation uses data for sixteen OECD member countries and confirms McCallum’s results of a positive relationship between GDP in both countries and the value of exports from country \( i \) to \( j \). Anderson and van Wincoop (2003) found similar relationships in their study of trade and border effects. While the positive relationship between exports from country \( i \) to \( j \) and GDP in country \( j \) is not subject to much
dispute in the literature, there are some concerns regarding the direction of causality between the volume of exports and GDP in country $i$ (the exporter country). Although economic theory suggests that export growth contributes positively to economic growth, empirical studies have yet managed to prove this link (Xu, 1996, Anwer and Sampath, 1997). Instead, in accordance with the arguments of Melitz (2003), Helpman et al. (2008) and others, an increase in firms’ profits as a result of GDP growth in the domestic country is expected to have a positive impact on exports, since only the most profitable firms are expected to participate in exporting activities. Hence, it is reasonable to assume that an increase in the GDP of the domestic country will increase the number of exporting firms and, as a result, both the range of varieties exported and the value of exports.

The practice of reporting the GDP growth in either nominal or real terms seems to be ambiguous. Some researchers have questioned the choice of real GDP as a proper measure of a country’s economic growth. Kohli (2003) argued that real GDP can be misleading in cases where the country is subject to changes in terms-of-trade. Instead, he favors the use of real domestic income as a proxy for domestic growth. In his study, he finds that real GDP underestimates growth in real income when the terms of trade improve. In addition, some studies choose to report the total real GDP growth, while others report the real GDP growth per capita, thereby incorporating population growth into the variable. Traditional trade theory suggests a positive correlation between population growth in the importer country and demand for exports. In contrast, a negative correlation between population growth and supply of exports is expected in the exporter country, because a larger share of total production is needed for domestic consumption. Bergstrand (1985) criticizes this and argues instead that a larger population allows for economies of scale and therefore has a positive effect on exports. Nevertheless, since real GDP growth per capita still is the preferred choice among most economists, it is chosen as the unit of measurement for economic growth in this paper.

### 2.3 Product prices

Traditional economic theory suggests that, in general, an increase in the price of a product reduces the demand for that particular product. To illustrate, consider the framework of section 2.1. The market consist of two products with three differentiated origins; tomatoes from Israel, avocados from Israel, tomatoes from Spain, avocados from Spain, tomatoes from the West Bank and avocados from the West Bank. The products are not perfect substitutes,
and each product has its own unique price. Thus, there is also some degree of competition among products within the same category (for example between Israeli tomatoes, Spanish tomatoes and WB-tomatoes)\(^{32}\). Therefore, the demand for each product is a function of the prices of all products within the same category. Specifically, the demand for WB-tomatoes is a function of income, its own price, and the prices of both Israeli and Spanish tomatoes. Since February 2005, WB-products were not longer eligible to take advantage of the preferential tariff rate from the agreement between Israel and the EU. The result was in effect an extra tariff imposed on these products (compared to before the implementation of the technicality). Anderson and van Wincoop (2003) argue that most trade costs are borne by the exporter. In this sense, because of the competition among the varieties of the same product category, it should be expected that the whole tariff could not be passed on to the consumers through increases in product prices, because a large price increase could lead to a large drop in demand\(^{33}\). Nevertheless, an increase in prices (although not large) would be expected, and this increase may lead to reduced demand for WB-products (this argument is further discussed in section 3.2). Hence, the demand for WB-tomatoes might decrease. In addition, according to Helpman et al. (2008), the decrease in demand would have a negative impact on the proportion of exporting firms, because only the most profitable firms are expected to export\(^{34}\). Hence, the supply of WB-products would decrease. This would have a negative impact on the value of exports (if all other factors are held constant). The impact on the published Israeli value of tomato exports (which include both Official Israeli tomatoes and WB-tomatoes) could be dampened by an increase in the demand for tomato exports from Official Israel. But, some of the consumers’ reduced demand for WB-tomatoes could also be satisfied by an increase in the demand for Spanish tomatoes. Hence, the direct effect on the published value of exports of the reduced demand of WB-tomatoes is larger than the indirect effect of increased demand for Official Israeli tomatoes, because some of the demand for tomatoes would be satisfied by imports of Spanish tomatoes.

Thus, this section confirms the argument in section 2.1 of a reallocation of market shares as a result of the implicitly imposed tariff. This reallocation takes place through two main

\(^{32}\) As explained in Armington (1969).

\(^{33}\) In this framework, only reduced production of all varieties (that is Spanish, Israeli and West Bank-originating) could result in a substantial increase in product prices. Further, if all prices increases (and the increase is not countered by an equal increase in income), then the demand for each product is expected to decrease.

\(^{34}\) Though the increase in prices might offset the negative effect on profits of reduced demand, the overall effect is expected to be negative. The reasoning behind this argument is that if firms subject to the initial conditions could increase their prices without reducing profits, then they were not profit maximizing in the initial state. Hence, a price increase is expected to have a negative overall effect on profits.
channels. The first channel works through the emergence of a market for WB-products (because of the differentiation of products by origin), and the other channel works through changes in prices (because of the implicitly imposed tariff rate). Hence, the development of prices may be an important factor of fluctuations in the value of exports. Unfortunately, information on the development of the price level of WB-vegetable products in the UK cannot be differentiated from the general price level in the food sector. But, because of the competition among the varieties, the time series of food prices is a useful proxy (thereby implicitly assuming that the tariff as a whole is absorbed by the producer and, in addition, that WB-vegetable products follow the same price development as the rest of the sector). Both the time series of food prices in the UK and the general development of prices in the UK economy (implicitly measured by the real exchange rate between the Israeli shekel and the UK pound which includes the consumer price index) are reported in chapter 4.

2.4 Input prices in agricultural production

Price volatility of goods and services used in the production process can affect profits per unit of final output through its impact on the marginal value of inventory and the marginal cost of production (Pindyck, 2004). When input prices are volatile, there is a greater demand for inventories. Uncertainty about input prices increases the need for larger inventories in order to smooth production and fulfill delivery orders\(^\text{35}\). Thus, the increase in inventories, which is associated with increased costs, may increase product prices. Although the use of input price indices can be helpful in understanding the empirical relationship between final product prices and demand, it neglects several important costs which may influence the supply decision (Feenstra, 2004). Costs of overseas transactions involving time, currency and money are probably not adequately captured by the price indices. Nevertheless, important insight can be gained from examining the relationship between input prices and the value of exports.

The Israeli Bureau of Statistics publishes the time series of the price index of input in agricultural production\(^\text{36}\). It is measured as the percentage change in the costs of acquiring

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\(^\text{35}\) The role of inventories will be further examined in section 2.6 in relation to the discussion of security considerations.

\(^\text{36}\) It contains a range of input with individually attached weights. Examples of input included in the index are wages, seeds and other inputs for vegetable crops, and fertilizers.
goods and services used in the production process. An increase in the agricultural input index is expected to have a negative impact on firms’ profits in the agricultural sector, and accordingly, reduce the range of exporting firms in the industry. In the case of Israeli firms operating in the West Bank, uncertainty about the daily number of workers made firms replace cheap Palestinian labor with more expensive foreign labor (Miaari and Sauer, 2006), leading to an increase in the agricultural input index. This may have increased the firms’ production costs, and reduced profits. When profits decrease, the least productive firms are forced to exit the export market (Melitz, 2003, Helpman et al., 2008). Hence, the number of exporting firms reduces. However, this does not necessarily translate into a reduction in the total value of exports. Eaton and Kortum (2002) argue that the value of trade reflects both an intensive and extensive margin. The former is related to the volume of exports per exporter, while the latter is related to the number of agricultural varieties exported. Assuming that all products are differentiated, the exits of some firms will unambiguously reduce the extensive margin of exports. But, if more than one firm exports the same variety, then the exit of some less productive firms may increase the market shares of the remaining exporters. In this case, the increased intensive margin of exports may offset the negative impact of the reduced extensive margin, leaving the value of total exports unchanged. Thus, the exit of some less productive firms may be offset by increased production of others.

2.5 Exchange rates

Most of the recent empirical studies of the relationship between exchange rates and exports emphasize the impact of both the level and volatility of exchange rates between the exporting and the importing country. In addition, changes in the exchange rate between the exporting country and all other importing countries could affect the volume of trade between two trading countries. There have been some discussions regarding the use of nominal or real exchange rates in comparative analyses, especially regarding the proper measure of volatility. Gotur (1985) argues in favor for the use of real exchange rates. He suggests that the risk associated with volatility of nominal exchange rates may be offset by changes in costs and prices. Bini-Smaghi (1991) criticizes this and suggests instead that nominal exchange rate

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37 Specifically, the index is calculated using the prices of a fixed basket of representative input from a base year. Setting the year 2000 = 100, and then calculating the percentage change using the equation: % change = \( \left( \frac{\text{index}_x}{\text{index}_{x-1}} \times 100 \right) - 100 \)

38 Note that in 2008 the High Court of Justice issued a ruling that Israeli firms operating in the West Bank must pay the Israeli minimum wage to Palestinian workers which may have increased the agricultural input index.

39 The assumption of differentiated products will be discussed further in chapter 3.1.

40 See for example McKenzie and Brook (1997) or Vergil (2002).
should be used as a measure of volatility. Qian and Varangis (1994) argued that the choice of either the nominal or the real exchange rate will not affect the results. McKenzie and Brooks (1997) support this conclusion. Since the volatility of the real exchange rate is influenced by both the volatility of the nominal exchange rate and the relative prices, it should reflect the real choice of agents. The literature has commonly used the consumer price index to deflate the nominal rate. The real rate is usually calculated by adjusting the nominal exchange rate by the ratio of the foreign price level to the domestic price level. Specifically, it is done by multiplying the nominal exchange rate between the domestic currency and the foreign currency with the consumer price index (CPI) in the foreign country, and dividing it on the CPI in the domestic country. In this paper, both the level and volatility of exchange rates are reported in real values.

The next subsection will review the theory of the level of exchange rate and its impact on the value of exports. The theory of exchange rate volatility will be studied in subsection 2.5.2, while the multilateral exchange rate as a measure of competitiveness and its impact on exports will be discussed in subsection 2.5.3.

2.5.1 The level of exchange rate

The level of the exchange rate is expected to influence both the supply of and demand for exports. Traditional economic theory suggests that an appreciation of the currency of the exporter relative to the currency of the importer (an appreciation of the exchange rate) would decrease the exporters’ profits, thereby making the exporting activity less attractive (holding all other variables constant). In the same way, a depreciation of the exchange rate increases the exporters’ profits and strengthens the incentives for participating in exporting activity. Franke (1991) argues that as long as the exchange rate yields positive profits from participating in exporting activity, firms will choose to export. Hence, a depreciation of the exchange rate is expected to increase the value of exports. In addition, Bernard and Wagner (2001) suggest that as the domestic currency appreciates, exit rates increase and entry rates decline. In this sense, the number of exporting firms and the value of exports will further decrease as a result of a real appreciation of the domestic currency. While the exporter would

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41 See for example Thursby and Thursby (1987) or Carporale and Doorodian (1994).
42 The consumer price index (CPI) is the average changes in the prices of consumer goods and services purchased by households. CPIs are presented as an index where a specific chosen year is the base year and equal to 1,00.
43 The exchange rate is here defined as the amount of the currency of the exporter per unit of currency of the importer.
choose to export as long as profits are expected to be positive, the importer might choose to withdraw from the trade relationship if the exchange rate appreciates below a certain level. Subsequent periods with a low exchange rate might induce the importer to replace the Israeli exporter with trading partners in other countries. Thus, an appreciation of the exchange rate is associated with two negative effects on exports; a decrease in the supply of exports due to reduced competitiveness and a reduction in importers’ willingness to participate in trade relationships. As a result, the overall effect on the trend value of exports of an appreciation (depreciation) of the real exchange rate is expected to be negative (positive)\(^{44}\).

2.5.2 The volatility of exchange rate

The impact on exports of exchange rate volatility is highly debated in the literature. Hooper and Kohlhagen (1978) argue that increased volatility leads to increased uncertainty and risk, and thus is expected to have a negative impact on both exporters and importers willingness to trade, assuming that both agents are risk-averse. Feenstra and Kendall (1991) suggest that risk-averse exporters will raise the prices when the volatility of exchange rate increases, but only if they set the prices in the foreign currency. De Grauwe (1988) argues that the response of an exporter of higher exchange rate risk will depend on whether the expected marginal utility is a convex or concave function of the exchange rate. In other words, if the exporter exhibits a high degree of risk aversion, he will choose to export less as the volatility of exchange rate increases. Further, a low degree of risk aversion will induce the exporter to increase exports if the volatility of the exchange rate increases in order to counteract a decline in expected revenues. Franke (1991) suggest that a risk-averse firm will enter a market sooner and exit the market later if the firm operates in a monopolistic competitive market and the expected cash flow is an increasing function of the real exchange rate. As a consequence, the number of exporting firms will increase (decrease) if the volatility of the exchange rate increases (decreases), and the volume of exports will change accordingly. Although, currently, there do not seems to be a consensus among economists, recent empirical studies

\(^{44}\) Note that if the trade agreement is specified in such a way that the importer is required to buy a minimum amount of products, then an appreciation of the exchange rate is not expected to decrease the short-term demand for exports, provided that the mean of transaction is in the currency of the exporter. The importer has committed to import a certain amount and cannot withdraw from the agreement even though import prices have increased (assuming that import prices are not specified in the agreement). However, this argument is not valid for the case of Israeli exports to the UK, since, as is shown in Appendix C, most exports are priced in UK pounds.
seem to suggest that there is a negative relationship between exchange rate volatility and the total value of exports\textsuperscript{45}.

2.5.3 The multilateral exchange rate
A firm may export to multiple countries. Therefore, in accordance with the argument of Melitz (2003) and Helpman et al. (2008), the firm’s profit is influenced by the bilateral exchange rates between the domestic currency and all currencies of importing countries. In other words, both the level of exchange rate between the Israeli shekel and the UK pound and the exchange rate between the shekel and all other currencies of major trading partners may have an impact on the profit and the export choice. Reporting the bilateral exchange rates between the shekel and the currencies of all trading partners would be too informational. It is more useful to use a \textit{multilateral} exchange rate index (the exchange rate between the domestic currency and an index of the currencies of all major trading partners). Similar to the discussion in section 2.6.2, a depreciation of this rate is expected to reduce the supply of exports to the destinations included in the index. In other words, the competitiveness of the firms is reduced. Since firms are expected to engage in exporting as long as profits are positive, any variable affecting the profitability of firms would reduce the value of exports to the UK (provided that the firms exporting to countries included in the index also exports to the UK). However, in accordance with the arguments of Hooper and Kohlhagen (1978) and Warner and Kreinin (1983), the negative effect on the value of exports could be dampened if the reduced supply of exports to the countries included in the index is partly offset by increased supply of exports to the UK. Nevertheless, in the short-term, a depreciation of the multilateral exchange rate is expected to decrease the value of exports to the UK. The time series of the monthly percentage change of this rate is reported in chapter 4.3\textsuperscript{46}.

2.6 Security measures and infrastructure
Even though most developed countries face the same causes of fluctuations in the value of exports, some factors are subject to domestic conditions. This is particularly plausible when studying the role of infrastructure on trade in territories of political dispute, which may be subject to security issues, thereby inflicting uncertainty and inefficiency on economic activity.

\textsuperscript{45} See for example Vergil (2002) regarding exchange rate volatility and trade flows in Pakistan, or Carporale and Doroodian (1994) for US imports from Canada.

\textsuperscript{46} The monthly percentage change in the multilateral exchange rate measures the monthly change in competitiveness of Israeli firms.
This section will examine the relationship between security measures and infrastructure in the West Bank, and its impact on the value of exports.

Gehlhar and Coyle (2001) argue that the relative abundance of land is the most important determinant of agricultural production in the long run. But, the amount of land cleared for agricultural production is relatively fixed for most regions, particularly for small territories such as Official Israel and the West Bank. In addition, topographical factors such as rough terrain and infertile soil may limit the scope of expansion. Hence, this factor is not likely to be the most important source of fluctuations in the supply of vegetable products. The effective use of vegetable production areas in the West Bank may instead be subject to the degree of enforcement of closure and the number of work permits issued to workers, which are consequences of dynamic security considerations. In the study of Miaari and Sauer (2006), statistics on the frequency of closures in the West Bank and Gaza Strip is used to analyze the Palestinian labor market. Instead, in this paper, the frequency of closures (measured by the number of physical obstacles in the West Bank) is used as a proxy for the level of infrastructure and its effect on exports. The Israeli Defense Force (IDF) have a policy of increasing (decreasing) the number of obstacles in accordance with a deterioration (improvement) in the security situation. Hence, the time series of the number of obstacles in the West Bank should reflect the development of the level of security. The numbers of physical obstacles installed at different locations in the West Bank and the restrictions of movement of people are likely to be important factors affecting the daily production levels of Israeli firms. These obstacles had a severe impact on the accessibility of Palestinian workers in the Israeli firms located in both the West Bank and Official Israel during the second Intifada. There are no exact figures of the number of Palestinian workers in Israeli firms operating in the West Bank. However, some organizations produce estimates based on the number of issued work permits and the number of employees in Israeli firms. In 2009, there was approximately 10,000 Palestinians employed in Israeli firms in the West Bank, East Jerusalem and the Golan Heights (Kav LaOved, 2009). In September 2006, the Israeli Civil Administration’s Labor Officer estimated the number of Palestinian workers in the Jordan Valley, the main agricultural area in the West Bank, to be approximately 8000. Additionally,

47 According to a report by the Office of the UN Special Coordinator in October 2005 (Economic Fragmentation and Adaption in the Rural West Bank, p. 13). In addition, it was also noted in the official blog of the IDF (Israel Defense Forces, 2010), and by the Israeli ambassador to the UN Meron Reuben in his first speech addressed to the Security Council in October 2010.

48 As noted in section 2.4 (regarding production uncertainty and replacement of Palestinian workers with foreign workers).
an estimated 20,000 Palestinians worked inside Israel in agricultural production and construction facilities. The restrictions on the movement of this workforce may have caused fluctuations in the production levels. Grinberg (2007) made a more thorough study of the impact of the second Intifada (2000-2005) on the Israeli economy. He suggests that the Intifada affected the value of exports from the West Bank through multiple channels. It had a direct negative impact on the profitability of Israeli firms operating on the West Bank through the increased costs of transportation caused by the security threats, shipping interruptions and foreign importers switching to more reliable sources of supply. In addition, the volume of the Israeli-Palestinian inter-trade decreased. Since Palestinian agricultural products were relatively cheaper, some Israeli firms bought these and exported them into the UK. Hence, a share of the Israeli vegetable exports was produce of Palestinian firms. The exports of these products substantially declined from September 2000, due to the outbreak of the second Intifada and the restrictions on movement of products from the West Bank (World Bank report, 2006). These restrictions had a negative impact on the infrastructure in the West Bank through accessibility and time-consuming security checkpoints (World Bank report, 2007).

The UN Office for the Coordination of Humanitarian Affairs (UNOCHA) estimated an increase in physical obstacles (such as checkpoints, roadblocks and gates) between 2005 and 2006 of 44%. The Israeli Information center for Human Rights in the Occupied Territories (B’Tselem) reported that in 2005 there were 132 days of comprehensive closure banning all movement. In 2006, there were 78. Accordingly, the Israeli-Palestinian inter-trade would be subject to dynamically infrastructural problems which cause inefficiency in the production levels, and thereby have a negative effect on economic activity. However, because of the infrastructural difficulties, Israeli firms in the West Bank may need larger inventories in order to satisfy export orders during periods with production uncertainty. In periods of reduced production capabilities, the large inventory may then have a dampening effect on fluctuations in supply of exports caused by restrictions on movement of the workforce.

Thus, changes in the number of physical obstacles in the West Bank have three main effects on exports. The first effect works through the direct impact on production levels as a result of changes in the accessibility of workers and transportation of products. The second effect works through changes in the amount of Israeli-Palestinian inter-trade (changes in the practice of

49 Limão and Venables (2001) confirm that infrastructure is an important factor of transport costs. Their study found that a deterioration of infrastructure increased transport costs, and reduced trade volume.  
50 However, this dampening effect would not be applicable to firms specializing in exports of vegetable products with short durability capacity (such as fresh, unprocessed vegetable products).
of Israeli firms buying products from Palestinian producers and exporting them to the UK). The third works through the effect on the general security situation and its effect on foreign importers risk-taking when participating in a trade relationship characterized by delivery uncertainty.
3 The effect of labelling by origin

Several researchers have studied consumer behavior in response to food labelling. Anderson and Cunningham (1972) showed that consumption decisions may be influenced by individual social consciousness. van Ravenswaay and Blend (1999) identified growing consumer awareness for internalities of consumption. But, although there are many studies of the connection between labelling and the growing consumption of eco-and fair-trade products, there are not many studies of the connection between political views and their impact on consumption.

The next sections will discuss how Israeli firms operating in the West Bank were affected by the implementation of the labelling-by-origin policy. They were affected through two main channels, one affecting demand and one affecting supply. The former refers to the policy of singling out West Bank-originating products and label them as “Produce of the West Bank”, which may have influenced consumers’ buying decisions. The latter refers to the direct effect of being excluded from the Trade Agreement, which in effect is considered to be the same as imposing a tariff on the products. Section 3.1 will discuss how perception affects consumption, which is likely to be especially important for the understanding of consumer demand for West Bank-originating products. Section 3.2 will discuss the direct effects on firms’ profitability of the expulsion from the trade agreement.

3.1 The conscious consumer and demand for WB-originating products

In order to analyze how consumers’ consciousness affects buying decisions, there is a need to examine the link between perception and consumption. But several problems arise when trying to study this relationship. First, the consumer decision process is a complex phenomenon, involving multiple factors with different impact on the final buying decision (Attalla and Carrigan, 2001). Second, consumer perception is a highly subjective term, which makes collection of data vulnerable to individual interpretation (Ulrich and Sarasin, 1995). Unethical behavior is judged differently by different people. Third, it is not enough to possess the ability to make buying decisions based on consciousness and ethical principles. You also have to translate it into final buying decisions (Titus and Braford, 1996). Further, these problems may increase in complexity as individuals’ consumption choices are aggregated. Still, some researchers have studied the process of how perceptions materialize into consumption. Berkowitz and Lutterman (1968) show, by using a “Social Responsibility
Scale”, that socially conscious individuals translate their consciousness into consumption decisions. According to this, it is reasonable to assume that socially conscious consumers would buy more or less (depending on the political circumstances and personal preferences) of a product associated with or originating from a political “hotspot” such as the West Bank. Anderson and Cunningham (1972) discuss the notion of “the socially conscious consumer”. They argue that markets are not only segmented by demographic differences but also by differences in personal attributes such as the degree of social consciousness. By contrast, a more recent study by Attalla and Carrigan (2001) suggest that although consumers have become increasingly more sophisticated, this does not automatically translates into buying decisions based on consciousness. Accordingly, an Israeli firm operating in the West Bank may not experience a downfall in its value of export due to the practice of labelling by origin, even though many consumers associate it with unethical behavior. Nevertheless, there are those who deliberately avoid the consumption of products with perceived qualities in conflict with their social consciousness (Attalla and Carrigan, 2001). A survey by Mason (2000) found that 44 per cent of the British public had deliberately boycotted a product for ethical reasons in the last year. Creyer and Ross (1997) suggest that a firm’s ethical behavior or misbehavior may have an impact on the purchase decision. But, the same study also highlights that consumers would still buy products from firms conducting what they perceive as unethical behavior, but only at a lower price. Similarly, the demand for a perceived ethical product may not decrease (at least as much) even though its price increases. In other words, the price can serve as an indicator for the valuation of consumers’ ethics in buying decisions. Hence, in cases where conscious consumers attach ethical qualities to a product, the effect on demand of an increase in the price may in part be offset, since the demand for ethical products is expected to be relatively inelastic. On the other hand, the effect on demand of an increase in the price of a product with perceived unethical qualities is unambiguously negative, since the demand for unethical products is expected to be more elastic.

But who are the socially conscious consumer? And how do his perceptions materialize into choices of how much to buy of a specific product? According to Cordell (1992), country-of-origin responses may vary by consumer segments. To illustrate how different segments affect total demand, assume that a consumer $i$ derives utility ($U_i$) from consuming a bundle of “normal” products ($X$), products originating from the West Bank ($Y_i$), and from his individual

51 Demographic differences refer to differences in variables such as occupation, income, education, socioeconomic status and age.
consciousness \( (P_i) \) as a function of \( Y \)-products, \( U_i(X_i,Y_i,P_i(Y_i)) \), where \( i \in [1,3] \)\(^{52}\). The arguments in the utility function are assumed to enter additively. Hence, in theory, the consumer’s total budget could be allocated for consumption of only one type of products\(^{53}\). In addition, assume that \( P_i \geq 0 \) from each agent’s point of view\(^{54}\). Three relevant types of agents can be identified. Agent 1 has a utility function \( U_1(X_1,Y_1,P_1(Y_1)) \), where \( \partial U_1/\partial X_1 > 0 \), \( \partial U_1/\partial Y_1 > 0 \), \( \partial U_1/\partial P_1 > 0 \) and \( \partial Y_1/\partial P_1 > 0 \). This agent draws positive utility from consuming both normal products and WB-products, and increased consumption of WB-products increases the utility derived from individual consciousness. In other words, the agent is a supporter of Israeli firms operating in the West Bank, and therefore wishes to divide his budget between “normal” products and WB-products. Agent 2 has a similar utility function, \( U_2(X_2,Y_2,P_2(Y_2)) \), but now \( \partial U_2/\partial X_2 > 0 \), \( \partial U_2/\partial Y_2 > 0 \), \( \partial U_2/\partial P_2 > 0 \) and \( \partial Y_2/\partial P_2 < 0 \). This agent draws utility from consuming both “normal” products and WB-products, but increased consumption of WB-products reduces utility derived from consciousness. For this agent, there is a tradeoff between the marginal utility gained from consuming an additional unit of WB-products and the marginal disutility of reduced consciousness. Agent 3 has a utility function \( U_3(X_3,Y_3,P_3) \). Now, \( \partial U_3/\partial X_3 > 0 \), \( \partial U_3/\partial Y_3 > 0 \) and \( \partial U_3/\partial P_3 > 0 \). This agent draws utility from consuming both bundle of products, but unlike the two other agents, this agent’s consciousness is not affected by the consumption choice.

It is important to recognize the asymmetrical effect on demand of these different types of agents. For example, agent 1 draws positive utility both from consuming WB-products and from increased consciousness of increasing his consumption of these products, while agent 2 has a tradeoff between consuming an additional unit of \( Y \)-products and the disutility of reduced \( P \). Now, imagine going from a situation of complete ignorance of the origin of the products to a situation with full information. Because of this new information, it is likely that agent 1 will increase his consumption of \( Y \)-products while agent 2 will reduce some of his consumption. In this sense, because of their asymmetrical impact on total consumption, it is possible that agent 1’s increased consumption choice will more than offset the reduced

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\(^{52}\) In the context of this paper, \( Y \) will be products made by Israeli firms operating in the West Bank.

\(^{53}\) This specification is for illustrational purposes only. Theoretically, the specification of the utility function is crucial for the results of the comparative analysis. For example, depending on whether the utility function is additively or of a Cobb-Douglas form, a price increase of West Bank-originated goods will have different impact on demand for the bundle of products.

\(^{54}\) This assumption is needed in order to be unprejudiced regarding consumption of West Bank-originated products and the corresponding level of consciousness.
consumption of agent 2. The demand for $Y$-products will therefore be influenced by how many agents of each type are present in the economy. In contrast, Skowonski and Carlston (1987) argue that a consumer is more likely to punish perceived unethical behavior than reward ethical behavior. This seems to erupt from the notion that people are obligated to take actions against perceived injustice, but do not think that one have a right to be supported. Accordingly, the consumers in support of the WB-products are less likely to increase their consumption as much as the reduced consumption by those who punish them based on their notion of ethics. Hence, the value of total exports of WB-products is expected to decrease. A dampening effect could exist if the consumers in favor of WB-products believe these goods are mistreated by others. In this case, they might actively support the goods in order to counter the perceived mistreatment. In addition, the degree of punishment or reward will depend on the reference point (Creyer and Ross, 1997). If ethical behavior is referred to as the “normal” status, unethical behavior will be punished. Contrary, if unethical behavior is the “normal” status, then ethical behavior will be rewarded. Therefore, it is unclear whether the different types of agents will choose to reward or punish the WB-products.

In order to calculate the total effect of the practice of labelling-by-origin, one needs to aggregate each consumer’s choice of consumption of the bundle of WB-products before and after the procedure was implemented. In practice, this will be difficult, because it requires knowledge of every UK-retailer’s changes in sales of each specific Israeli vegetable product. Moreover, this depends crucially on retailers’ willingness to implement the technical arrangement\(^5\). But, as already outlined, the choice of the UK as the country of arrival for Israeli exports is in part due to UK-retailers’ willingness to comply with the labelling requirements. In addition, the Food Standards Agency has a clear enforcement policy which increases the probability of a firm to comply\(^6\).

Other factors affecting consciousness have been recognized. For example, Anderson and Cunningham (1972) identify several independent variables besides a social consciousness based on personal attributes such as morality and notions of right and wrong.

\(^5\) Again, country of origin labelling for the purpose of consumer information should not be confused with Rules of Origin for Customs’ classification. Country-of-origin labelling affects consumer demand while Rules of Origin affects the number of firms which could benefit from the trade agreement. However, labelling by the country of origin is not possible before Rules of Origin is implemented.

\(^6\) Note that from September 1, 2010, the responsibility of certain aspects of labelling in England has been transferred to the Department for Environment, Food and Rural Affairs.
a) Participation in a social group. Concerns for social recognition within a group give the consumer a feeling of identity, belongingness and acceptance (Shimp and Sharma, 1987). People participating in a social group tend to adopt the shared views and beliefs of the group, and are thereafter socially rewarded for this (Berkowitz and Lutterman, 1968). In order to achieve this, an understanding of what consumption is acceptable or unacceptable within the group is required. However, the impact of the social recognition factor on exports from the West Bank is questionable. It depends on the number and size of the groups, and to what extent an individual member thinks that other members judge him by his consumption decisions. There exist many interest groups in the UK related to Israeli economic activities in the West Bank, all with different understandings and rules-of-consumption57. Some of these groups have launched boycott campaigns against products of Israeli firms originating from the West Bank. Several studies acknowledge the impact of such consumer campaigns. For example, Klein (2000) estimated a total loss of between 20 and 50 per cent during a single boycott campaign against Shell, and Nelson-Horchler (1984) estimated the cost of a boycott campaign against Nestlé to 40 million dollars58. Accordingly, campaigns against Israeli firms in the West Bank could be expected to have some degree of impact on profits. However, Boulstridge and Carrigan (2000) noted that punishment of a product was unlikely if the consumer relied on it. In other words, if they liked and bought a product regularly, new information of unethical behavior regarding the company producing it would probably not impact the purchase decision. Other factors such as price, quality and brand were more important.

b) The media. In a survey by Carrigan and Attalla (2001), the media was highlighted among the respondents of a questionnaire as their main source of ethical information. Consumers are exposed to an abundance of information through the media. In relation to the Israeli-Palestinian conflict, it might be expected that consumers are more concerned with consumption choices of WB-products in periods with high degree of media attention. In this sense, dynamic media attention may in part serve as an explanation for monthly fluctuations in exports. But, although many consumers are concerned with ethical issues (Mason, 2000), it seems that most consumers simply lack the information to determine whether a single firm behaves unethically or not (Boulstrige and Carrigan, 2000). More information would simply add to the confusion in the purchase decision. The Israeli-Palestinian conflict comprehends a

57 Examples are groups such as the Ethical Consumer Research Association (ECRA), Boycott Israeli Goods Campaign (BIG), various political parties, student groups and others.

58 Although this number is debated.
multiple of issues, and can be too complex and demanding for consumers to understand properly. Time pressure and the abundance of information can overwhelm the consumer in such a degree that the ethical aspect is no longer a primary focus (Titus and Bradford, 1996). In this sense, ethical information extracted from the media may reduce the consumer’s ability to make rational decisions based on their consciousness. Consumers do not have sufficient knowledge of a specific product, and simply view all products within a certain perceived category as one ethical group (Boulstrige and Carrigan, 2000). In addition, the labels have been reported to be misunderstood by consumers (Tootelian and Ross, 2000). In the case of exports from Israeli firms operating in the West Bank, it is evident that the labelling-by-origin of these products has caused some confusion. For example, it has been voiced that the label “Produce of the West Bank” were misunderstood by some confused consumers as of being of Palestinian origin. This lead to the technical advice made by the UK Department for Environment, Food and Rural Affairs in December 2009 to indicate whether the product originated from an Israeli or Palestinian producer. Confused consumers could have increased the demand for Israeli produce from the West Bank unintentionally, and thereby reducing the change in the value of Israeli exports caused by the introduction of labelling by origin in February 2005. Further, it is questionable whether a consumer is able to distinguish WB-products from products originating from Official Israel, or regard them as one common ethical group.

c) Label as a trade barrier. According to one study, 79% of consumers read labels on food products before purchasing them (Mueller, 1991). 80% stated that the information on the label affects their purchase decisions. Several studies confirm the importance of labelling in buying decisions (Tootelian and Ross, 2000, D’Souza et al., 2006). They argue that labelling by origin is a non-tariff barrier to trade. The consumers’ preferences for a specific vegetable product are functions of its intrinsic and extrinsic qualities (Olson and Jacoby, 1972, Steenkamp, 1990, Pires Gonçalves, 2008). Intrinsic qualities are characteristics of the product such as color, freshness and aroma. Extrinsic qualities are characteristics such as perceptions of price, label, and popularity. The policy of labelling-by-origin affects demand through the extrinsic characteristics of a product. The country-of-origin label leads the consumers to a greater cognitive perception about a product (Cordell, 1992). The demand for the product is therefore influenced by its label and the reputation of the producer. Any change in either the perceptions associated with the label or a change in the reputation of the producer could

change the quality of the extrinsic characteristics of the product. But, the cognitive perception of consumers about the extrinsic qualities of a product is all a due to how the retailer promotes it (Chao, 1989). Although the introduction of labelling excluded some products from the trade agreement, it is not certain that these products could be distinguished in the store. It depends on UK retailers’ willingness to implement the directive. Currently, there is no requirement for WB-products being labelled as such in UK stores. But the place of production shown on the packaging must match the place of production shown on the proof of origin. The HM Revenue and Customs (HMRC) is expected to have been effective in enforcing this requirement (as suggested in section 1.2). In addition, consumer interest groups in the UK have exerted heavy pressure for retailers to implement the technical arrangement (noted in the UK Department of Environment, Food and Rural Affairs’ advice to retailers on December 10, 2009). Nevertheless, the policy of labelling-by-origin increases consumers’ information about a product, and thereby influences trade through consumer awareness. In addition, other factors contributing to the perceptions of the country-of-origin qualities may be of relevance. Aversion to foreign products is more likely among the less educated, older consumers and workers who feel threatened by imports (Anderson and Cunningham, 1972, Shimp and Sharma, 1987).

\[d)\text{ Demographic factors.}\] Other possible contributors affecting the political consciousness are demographic factors such as gender, age and social class. There could be differences in ethical views and buying decisions between young and old individuals. In that case, changes in the age composition in a country might be a factor in explaining ethical buying behavior. However, Carrigan and Attalla (2001) did not find any gender difference in their study. It is likely that demographic factors do not contribute to fluctuations from month to month, but instead may be of relevance in the long term.

**Conclusive remarks**

The study of Tootelian and Segale (2004) examines the importance of place-of-origin in buying decisions. It concludes that most consumers do not think of it as especially important. The same study found that among those who did not considered place-of-origin important, the most important reasons are that they trust their grocers to purchase good produce, think all fresh produce is about the same, or they have not thought about the issue. Feenstra (2004) notes that the impact of political variables on economic outcomes is limited, and that such policies often are politically motivated and the results of lobbying of interest groups. Although some consumers express willingness to adapt and adjust their consumption in
accordance with their notion of political consciousness, it may be that other factors are more important in explaining the choices of consumption. Results from other studies confirm this conclusion. Accordingly, the implementation of the technical arrangement in February 2005 may not have had much impact on the demand for exports from Israeli firms operating in the West Bank. Hence, the conscious consumers may be a minority group with negligible influence on exports.

3.2 Subsidization and supply of WB-originating products

The new empirical literature on the export behavior of firms emphasizes the large costs facing exporters⁶⁰. Each firm chooses the same profit maximizing markup independently of the productivity of the firm. Thus, a more efficient firm will charge a lower price and have higher profits than a less efficient firm. As a result, the less efficient firm would be more exposed to negative shocks that could force exit. The expulsion from the EU-Israel Trade Agreement could be characterized as a negative shock to the profitability of the firms operating in the West Bank. In effect, the implementation was similar to imposing a tariff on the exported products, thereby raising per-unit costs. However, it is not immediately clear whether it is the exporter or the importer whom incurs these costs. Anderson and van Wincoop (2003) believe that most trade costs are borne by the exporter. By incurring these costs, it would not be profitable for some of the least productive firms operating in the West Bank to continue exporting⁶¹. Hence, these firms would exit the market. Further, in accordance with entry and exit strategies of firms, only the most efficient firms will choose to enter the export market. Both firm characteristics and fixed costs of entering are important for entry decisions (Bernard and Wagner, 2001). As a consequence, the probability of entry of a firm operating in the West Bank is reduced. Hence, the impact on the value of exports would be expected to be negative. In contrast, Roberts and Tybout (1997) suggest that the exporters pass on these costs to the importers. Now it is the profitability of the importers that would diminish, unless it is offset by an increase in the consumer prices of the products which is expected to reduce demand. In addition, as in the case with a reduction in the profitability of exporters, it may be that reduced profits of importers would reduce the range of importing firms. To illustrate, assume a price of exports originating from the West Bank, before the implementation of the

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⁶⁰ For example Roberts and Tybout (1997), Bernard and Wagner (2001), Melitz (2003), and Helpman et al. (2008).

⁶¹ The effect of the decreased demand for exports on the profits of firms cannot be offset by the increase in prices. If the firms were initially maximizing profits, then an increase in prices is not expected to increase profits. If it was, the firms should have had higher prices from the start (see section 2.3).
technical arrangement, equal to $p_1$. As suggested, after the implicit tariff is imposed, the prices charged by exporters may either be the same, $p_1$, or $p_2 = p_1 + t$ (depending on whether the tariff is incurred by the exporter or the importer), where $t$ is the part of the tariff rate added to the initial price\(^{62}\). In either way, the profitability of exporters is expected to decrease (as a result of increased costs or decreased demand or both). Hence, even though the exporters pass on the tariff to the importers, they will nevertheless face a reduced demand for their products\(^{63}\). Therefore, for the purpose of the analysis, it doesn’t really matter whether the tariff is passed on to the importer or incurred by the exporter, since, in either cases, it is expected to have a negative impact on the profitability of the exporter\(^{64}\).

However, several dampening effects could be identified. First, the exits of some firms may induce others to expand their output. Eaton and Kortum (2002) argue that the value of trade reflects both an intensive and extensive margin. The former is related to the volume of exports per exporter, while the latter is related to the number of exported vegetable varieties. Assuming that all products are differentiated, the exits of some firms will unambiguously reduce the extensive margin of exports. But, if more than one firm exports the same variety, then the exit of some less productive firms may increase the market shares of the remaining exporters. Exporters produce for both the domestic and foreign market. According to Bernard and Wagner (2001), output meant for the domestic market can be redirected to foreign markets. In this case, the increased intensive margin of exports may offset the negative impact due to the reduced extensive margin, leaving the value of total exports unchanged. Second, the reduced demand in the foreign market may in part be offset by increased demand in the domestic market, thereby dampening the negative effect on the profitability of firms\(^ {65}\). Thus, external market forces may have contributed to reducing the effect on the profitability of firms. Third, the firms’ profitability of exporting may vary by destination. It may be higher to countries with higher level of demand, lower variable export costs, and lower fixed export costs. Therefore, it is possible that firms operating in the West Bank may compensate for the

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\(^{62}\) Leaving open the possibility that exporters incur only a share of the tariff and pass on the rest to importers.

\(^{63}\) As argued in section 2.1, the market for vegetables is expected to be characterized by competition among types of products (for example WB-tomatoes vs. Spanish tomatoes), so an increase in the relative price of a product type would reduce the demand for this product.

\(^{64}\) Tariffs are usually implemented in order to increase the competitiveness of domestic firms. Therefore, it might seem odd to have left out a discussion on the behavior of domestic firms in the UK. But, in the context of this paper, the implicitly imposed tariff is reckoned to serve political considerations. As a result, the effectiveness of the tariff should be measured by its effect on the exports of Israeli firms operating in the West Bank and not its effect on UK domestic firms.

\(^{65}\) If firms are subject to reduced demand from both domestic and foreign markets, the effect on profits will be unambiguously negative.
increase in costs of exporting by finding trading partners outside the EU (or increase trade with existing ones). Hence, even though the EC expelled Israeli firms operating in the West Bank from the EU-Israel Trade Agreement, the negative effect on the profitability of firms may in part have been offset by internal export choices.

The validity of the discussion is crucially dependent on the assumption of “holding all other factors constant”. There are several actions a government can take in order to minimize the effect of a tariff on the profitability of firms. Subsidization of export industries has been (and still is) a popular policy instrument among trading countries to increase the competitiveness of exporting firms and to promote economic growth (Feenstra 2004). In 1959, Israel adopted a law specified to encourage investments, appropriately called “The Law for the Encouragement of Capital Investments”. Based on this law, the Israeli Government has implemented a subsidization program (Ministry of Industry, Trade and Labor, Investments incentives in the Law for the Encouragement of Capital Investment). The program offer tax benefits and grants to firms satisfying certain criteria. To qualify, firms must satisfy requirements on international competitiveness and expected value added (among others). The amount of tax benefits received is based on conditions such as the cost of land development and the level of capital investment. In addition, the law differentiates between three geographical regions (A, B and C). A firm located in Priority Area A receives a more beneficiary tax scheme than firms located in the other regions. Priority Area A includes the Galilee, the Negev, Jerusalem and the Jordan Valley. Of particular interest among these places is the Jordan Valley which is located within the West Bank and is an important location for vegetable producers. Hence, the program induces investments in some parts of the West Bank. However, an important question is whether the program was already in place when the technical arrangement was implemented in February 2005. If it was, then it should not be expected to have dampened the negative effect on the profitability of firms. But, although the law has been in effect since 1959, a major reform amendment was implemented on April 1, 2005 (Bank of Israel, 2007). In general, the amendment eliminates the limitation on the total amount of tax benefits. Hence, a substantial improvement in the subsidization benefits was implemented only two months after the expulsion from the Trade Agreement.

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66 According to a report issued by the Ministry of Agriculture and Rural Development and The Israel Export and International Cooperation Institute in 2003 (Israel’s Agriculture: Innovations Make the Land Bloom, Part 1).
Bregman et al. (1998) suggests that a capital subsidy reduces the cost of capital and lowers the cost of production. Two versions of capital subsidization are considered; subsidization of the cost of investments in start-ups and a subsidy per unit of capital used in production. Both versions might lead firms to lower their prices and expand output. To illustrate, assume that total costs ($C$) consists of fixed costs ($F$) and variable costs ($V$), so that $C = F + V$. First, consider a subsidy per unit of capital used in the production process. Assuming only one input in production, capital ($K$), and setting the cost of capital equal to unity, so total costs becomes $C = F + s \times K$, where $s$ is the percentage equivalent of the subsidy and a number between 0 and 1. Thus, a subsidy per unit of capital used in production lowers total costs and hence, may lead firms to lower their prices and expand output (neglecting the ambiguous effect of input substitutability). Second, consider a subsidy ($s$) of the amount of investments in capital necessary to start the production process. Total costs now becomes $C = s \times F + V$. Since $s$ is between 0 and 1, it is clear that total costs are reduced. Hence, again, prices may fall and output may increase. Further, as Feenstra (2004) suggests, subsidies can be effective in encouraging the entry of firms into a market. By offering subsidies a government can reduce the barriers of entry. This can be an effective tool in encouraging entry.

Thus, if the subsidy rates are adjusted to such a degree that the effect on the profitability of firms is exactly offset, then it could be expected that the effect of expulsion from the Trade Agreement would not affect the value of Israeli exports from the West Bank. But, even though subsidization of economic activity in the West Bank is favorable for firms operating in the region, the effect of subsidies on the value of exports (which also includes exports from Official Israel) might be ambiguous. To illustrate why, assume that the UK market consists of vegetable products differentiated by three origins; vegetables originating from Official Israel, Spain and the West Bank. As before, it is expected to be some degree of competition between product varieties within the same category originating from these three places (for example between Israeli tomatoes, Spanish tomatoes and WB-tomatoes). Hence, by subsidizing the WB-vegetable export sector, the Israeli Government is inflicting increased competition on

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67 The program also includes the possibility of receiving reduced tax on revenues which, in effect, might be considered the same as receiving a subsidy per unit of output. If this subsidy is set equal to the tariff rate, $s = t$, then the effect of the tariff on the profitability of firms is eliminated. The firms can reduce the product prices to the pre-tariff level without experiencing a drop in profits.

68 In addition, two offsetting effects may be present. First, the reduced cost of capital may lead to a substitution from labor to capital. Second, increased production may increase the demand for labor. The overall effect on the demand for labor is therefore ambiguous. Wages are expected to increase if the magnitude of the latter effect dominates the magnitude of the former.

69 Which is consistent with the framework adopted by Melitz (2003).
exporters from Official Israel. Assume, before the implementation, an allocation of the UK market such that Israeli products capture one half and Spanish products capture the other. Then, following the implementation, a new allocation is expected. If the total market share of products originating from Official Israel and the West Bank now exceeds one half (so that WB-products have captured part of the share of Spanish products), then it is reasonable to assume that the value of Israeli exports has increased. Thus, the subsidization policy has an unambiguously positive effect on the value of exports if the West Bank export sector captures a sufficient market share from Spanish vegetable exporters.

Conclusive remarks
Although the tariff may have reduced the profitability of many Israeli vegetable producers, the counteractions taken by the Israeli Government could be expected to have, in part, dampened the negative effect on supply and the value of exports. This result depends on the outcome of the reallocation of market shares following the differentiation between products originating from Official Israel and products originating from the West Bank.70

70 Other subsidization policies have recently been discussed. IFF economist Rachel Borshok and IFF Secretary-General Avshalom Vilan suggests the Government should take measures to offset the drop in farmers’ income by insuring water quotas for farmers at fixed prices, providing incentives for replacement of human labor with technology and providing protection from fluctuation currencies (Jerusalem Post, October 14, 2010).
4 Empirical results

The published statistics of the value of exports do not reveal how much of the value originating from the West Bank. Hence, in order to analyze the impact of the EU policy of differentiating by origin on Israeli vegetable producers operating in the West Bank, it is necessary to compare the development of the trend value of vegetable exports with the main contributors of fluctuations in this time series. This indirect approach will highlight the probability of the EU policy being the main driving force behind the development of the value of exports after its implementation. The rest of this section will examine the development of the trend value of exports. Sections 4.1 - 4.4 analyze the main contributors, while section 4.5 highlights some problems and limitations. All subsequent analyses are based on the theory of chapter 2 and 3.

The value of vegetable exports data have been extracted from the ICBS Foreign Trade Statistics Monthly. Figure 1 shows the monthly value of Israeli exports of vegetable products to the UK from January 1995 until August 2010 in current prices (see Appendix A for a description of the data).

A pattern of seasonality can be identified in the figure. This is expected when using agricultural data (Hylleberg et al., 1993). Seasonality of the series is an important factor in explaining cyclical fluctuations (Wooldridge, 2009). Hylleberg et al. (1993) argue that the seasonal component of many time series of agricultural data is dynamic due to variations in variables such as temperature, number of sunny hours and the implementation of new
Irrigation techniques. Agricultural production in Official Israel and the West Bank depends heavily on rainfall which mostly falls between November and April. Differences in the amount of rainfall result in monthly fluctuations in the production level (Fedler, 2002). In addition, other environmental constraints such as hours of sunshine and degree of humidity may be important factors of the seasonal component. The Israeli agricultural export year lasts from October 1 until September 30 with its peak in February and March. Therefore, each year, the value of exports is at its highest around these months.

In order to understand the underlying economic phenomenon of the real fluctuations, one needs to adjust for the seasonality component of the data. Several methods have been developed over the years in order to adjust for this component. In order to minimize the seasonality and highlight the trend of the time series, the X-11 procedure similar to the method developed by the US Bureau of Census has been applied on the data. The underlying assumption behind the method is the belief that an observation can be broken down into a trend component, a seasonal component and an error component, $O_x = T_x \times S_x \times e_x$, where $O_x$ represents the original data in period $x$, $T_x$ represents the trend, $S_x$ represents the seasonal component, and $e_x$ includes all other variables unrelated to the trend and the seasonal variable (Jaditz, 1994). The X-11 procedure isolates the trend component by estimating the seasonal and error components (a step-by-step calculation is offered in Appendix C). The method ensures that observations which are near in time have greater weights than the first and last observations. Taking the average of the points near an observation will provide a reasonable estimate of the trend at that observation. This eliminates some of the seasonal effects in the data, leaving a relatively smooth trend. In addition, some of the randomness is reduced, and one is able to get a better view of how the cyclical fluctuations in the value of exports are developing. But, the procedure has certain weaknesses. It pretends that the long-term trend changes very little. In addition, some of the real fluctuations could be allotted with the seasonal fluctuations. If the purpose of this paper was to understand why the value of exports is decreasing or increasing in a given month, then only the raw data should be examined. However, the purpose is not to measure the effect of the technical arrangement in one particular month, but rather to see the trend in the value of exports in subsequent time periods, starting from the month of implementation and comparing it to the trend before the

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71 This method is explained in Ladiray and Quenneville (2001).
implementation. Hence, it is reasonable to use this method even though some variations in the real fluctuations are omitted.

There is one problem with the published data that needs to be addressed. Israel is a small country dependent on exports in order to experience economic growth. Therefore, in order to reduce the barriers to trade, Israeli exporters often accept foreign currency as payment for their products, thereby inflicting on themselves some of the uncertainty and risk of exchange rates (Central Bureau of Statistics, Definitions and Explanations). Thus, both the shekel and the UK pound can be expected as a mean of payment. Each exporter must submit the value of its exported goods to the customs authority. Both the values in Israeli shekels and in the currency in which the transaction is made are reported. The value is then converted into US dollars using the corresponding exchange rates on the day the transaction is registered at customs. Hence, the published data of the value of exports is subject to fluctuations in both exchange rates (Israeli shekels per UK pound and Israeli shekels per US dollar). Available information on the share of transactions in which UK pounds are used as the mean of payment does not exist. However, evidence presented in Appendix C suggests that transactions between Israeli exporters and UK importers are usually conducted in UK pound. Therefore, in order to adequately analyze the trend value of exports, this process needs to be reverted. The published monthly data of the value of exports are first multiplied by the monthly representative nominal exchange rate between the shekel and the US dollar, and then converted to pounds using the representative nominal exchange rate between the shekel and the UK pound. Figure 2 depicts the time series of the trend value of vegetable exports when the effects of seasonality and the effects of nominal exchange rates have been excluded.

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72 Since only the monthly value of exports is published, the monthly representative exchange rate is presented in this paper. In order to use the daily rate, one needs daily data on exports value, which are not available. Note that when converting the trend value of exports from shekels into UK pounds using the nominal exchange rate, one needs to divide the monthly trend value of exports on the amount of shekels per pound.

73 Note that moving averages do not allow for estimates of observations near the ends of a time series. Therefore, the adjusted time series starts from November 1997 and ends October 2007.
The data presented in the figure suggest that Israeli exporters experienced a substantial increase in the trend value of exports in a relatively short amount of time from the end of 2001 until the end of 2004. In August 2001, the trend value of exports was only 7.5 million UK pounds. In subsequent periods, the value increased steadily until it peaked in May 2004, at approximately 14 million pounds. From the beginning of 2005 the export sector entered a period with repeated months of negative growth. This slowdown concurs with the implementation of the label requirement from February 2005. This might suggest that some vegetable exporters were forced out of the market due to the expulsion from the EU-Israel Trade Agreement and/or that some consumers in the UK decreased their demand for West Bank vegetable products due to the practice of labelling. In order to explain these non-seasonal fluctuations, one needs to look at other possible sources. The most important factors influencing Israeli exports are the development of international trade, economic growth, the security situation, and changes in exchange rates. The next sections will examine the development of these factors and their contribution to fluctuations in the trend value of exports.

4.1 Development of economic growth

The link between economic growth and demand for imports has been extensively documented. Cyclical variations in income are recognized as a possible source of volatility in the demand for foreign exports. Economic growth in both the domestic and foreign country can affect exports. In accordance with the discussion in Section 2.2, real GDP growth per capita is used as the measure for economic growth. Therefore, both the time series of Israel’s growth...
GDP per capita growth and UK’s GDP per capita growth are reported. Data for both the UK and Israel are extracted from the OECD Statistics database for monthly main economic indicators (MEI). The real GDP growth rates are seasonally adjusted by OECD, which uses the X-12 ARIMA software developed by the US Bureau of Census (U.S. Census Bureau, 2009). This method is an enhanced version of the X-11 procedure explained in Appendix B. Unfortunately, only quarterly data exist\(^{75}\). The growth rates are calculated as percentage change from to the previous quarter. Figure 3 shows the trend in the real GDP growth rate in the UK from the third quarter of 1996 until the second quarter of 2008, as published in the September 2010 edition (the trend has been calculated using the 11-term centered moving average-method similar to step 3 in Appendix B)\(^{76}\).

![Figure 3. Real GDP per capita growth in the UK](image)

As could be seen from the figure, the UK economy has experienced a long period of stable positive economic growth almost throughout the time period. From the beginning of 2001 until the end of 2006, it experienced a growth rate of roughly 0.6% in almost all subsequent quarters. Hence, this factor may explain why the value of vegetable exports increased in this period. The UK economy did not experience a single quarter of negative growth (compared to last quarter) until 2007. Hence, the development of economic growth in the UK does not seem to be able to explain the decrease in the trend value of exports from the beginning of 2005. Figure 4 shows the trend in the real GDP growth in Israel from the third quarter of 1996 until the second quarter of 2008 (using the 11-term centered moving average-method).

\(^{75}\) Some researchers use the index of industrial production as a proxy for GDP in order to get monthly data (McKenzie and Brooks 1997, Doroodian 1999). This index is published by OECD. Only data for the UK exist. In addition, it is questionable whether the index is proper as a measure for income growth.

\(^{76}\) The September 2010 edition refers to the particular month and year of the Main Economic Indicators publication.
The real GDP growth in Israel has been more volatile than in the UK. From the beginning of 2002, the Israeli economy mostly experienced quarters of increasing growth compared to last quarter. This may partly explain the rapid increase in the trend value of exports from 2001 until the beginning of 2005. However, the economy experienced much higher growth in 1999-2000, which did not seem to have had much impact on the trend value of exports. Further, Israel still had high quarterly growth throughout 2005, when the trend value of exports declined. Hence, economic growth in Israel seems incapable of serving as the sole factor for the decrease in the trend value of exports in this period.

### 4.2 Development of agricultural prices

As suggested in section 2.1, the price of a product is an important factor in consumers’ decision process of choosing how much to buy of a specific product. Although the development of prices of vegetable products is not available, some information could be extracted by examining the general development of prices in the food sector. Figure 6 shows the time series of the consumer price index in the food sector for the UK from November 1997 until October 2007, using 2005 as the year of reference\(^\text{77}\).

\(^{77}\) The series is extracted from the OECD Statistics Database, Consumer Price Indices for the UK. It is calculated using price indices in the agricultural sector by collecting data from 20 000 outlets in around 150 areas in the UK.
Although the time series of the CPI in the food sector is a somewhat inaccurate measure of the development of prices of vegetable products originating from the West Bank in UK stores (since it also includes a range of products from other destinations), due to the expected competition in the market it can be assumed that the prices of West Bank-products cannot deviate substantially from the development of the food prices in the same market (as explained in section 2.3). Hence, the proxy is useful for analyzing the expected price development of West Bank-products\(^78\). The figure shows an increasing trend in food prices throughout the period. Note the relatively sharp increase in prices from the beginning of 2006. This increase does not coincide with the decrease in the trend value of exports experienced at the start of 2005 (although it may explain the decline in subsequent periods). Thus, the figure does not present conclusive evidence for suggesting that the development of UK food prices can serve as an explanation for the decrease in the trend value of exports in the beginning of 2005.

The prices of input in agricultural production could be an important factor in the exports choices of producers, as explained in Section 2.3. Figure 6 shows the trend in the monthly

\(^{78}\) An endogenous relationship could be identified between the price of exports and the value of exports. Figure 5 shows a sharp increase in the expected price of Israeli vegetable exports from 2006 which implies a corresponding increase in the value of exports (holding all other factors constant). However, traditional economic theory suggests that a price increase would lead to a drop in demand. Hence, the overall effect on the value of exports is ambiguous.
percentage growth in the price index of input used in agricultural production from November 1997 until October 2007.  

As could be seen from the graph, the agricultural production sector has experienced positive growth in prices of input in all periods of the series. An increase in the index is associated with reduced profit and export volume, as explained in section 2.3. But the index of input prices is growing in all months, which do not seem to fit the theory when one compares this development with the increase in the trend value of exports from 2002-2004. In addition, the growth rate has been relatively stable, at least until the end of the dataset. Therefore, although fluctuations in input prices can potentially be an important part of the explanation for the decrease in the value of exports from 2006 and throughout the time period, it does not seem to be able to explain the decrease in the trend value of exports from 2005.

4.3 Exchange rates

According to the discussion in section 2.6, both the real exchange rate between shekel and pound and the corresponding volatility as measured by the percentage change from last month can affect the trend value of exports. Figure 8 shows the time series of the monthly average

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79 The series is extracted from the Israeli Central Bureau of Statistics’ Price Statistics Monthly database. It has been adjusted for seasonality by taking a 21-term centered moving average of the original data (using the same equation as explained in Step 5 of Appendix B).
The real exchange rate between the Israeli shekel (NIS) and the UK pound (£) plots the development of the real exchange rate over time. Figure 7 illustrates the relationship between the real exchange rate and the trend value of exports. It becomes evident that the relationship between them seems to fit reasonably well with the theory for most periods in the dataset. The real depreciation of the exchange rate between July 2001 and February 2005 suits well with the increase in the value of exports within the same period. However, in subsequent months, the exchange rate seemed to have converged to a rate fluctuating around 8 - 8.5 shekels per pound. This pattern does not correlate with the decline in the value of exports in the first months of 2005, since the exchange rate was reasonably stable in the period. Therefore, although the level of the exchange rate can explain part of the development of the series, it does not seem to be able to explain the decline in the value of exports from 2005 until 2007. Part of the reason for the somewhat surprising lack of correlation between them may be due to the choice of the pound as the mean currency of payment in most transactions between Israeli exporters and UK importers. Since most export transactions seem to be priced in the currency of pound, an appreciation of the exchange rate does not necessarily translate into decreased demand for exports. Similarly, a depreciation of the exchange rate may not increase the demand for exports. The effect on the value of exports is therefore dampened. Nevertheless, the profitability of firms is expected to be reduced since a payment in pounds needs to be converted into shekels in order to be of practical value. Hence, the value of exports would decrease, although by less than if the mean of payment was

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80The rate is measured as the amount of shekels per pound, adjusted for differences in the consumer price indices (CPIs). It is calculated by multiplying the nominal rate between shekel and pound with the CPI in the UK and dividing it on the CPI in Israel. The CPI is the average changes in the prices of consumer goods and services purchased by households. CPIs are presented as an index where the year 2005 is the base year and equal to 1.00. Nominal exchange rates are extracted from the Bank of Israel’s Series Database, while the monthly data of CPIs are extracted from the OECD’s Main Economic Indicators Database.
in the currency of the exporter. By the same way of reasoning, the value of exports may fluctuate even though the exchange rate is relatively stable. Since the price of imports is expected to be in the currency of the importer (pounds), the exchange rate is no longer as important in the decision process of the importer, unless the exporter adjusts its prices in accordance with changes in the exchange rate. As a result, since the exchange rate’s impact on the value of exports is weakened, there could be periods where the exchange rate is stable and the value of exports fluctuate, as is the case from 2005-2007. Hence, in periods of exchange rate stability, other factors are more important as determinants of fluctuations in the value of exports.

As explained in section 2.5.2, the volatility of the real exchange rate could also be a factor influencing the development of the value of exports. A high degree of volatility is associated with great risk-taking by both exporters and importers. Thus, assuming risk-averse agents, large percentage differences in the real exchange rate would reduce the agents’ incentives to participate in trade relationships. Figure 9 depicts the volatility of the real exchange rate between the shekel and the pound measured as the percentage change from last month.

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Figure 8. Volatility of the real exchange rate

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81 An appreciation of the pound towards currencies of other major UK trading partners might lead to reduced profitability of importing firms, and thereby, analogous to the argument of Melitz (2003) and Helpman et al. (2008), reduce the incentives for UK firms to engage in importing activity. In this case, the value of exports from Israel to the UK will also be reduced. However, the impact and magnitude of this effect on the aggregated value of exports is questionable.

82 Then there would be some degree of correlation between changes in prices and changes in the exchange rate. The effect of exchange rates on prices would be captured by the development of agricultural prices in the UK (section 4.2).
The real exchange rate has experienced relatively large monthly percentage changes for several periods of the series. Changes of 3 - 4 % are not unusual in the dataset. In 2002, five of the months experienced more than 3 % increase in the real exchange rate. However, from March 2004 until June 2007, the monthly percentage change was fairly moderate, just twice experiencing a change above 3 %. Therefore, the volatility of the real exchange rate in this period cannot serve as an explanation for the decrease in the value of exports in 2005-2007.

Further, as explained in section 2.5.3, the trend value of exports could be influenced by changes in the volatility of the multilateral exchange rate between the shekel and a currency basket of all other major trading partners. The development of the volatility of the multilateral exchange rate measures the development of the competitiveness of Israeli firms and the risk associated with exporting. Figure 9 shows the time series of the monthly average percentage change in the real effective exchange rate from July 1999 until October 2007\textsuperscript{83}. The data are extracted from the Bank of Israel’s Exchange rates Series Database.

As could be seen from the graph, the competitiveness of Israeli firms has been subject to highly volatile monthly fluctuations. However, from May 2003 until May 2007, the percentage change in the real effective exchange rate was fairly stable. Therefore, Israeli firms

\textsuperscript{83} This is the geometric mean of the exchange rate of the shekel against 28 currencies, representing 38 of Israel's main trading partners, weighted by the volume of Israel's trade with those countries and adjusted by the differences between inflation in Israel and in those countries. The countries are: USA, Germany, UK, Italy, Japan, Netherlands, France, Belgium, Canada, China, Spain, South Korea, Switzerland, Hong Kong, Taiwan, Turkey, Mexico, Singapore, Ireland, Sweden, Malaysia, South Africa, Russia, Brazil, Finland, India, Australia, Thailand, Denmark, The Philippines, Greece, Poland, Cyprus, Colombia, Hungary, Austria, Romania, Ukraine and Argentina. Data from earlier than July 1999 are not available. 

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did not experienced neither an increase in competitiveness extensive enough to motivate the rapid increase in the trend value of exports from 2002 until 2005 nor a decrease in competitiveness to explain the subsequent reduction.

Thus, although exchanges rates seem to be the driving force behind several periods of fluctuations in the value of exports, they seem incapable of explaining the reduction in the value of exports from 2005 until 2007.

4.4 Security measures and infrastructure

The security situation was highlighted as one of the most important factors influencing agricultural exports (The Israel Export and International Cooperation Institute, 2006). In practice, a distinction should be made between internal and external closures. The former refers to restrictions on movement of Palestinian workers and products within the West Bank, while the latter refers to restrictions on movement between Official Israel and the West Bank. As argued in section 2.5, the number of physical obstacles in the West Bank can be used as a proxy for the level of infrastructure in the West Bank\(^{84}\). The time series of this proxy will mainly reflect the development of internal closures, that is, the development of the number of physical obstacles \textit{within} the West Bank. Hence, it should mostly reflect the level of accessibility of Palestinians working in Israeli firms operating \textit{in} the West Bank. These data are extracted from various reports issued by the UN Office for the Coordination of Humanitarian Affairs (UNOCHA, Access and Movements, various reports from 2003-2007). Figure 10 shows the number of physical obstacles in the West Bank for some particular months between December 2003 and September 2007\(^{85}\).

\(^{84}\) The total number of physical obstacles measures the degree of closure, but it does not measure the type of closure. The number of obstacles consists of earth mounds, fences, trenches, roadblocks, earth walls, road barriers, checkpoints, manned and unmanned checkpoints. The different impact of these obstacles is not calculated. As a consequence, it may be that a month with more checkpoints but less total obstacles is counted less than a month with less checkpoints and more total obstacles, even though it’s real impact is less. For example, road barriers are usually fences that parallel the road. Hence, it does not restrict workers or products travelling by road.

\(^{85}\) From December 2003 until January 2006 the OCHA only collected data every third month (with some exceptions). However, since January 2006, the OCHA has collected data in every month. Hence, it is some inconsistency in the intervals between months for which data are reported. For graphical convenience, only the number of obstacles in every third month is included in the figure.
As can be seen, the number of obstacles has been high until the end of 2005. Comparing this figure with the development of the trend value of exports, there seems to be a contradiction between the high number of obstacles during the Intifada and the increase in the trend value of exports from 2002 to the beginning of 2005. In that period, although the number of internal closures increased, the value of vegetable exports increased. This questions the significance of this factor as an explanation for the development of the value of vegetable exports. It could be argued that the effect on the value of exports of the number of obstacles may have been dominated by the growth of the UK economy from 2002-2004. But, the level of infrastructure is expected to restrict the production level and hence, its effect on the volume of exports cannot be counteracted by increased demand. However, the combination of reduced supply and increased demand may have increased the prices and hence, the value of exports. But, as could be seen from figure 5, the prices did not increased abnormally in the time period. In addition, the competition in the market is expected to have reduced the possibility of exporters raising the prices (as explained in section 2.1 and 2.3).

From the end of 2005 there has been a continued increase from 376 physical obstacles in August 2005 to 563 obstacles in September 2007. The decline in the trend value of exports from the beginning of 2005 seems to coincide with this increase in the number of obstacles from the end of 2005 (although seemingly with some lags). Hence, it seems to be some inconsistency in the explanatory power of the factor. These results question the impact of security considerations on the value of vegetable exports.
Figure 11 shows the quarterly number of comprehensive closure days from 2000 until 2007 (B’tselem, Closure - Figures on comprehensive Closure Days). Specifically, it shows the number of days each quarter where all permits issued to residents in the West Bank were invalid. Since West Bank-residents are used as workers in Israeli firms located both in Official Israel and the West Bank, the dynamics of this time series will have a severe impact on the production ability of the firms. As a result, the development of this factor can be used as an indicator for the level of external closures in the West Bank, that is, the degree of accessibility between the West Bank and Official Israel.

![Figure 11. Number of closure days](image)

It is clear that the number of closure days was relatively low in the first quarters after the implementation of the label procedure. In the first quarter of 2005 there was only eight days of closure. The months of April, May and June experienced only seventeen days of closure in total. Hence, this factor seems unable to explain the decrease in the trend value of exports in the beginning of 2005. Further, towards the end of 2005, the number of closure days increased dramatically. The month of October alone experienced 31 days of comprehensive closure. This does not correlate with the development of the trend value of exports which was fairly stable in the period between the end of 2005 and the beginning of 2006.

Thus, security considerations (both internal and external closures) do not seem to be the main driving force behind the decline in the value of exports experienced in the beginning of 2005. Although the figures provide limited information due to the restricted data accessibility, it can be used as an indicator for the production capabilities in the sector. But, further data observations are necessary before this relationship can be verified.
4.5 Problems and limitations

Several problems arise when studying export data reported by the Israeli Central Bureau of Statistics (ICBS), OECD, and other sources.

First, when conducting economic analyses of territories in a political and military conflict, data may be unavailable or missing for certain time periods. The Israeli-Palestinian conflict seems to be no exception. Unfortunately, trade flows are incompletely registered, since most exports from the West Bank into the UK are not quantified and valued by a customs station before entering Israel on its way to the UK. The Israeli Government does not publish disaggregated export data from the West Bank. These numbers are included in the total value of Israeli exports. In addition, the economy of the Israeli activity in the West Bank is closely integrated into that of Official Israel itself. Thus, distinguishing the two becomes difficult.

Second, the adjusted time series of the trend value of exports is based on the assumption of the pound as the mean of payment in most transactions between Israeli exporters and UK importers. Hence, any changes in this practice may have interfered with the data.

Third, some degree of correlation between variables may exist as a result of dynamic relationships (McKenzie, 1999). For example, correlation could be expected between the development of the real exchange rate and price indices, since both variables are affected by changes in prices. Further, if the exporter adjusts export prices in accordance with changes in the exchange rate, the development of the two variables will be correlated. This may cause either a downward or upward bias in the explanatory power of prices, depending on the magnitude of the effects. Another example of correlation can be identified. As noted in section 2.6, as a consequence of the increasing number of physical obstacles in the West Bank, Palestinian workers in Israeli firms were in part replaced with foreign workers due to uncertainty regarding the accessibility of the Palestinian workforce. This replacement with a relatively more expensive workforce had a negative effect on the input index, since the cost of labor is a factor included in the index. The development of input prices is therefore implicitly a consequence of security considerations. As a result, the level of infrastructure affects the value of exports both through its effect on the prices of input in vegetable production and through its effect on the production level. Hence, the time series of the number of physical obstacles in the West Bank and the input price index may be correlated.

86 The OECD specifically outlines that: "The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law."
Fourth, as noted by the technical advice issued by the UK Department for Environment, Food and Rural Affairs on December 10, 2009, the labelling of produce of Israeli firms in the West Bank as “Produce of the West Bank” may have led some confused consumers to the misinterpretation that these products are Palestinian produce. Hence, some consumers might have bought (or not bought) products in interference with their preferences. This could have had a positive (or negative) effect on exports, depending on the number of confused consumers and the magnitude of their consumption.

Fifth, in accordance with the use of the number of physical obstacles as a proxy for the measure of the level of infrastructure in the West Bank, it should be noted that the different types of obstacles and their locations may have different impact on the level of infrastructure. For example, external obstacles (along the border with Official Israel) could be expected to have more impact on the level of Israeli-Palestinian inter-trade, while internal obstacles (within the West Bank) may have a larger effect on the accessibility of Palestinians working in Israeli firms in the West Bank. In addition, checkpoints along highways might be considered to be more time consuming than checkpoints along a more remote road. Hence, any comparison between the development of the number of physical obstacles and the trend value of exports may to a certain degree be misleading.

Sixth, the analysis does not consider the development of trade flows between the UK and its other major trading partners. Anderson and van Wincoop (2003) argues that a higher trade barrier between a country j and its other trading partners would reduce the relative price of products from an exporting country i, and thereby raise exports from i (for a given trade barrier between i and j). Hence, the development of the value of exports from Israel to the UK would be interfered by changes in the UK’s multilateral trade barrier.

These problems undermine the ability to draw inferences between political actions and corresponding economic consequences. Nevertheless, the time series data can be used to evaluate the probability of a plausible empirical relationship between the variables.

4.6 Conclusive remarks
In this chapter, both the development of the trend value of exports and its main contributors have been analyzed. It is evident that the decline experienced in the beginning of 2005 cannot be explained by the “usual suspects”. Instead, it seems non-spurious that this decrease coincides with the implementation of the amendment to Protocol 4 of the EU-Israel Trade
Agreement. Further, the magnitude of the decrease does not present conclusive evidence against the hypothesis that the development is due to the implementation of the new EU policy. It is apparent that the size of the decline is within reasonable boundaries of the expected decrease in the vegetable exports originating from Israeli producers in the West Bank. However, the trend value of exports declined further towards the end of 2006 and in the beginning of 2007, which could be explained by both increased food prices and input prices (experienced towards the end of 2006) and decreased GDP in Israel and the UK (in 2007). Hence, although these factors seem unable to explain the decline in the trend value of exports experienced in the beginning of 2005, they might have contributed to the decline from the end of 2006 and throughout the time period.
5 Conclusion

This paper has examined the effect on Israeli economic activity in the West Bank of the expulsion from the EU-Israel Trade Agreement. It is hoped that the study has contributed to an enhanced understanding of the economic mechanisms in play.

The major results can be summarized as follows. The implementation of the technical arrangement to Protocol 4 in the EU-Israel Trade Agreement in February 2005 instigated two main effects. First, consumers in the EU member countries gained knowledge about the true origin of the products. Second, because of the differentiation in place-of-origin (between Official Israel and the West Bank), the products were no longer qualified to take advantage of the Trade Agreement, which, in effect, was the same as imposing a tariff on the products.

Although it is difficult (or even impossible) to separate the two effects and their individual impact on the value of exports, their total effect can be studied and analyzed in order to evaluate the impact of the EU policy. It could be expected that conscious consumers which attach negative qualities to West Bank-originating products would reduce their demand as a consequence of the new policy of labelling by origin in subsequent months from February 2005. However, results from other similar studies of the effect of place-of-origin on consumer demand show that demand is not likely to change significantly due to new information on the origin of the products. In addition, the analysis also highlights the complicated mechanisms between perception and consumption. Further, the direct negative impact on the profitability of firms operating in the West Bank may have been counteracted by a more beneficiary subsidization policy by the Israeli Government which was implemented in April 2005. Hence, the Israeli Government’s policy of subsidizing these firms may have, in part, offset the negative effect of expulsion from the Agreement.

It is evident that after the implementation of the amendment to Protocol 4 in the beginning of 2005, the trend value of vegetable exports experienced a decline which seems incapable of being attributed to factors normally expected to be the driving forces of fluctuations in Israeli exports. It seems non-spurious that the implemented technical arrangement corresponds with this development. Both the graphical analyses of the value of exports and other important contributors support this conclusion. Thus, the EU policy of differentiating by origin seems to
have had a negative impact on the profitability of Israeli vegetable producers in the West Bank.

The methodical approach applied in this paper has its limitations. Several simplifying assumptions have been made. In particular, the analysis is crucially dependent on two important assumptions; the framework developed by Armington (1969) of differentiated products and monopolistic competition and the assumption in Melitz (2003) of exporters distinguished by profitability. Although simplifying, they remain useful for studying and analyzing the information given by the time series. Another advantage with the approach is that there is no need to collect information on the level of sales of Israeli vegetable products from every single UK retailer.

In order to increase the understanding of the effects of trade policy involving the complicated relationship between the Israeli and Palestinian export industries, it is necessary to reduce the uncertainty of the data. Correct and accurate policy decisions require reliable data. Hence, transparency should be encouraged and resources should be spent on collecting data.
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Websites


Appendix A

Notes on the export data

The value of vegetable net exports from Israel to the UK is extracted from the Israeli Central Bureau of Statistics. The destination of export is defined as the country of the purchaser. In practice, it is recorded as the country to which the invoice for the products exported was sent. As is customary, only the portion of trade volume that flows through customs is included. Thus, products in transit are excluded. The date for registration of exports is the date that the products are loaded on ships, airplanes or trucks. Exports data are classified in accordance with the “Classification of Export Commodities”\(^\text{87}\). The main sources for imports and exports data are the forms submitted to the customs authorities by exporters. Note that the exports data do not include the value of goods belonging to the residents of the Palestinian Authority (PA). In other words, direct exports from the PA through Israel are not included. This must not be confused with exports from Israeli firms in the West Bank which are included. In addition, exports from Israeli firms which have bought vegetable products from Palestinian producers are included.

\(^\text{87}\) The Classification of Export Commodities is based on the standard international trade classification called “The Harmonized Commodity and Coding System” (H.S.), implemented by the Customs Cooperation Council.
Appendix B

Calculation of the trend value of exports using the X-11 procedure

The X-11 procedure is similar to the method developed by the US Bureau of Census. Assume an observation \(O_x\) which can be broken down into a trend component \(T_x\), a seasonal component \(S_x\) and an error component \(e_x\). The relationship between the components is given by the equation \(O_x = T_x \times S_x \times e_x\). To isolate the trend component of the data the following procedure has been applied:

1) First, calculate a 12-term centered moving average of the original data in order to get an initial estimate of the trend. This is done by using the equation:

\[
T_x^{ADJ} = \frac{1}{2} \left( \frac{m_{x-6} + m_{x-5} + m_{x-4} + m_{x-3} + m_{x-2} + m_{x-1} + m_x + m_{x+1} + m_{x+2} + m_{x+3} + m_{x+4} + m_{x+5}}{12} \right) + \frac{1}{2} \left( \frac{m_{x-5} + m_{x-4} + m_{x-3} + m_{x-2} + m_{x-1} + m_x + m_{x+1} + m_{x+2} + m_{x+3} + m_{x+4} + m_{x+5} + m_{x+6}}{12} \right)
\]

where \(T_x^{ADJ}\) is the first estimate of the trend in period \(x\), \(m_{-i}\) is the original value of exports in the \(i^{th}\) month before the month \(x\), and \(m_{+i}\) is the original value of exports in the \(i^{th}\) month after the month \(x\).

2) Each monthly trend value is then removed from the original data by dividing it on the original value,

\[
O_x/T_x^{ADJ} = (T_x \times S_x \times e_x)/T_x^{ADJ} \approx (S_x \times e_x)
\]

3) Then, to find the first estimate of the seasonal component, calculate a 5-term centered moving average on the new series without the trend component using the equation:

\[
S_x^{ADJ} = \frac{1}{5} \left( m_{x-2} + m_{x-1} + m_x + m_{x+1} + m_{x+2} \right)
\]

4) The first estimates of the seasonal component are divided by the original data in order to get an approximated seasonal adjusted series,

\[
O_x/S_x^{ADJ} = (T_x \times S_x \times e_x)/S_x^{ADJ} \approx (T_x \times e_x)
\]

5) To improve the estimate of the trend, a 24-term centered moving average is calculated on this series by using the equation:

\[
T_x^{ADJ} = \frac{1}{2} \left( \frac{m_{x-12} + m_{x-11} + m_{x-10} + m_{x-9} + m_{x-8} + m_{x-7} + m_{x-6} + m_{x-5} + m_{x-4} + m_{x-3} + m_{x-2} + m_{x-1} + m_x + m_{x+1} + m_{x+2} + m_{x+3} + m_{x+4} + m_{x+5} + m_{x+6} + m_{x+7} + m_{x+8} + m_{x+9} + m_{x+10} + m_{x+11}}{24} \right) + \frac{1}{2} \left( \frac{m_{x-11} + m_{x-10} + m_{x-9} + m_{x-8} + m_{x-7} + m_{x-6} + m_{x-5} + m_{x-4} + m_{x-3} + m_{x-2} + m_{x-1} + m_x + m_{x+1} + m_{x+2} + m_{x+3} + m_{x+4} + m_{x+5} + m_{x+6} + m_{x+7} + m_{x+8} + m_{x+9} + m_{x+10} + m_{x+11}}{24} \right)/24
\]

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$$m_{x+1} + m_{x+2} + m_{x+3} + m_{x+4} + m_{x+5} + m_{x+6} + m_{x+7} + m_{x+8} + m_{x+9} + m_{x+10} + m_{x+11} + m_{x+12})/24]$$

6) Again, divide this series by the original series in order to obtain the final estimate of the seasonal component,

$$O_x/T_x^{ADJ} = (T_x \times S_x \times e_x)/ T_x^{ADJ} \approx (S_x \times e_x)$$

7) A 5-term centered moving average is calculated from this series,

$$S_x^{ADJ} = [(m_{x-2} + m_{x-1} + m_x + m_{x+1} + m_{x+2})/5]$$

8) This series is again divided by the original data in order to get the final seasonal estimates,

$$O_x/S_x^{ADJ} = (T_x \times S_x \times e_x)/ S_x^{ADJ} \approx (T_x \times e_x)$$

9) In order to obtain a better seasonal adjusted series, conduct again the 24-term centered moving average, as is done in step 5, to obtain $T_x^{ADJ}$.

10) Then, in order to get the error component, the estimated trend component from step 9 is divided on the seasonal adjusted series in step 8,

$$(T_x \times e_x)/ T_x^{ADJ} \approx e_x^{ADJ}$$

11) Finally, the error component series is divided on the series in step 8 to obtain the final trend series.

$$(T_x \times e_x)/ e_x^{ADJ} \approx T_x$$
Appendix C

The effect of nominal exchange rates on the published data

In this appendix, a discussion is given regarding the effect of nominal exchange rates on the time series of the seasonal adjusted value of vegetable exports from Israel to the UK. This analysis is useful for identifying the mean of payment in most transactions between Israeli exporters and UK importers. Although the nominal exchange rates between the shekel and the US dollar and the shekel and the US pound do not directly affect the choices of exporters and importers, this effect must be examined in order to analyze its impact on the published data of the value of exports. First, each individual exporter’s value of exports is recorded by the ICBS in both Israeli shekels and UK pounds. Then the value is converted by the ICBS into US dollars using the exchange rate from the day the transaction was registered at customs. Hence, in cases where shekels are used as the mean of payment, the nominal exchange rate between the shekel and the dollar are used to convert the value of exports into US dollars. In cases where the pound is used as the mean of payment, the value of exports are first converted from pound to shekels and then from shekels to dollars, using the nominal exchange rates between both shekel and pound and shekel and dollar. As a result, the development of the seasonal adjusted value of exports will in part be subject to the development of the nominal exchange rates. The time series of the trend value of exports will mainly reflect the fluctuations in the most used method of conversion. Hence, comparing their time series are useful for the purpose of identifying the most used currency in transactions between Israeli exporters and UK importers. Figure A3.1 shows the seasonal adjusted value of exports in US dollars when the X-11 procedure has been applied on the data.

![Figure AC.1. Adjusted value of agricultural exports](image-url)
The data presented in the figure suggest that the trend value of exports, denoted in US dollars, experienced a rapid growth from the end of 2001 until the beginning of 2005. In December 2001 the value of exports was 12.5 million dollars. In subsequent periods, the value increased steadily until it peaked in February 2005 at approximately 18.5 million US dollars. From this date, it entered a period of continued decrease for six months. From September 2005, the monthly value seems to have converged at approximately 18 million dollars until the beginning of 2007. Since then, the value has decreased steadily in all subsequent time periods for which trend data are available.

Figure A3.2 shows the time series of the monthly average nominal exchange rate between the shekel (NIS) and the US dollar ($)^{88}$. The series is extracted from the Bank of Israel Statistics Database. If the shekel is the most used currency in transactions, then there is expected to be a negative relationship between the value of exports and the exchange rate. That is, an increase in the nominal exchange rate between the shekel and the US dollar is expected to have a negative impact on the value of exports^99.

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{\(88\) The nominal rate is measured as the amount of shekels per US dollar. There is no need to report the real exchange rate, since the transformation from shekels to dollars is done using nominal values.}

{\(89\) As an example, imagine that the value of exports measured in shekels equals 20. First, consider an exchange rate of 4 shekels per dollar. Then, the value of exports measured in dollars are \(20/4 = 5\) dollars. Now consider instead an exchange rate of 5 shekels per dollar. Then the value of exports measured in US dollars are only \(20/5 = 4\) dollars. Hence, there is a negative relationship between the nominal exchange rate between the shekel and the dollar and the value of exports measured in dollars. Economic theory predicts that a nominal depreciation would increase the value of exports. But, the exchange rate between the shekel and the dollar is only used for the purpose of presenting the value of exports in US dollars. Hence, this rate has no real effect on the choices of exporters and importers.}
As could be seen from the figure, the shekel experienced a period of nominal depreciation from the end of 1997 until the beginning of 2003. In February 2003 the exchange rate was 4.87 NIS per US dollar. In the period from the beginning of 2003 and the mid-months of 2005, the rate mostly fluctuated between 4.40 and 4.60 shekels per dollar. In subsequent months until February 2006, the rate seems to have depreciated, but from that date the rate fell sharply throughout the dataset. When comparing the figures, it seems like the nominal exchange rate between the shekel and the US dollar is not able to explain the pattern of fluctuations in the value of exports. The relationship fits poorly when comparing the growth in the trend value of exports from 2002 until the end of 2004, since the exchange rate was relatively stable in the period. Nor does it seem able to explain the relative stability until 2007, since the exchange rate depreciated in several months of that period.

Similarly, Figure A3.3 shows the time series of the product of the monthly averaged nominal exchange rates between the shekel and the UK pound (amount of shekels per pound, NIS/£) and the shekel and the US dollar (NIS/$)\textsuperscript{90}. If the pound is the most used currency for transaction purposes, then a positive relationship between the value of exports and the development of the value of exports should be expected\textsuperscript{91}.

\textsuperscript{90} This series is also extracted from the Bank of Israel Statistics database on exchange rates. Note that since the transformation is done from pound into shekels and then from shekels into dollars, one needs to divide the amount of shekels per pound on the amount of shekels per dollar.

\textsuperscript{91} To illustrate this argument, consider a value of exports of 200 pounds. First, the product of the rates is equal to 2. This means that 200 pounds amounts to the same as 400 dollars. Then, imagine a rate of 4. Now the 200 pounds equal 800 dollars. Hence, an increase in the rate is expected to increase the value of exports measured in dollars.
In the first months of the time series, the product of the nominal exchange rates experienced periods of relative stability, fluctuating around a rate of 1.65. From the beginning of 1999, the rate entered a period of almost subsequent decreases, until it reached its lowest level in the dataset in June 2001, at a rate of 1.40. Thereafter, until the end of 2004, the rate increased rapidly. Then the rate fluctuated around a rate of 1.80 throughout 2005, before it again started increasing. The rate reached its highest value in October 2007, at a rate equal to 2.04. When comparing the time series, it seems clear that the development of the product of the nominal exchange rates seems to be more in line with the pattern of fluctuations in the value of exports. Both the decrease in the rate in the beginning of the series and the increase from 2001-2004 seems to fit reasonable well with the theory.

The reason for this seemingly close relationship between the product of the nominal exchange rates and the value of exports, contrary to the uncorrelated series between the exchange rate of shekel and dollar and the value of exports, is likely to be that most transactions between Israeli exporters and UK importers are done in the currency of UK pounds. Therefore, the time series of the value of exports will to a larger degree reflect the development of the product of the nominal exchange rates. Hence, when adjusting the value of exports for the effects of nominal exchange rates, then the method of using the product of the nominal exchange rates between shekel and pound and shekel and dollar should be applied.