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EXPORT DIVERSIFICATION AND COMPETITIVENESS: INTENSIVE AND EXTENSIVE MARGINS OF TURKEY

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Abstract

Export diversification, which can be attained by changing the share of existing commodities ("intensive margin") and including new commodities in the export portfolio ("extensive margin"), is needed to improve international competitiveness. In this study, we examine the significance of Turkey's intensive and extensive margins in the EU-15 market. Using SITC (Rev. 3) five-digit data from 1996 to 2006, we determine the extent to which the increase in Turkey's share in the EU-15 market results from a rise in existing exports or an increase in product varieties. We compare Turkey with its main non-EU-15 competitors in this market by applying the approaches developed by Feenstra and Kee (2007) and Amiti and Freund (2008). According to our analysis, for all competitors in the EU-15 market, the growth of exports has arisen primarily from the intensive margin, rather than the extensive one. Although a far greater portion of export growth is due to the intensive margin, rather than the extensive margin, Turkey has important opportunities to improve its export growth and competitiveness in the EU-15 market by increasing the production and exports of new products especially in research-intensive sectors.

Keywords*: Turkey, European Union, export competitiveness, intensive margin, extensive margin.*

JEL Classification*: F10, F14, F19.*

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Özet

Uluslararası piyasalarda rekabet edebilirliği sağlamak için ülkelerin ihracatta çeşitlenmeye gitmesi gerekmektedir. İhracatta çeşitlenme hâlihazırda ihraç edilen malların paylarının artırılması ("yoğun marj") ve yeni mallar ihraç edilmesi ("yaygın marj") ile sağlanabilir. Bu çalışmada Türkiye'nin AB-15 piyasasına yaptığı ihracattaki yoğun ve yaygın marjları 1996-2006 yılları için sayım yöntemi, Feenstra ve Kee (2007) ile Amiti ve Freund (2008) tarafından geliştirilen yöntemlerle incelenmiştir. Bu yöntemler her bir teknolojik sınıf için ayrı ayrı ele alınmış ve ayrıca Türkiye'nin konumu AB-15 piyasasına ihracat yapan en önemli 30 AB-15 dışı ülke ile de kıyaslanmıştır. Çalışmamız, Türkiye'nin yeni malların üretimi ve ihracatını arttırarak AB-15 piyasasında AB-15 dışı rakiplerine karşı rekabet gücünü arttırabilmesi için önemli fırsatları olduğunu ortaya çıkarmıştır.

Anahtar Kelimeler*: Türkiye, Avrupa Birliği, ihracat rekabet gücü, yoğun marj, yaygın marj.*

JEL Sınıflaması*: F10, F14, F19.*

I. Introduction

One of the most challenging issues for developing countries is the need to reduce their dependence on traditional export products**;** such as raw materials, labor-intensive and agricultural goods, which are usually in a disadvantageous position against developed countries' exports that usually involve higher technologies and higher values added. In order to establish a more reliable basis for foreign exchange earnings and compete more successfully in international markets, not only increasing export earnings but also exporting new product varieties is required. Therefore, it is generally agreed that export diversification is a desirable practice, especially for developing countries, because it enhances export competitiveness by widening the set of variety of export products, thereby reducing dependence on traditional exports. By means of regular and successful export diversification, countries may improve the overall terms of trade for their exports, minimize the conjectural fluctuations in export revenues and establish a more dynamic and reliable export sector. In this sense, export diversification and export

competitiveness can be considered as two sides of the same coin. The general idea here can be summarized as follows: A country is more likely to improve its export competitiveness against its competitors if that country is capable of producing and exporting 'new varieties of products', rather than merely relying on producing and exporting 'traditional products'. (Feenstra and Kee, 2004; Agosin, 2007; Gourdon, 2010). Therefore, export diversification, which can be attained by changing the share of existing commodities (intensive margin) and including new commodities in the export portfolio (extensive margin) is needed to raise competitiveness in the world markets[1].

In this study, we evaluate the degree of Turkey's export diversification in terms of the so-called extensive and intensive margins. Although the extensive and intensive margins have been defined in different ways by different studies, in our analysis we consider the extensive margin as a measure of the extension of the set of exported products through the addition of new export products over time. On the other hand, the intensive margin is a measure of the intensity of the set of existing products that have been already exported in the previous time periods. More specifically, in this context, intensive margin refers to the share of products that are already being exported, while extensive margin refers to the share of new products in the export portfolio. We measure the relative significance of these margins in the context of the changes in Turkey's exports in the EU-15 market.

Turkey, in accordance with the world trend, has been adopting trade liberalization policies since the 1980s. In this process, the earlier 15 members of the EU (the EU-15 market hereafter) have traditionally been the most important trading partners of Turkey. Turkey's exports to the EU-15 market constitute nearly half of its total exports. More specifically, exports to the EU-15 constitute 50 % of Turkey's total exports in 1996 and 49% of it in 2006. So, EU-15 is a very important destination for Turkey's exports. Besides, the Customs Union between Turkey and the EU, which came into effect at the end of 1995, has been a turning point for Turkey in terms of a new regional-economic integration. However, previous studies such as Erlat and Erlat (2012) show that there is a well-established, difficult-to-change trade structure among the EU-15 countries themselves. Against this rigorous trade structure, it seems very difficult for Turkey to compete dynamically with the EU-15 countries in the EU-15 market, as Turkey's traditional competitiveness areas with respect to these well-developed countries are mostly raw-material- and labor-intensive products. Nevertheless, when the trade patterns between EU-15 and non-

[1] For alternative measures of export diversification and its evolution over time, with applications to Turkish foreign trade, see Erlat and Şahin (1998) and Erlat (1999).

EU-15 countries which compete with Turkey in the EU-15 market such as Central and Eastern European Countries (CEECs), Middle Eastern and North African (MENA) countries, as well as certain countries from Asia, Africa, Latin America and also some from the developed world are examined, it is easier to observe a dynamic framework. For example, CEECs have generally been the major competitors in this market, especially after their accession to the EU in 2004 and 2007. MENA countries also have prominent export relations with the EU-15 countries. Certain Asian countries – led by China – have also considerably increased their exports to this market. On the other hand, the export shares of certain developed countries – such as the US, which is the most important trading partner of the EU – have decreased in recent years. This dynamic framework creates potential gains and promising competition possibilities for those countries with rational trade strategies. As an important exporter to the EU-15 market[2], Turkey has a special interest in enhancing export competitiveness in the EU-15 market in this very dynamic market.

Moreover, one of the continuing problems in the Turkish economy is the large current account deficits. One way to overcome the problem of current account deficits is to develop rational strategies to increase export revenues. If Turkey is to overcome the problem of traditional current account deficits as well as increase its competitiveness, diversifying its exports would be of great importance. Therefore, Turkey's capability of producing and exporting new products constitutes a promising road to overcome the problem of current account deficits as well as to increase its competitiveness.

Therefore, we evaluate Turkey's competitive position in the EU-15 market against its non-EU-15 competitors in terms of its intensive and extensive margins in this study. More specifically, we determine the extent to which the rise in Turkey's exports in the EU-15 market is attributable to increases in existing exports and to increases in new product varieties. Relying on our calculations, we compare Turkey to its main competitors in this market.Our research questions are: What has been the degree of effectiveness of intensive and extensive margins on the changes in Turkey's exports? Against which competitors and in which product categories does Turkey compete more dominantly in the new products and in the existing products? We believe that identifying the main source of export growth over time is now a necessary step in the construction of a workable framework for developing practical export strategies.

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[2]Turkey's share in total EU-15 imports was nearly 1.7 % in 1996 and Turkey was ranked 11th among these 30.This share increased to 2.5 % in 2006 and Turkey was ranked 10th among 30.

With these questions in mind, we calculate the intensive and extensive margins for Turkey and its competitors in the EU-15 market for the period 1996-2006, in order to constitute a broad framework for comparative analysis. We also classify the export products into five groups according to their technological characteristics: Raw-material-intensive goods (RMIG), labor-intensive goods (LIG), capital-intensive goods (CIG), easy-to-imitate research-intensive goods (EIRG) and difficult-to-imitate research-intensive goods (DIRG). We report our results with respect to this technology-related classification.[3]

We first present the number of exported products for overall products along with the manufacturing and primary industries, according to technological categories in the initial and final years of analysis (i.e., 1996 and 2006). Then, we present our more detailed indexes and results, which we obtain by employing the methodologies developed by Feenstra and Kee (2007) and Amiti and Freund (2008).

To our knowledge, this is the first study analyzing the importance of the intensive and extensive margins of Turkey by using three methods of measuring extensive-intensive margins together, along with a much broader set of sectors, a much more disaggregate data-set and thus covering an unprecedentedly large variety of products (i.e., at 5-digit level with 3049 products and 30 countries) classified according to their technological characteristics.More generally, we contribute to the empirical investigation of export diversification by providing new evidence based on intensive and extensive margins insofar as the main exporters to the EU-15 market are concerned.We hope that these new features of our analyses will not only enrich the existing empirical literature, but also provide an expanded choice set for export strategy possibilities.

One important conclusion that we derive from our analysis is that, in general for all competitors in the EU-15 market, the growth of exports was due primarily to the intensive margin, rather than the extensive margin. This result is in line with the previous findings of such studies as Besedes and Prusa (2011) and Helpman et al. (2007). Our results, in line with the results of Kehoe and Ruhl (2013), also suggest that the extensive margin (i.e., export diversification) has been relatively more contributive in the case of developing countries, as compared to the developed ones. From theviewpoint of Turkey's technological categories, we conclude that Turkey

[3]See, e.g., Erlat and Erlat (2003) for details of this classification. In fact, we carried out our analysis for each country with respect to the technology-related classification. However, we report our results only for Turkey by determining its rank among the other 30 countries. In some relevant connections, we evaluate the cases of other countries as well. That is to say, we are in a position to provide the results for each country upon request.

exhibited a successful performance in terms of exporting new products from 1996 to 2006, especially in research-intensive sectors.

II. Literature Review

In the literature, the studies that involve intensive-margin analysis originate from Armington's (1969) model of national differentiation. Such studies focus mainly upon the growth in the set of products that have already been exported previously. On the other hand, the studies that involve extensive-margin analysis originate from Krugman's (1980) monopolistic competitive model. Such studies consider only the growth in the set of new export-products. Recently, however, Hummels and Klenow (2005) argued that neither the Armington- nor the Krugman-model alone is successful enough in explaining the sources of export growth in a comprehensive way.

In the literature, the extensive margin is generally used to refer to the extent of new varieties of export products. Feenstra (1994) is one of the earlier and major studies that measure the growth in product variety over time. Incorporating product variety with the US import price index, he finds strong evidence for the role of product variety growth in affecting this index. In this connection, some later studies that deal with product variety have utilized the Feenstra-index developed in Feenstra (1994). For example, Feenstra et al. (1999) analyze the effect of export variety on productivity in the case of South Korea's and Taiwan's exports to the US at the sector level between 1975 and 1991. They conclude that, in 9 of the 16 export sectors, product variety has a significantly positive effect on productivity. Also, Feenstra and Kee (2007) compare the export variety of China and Mexico in the US market over the period 1989-2001 by using "The Harmonized Commodity Description and Coding System (HS)" 10 digit US import data. They find a significant increase in Mexico's export variety in all industries, especially after Mexico's admittance to the NAFTA. They find a significant increase in China's export variety as well. They conclude that China's export variety has recently exceeded that of Mexico in certain industries. Analogously, Feenstra and Kee (2006) relate export variety with productivity and they find that among the countries exporting to the US, the ones with higher export variety also have higher productivity. Funke and Ruhwedel (2001) find a positive correlation between the product variety of exports of 19 OECD countries to the US and their per-capita-income over the period 1989-1996. All these studies show that there is an important connection between the ability to export new products and productivity and hence competitiveness.

On the other hand, Hummels and Klenow (2005) examine both the extensive and intensive margins in a cross-country context for a given year. They develop extensive and intensive margins in order to see the cross-country differences between the exports of smaller and larger economies in terms of quantity, quality and product variety. Using trade data for 110 exporter and 59 importer countries for the year 1995, Hummels and Klenow (2005) find that the extensive margin constitutes the bulk of the exports of larger economies. They also find that the intensive margin is affected more by higher quantities than higher prices. In the literature, many studies have followed and further developed Hummels and Klenow's (2005) framework of analysis. For example, Alvarez and Claro (2007) analyze the sources of China's export growth in Chilean markets. Their study is based on Hummels and Klenow's (2005) methodology of decomposing export growth into extensive and intensive margins and then decomposing further the intensive margin into price and quantity margins. They find that China's export growth is mainly due to the increase in the intensive margin. Yoshida (2008) also relies on the extensive and intensive margins, as developed by Hummels and Klenow (2005), as a determinant of intra-industry trade between Japan and Korea. He finds that the level of intra-industry trade is positively influenced by the introduction of new products and negatively affected by the increases in the trade of old products. Iranzo and Ma (2006) assess the extent to which China's influence on Mexico-US trade is due to extensive and intensive margins. Employing econometric estimation techniques, they find that China's exports to the US have adversely affected the volume of Mexico's existing products, while it has positively affected Mexico's new exports. Kandoğan (2006) compares the transition economies, i.e., formerly socialist countries from Central and Eastern Europe and Commonwealth of Independent States (CEECs and CIS), in terms of the extensive and intensive margins of their exports to the market economies over the years 1992-1999. Using a modified version of Hummels and Klenow's (2005) methodology, he finds that the increase in the intensive margin is much more important for CIS-exports, while the increase in the extensive margin is more significant for the exports of CEECs.

In this literature, one of the most important studies has been carried out by Besedes and Prusa (2011), who interpret the extensive margin as the ability of a country to obtain new export relationships and the intensive margin as the ability to maintain the existing export relations. They decompose the intensive margin into surviving and deepening existing relations. Based on detailed export data for 46 developed and developing countries between 1975 and 2003, they conclude that the intensive margin constitutes the largest part of the growth of trade compared to the extensive margin. Their survival and deepening analysis show that although new

relationships are more important for developing countries, export survival for developing countries is shorter than that for developed countries and so new export relationships generate far less export growth for developing countries.

Evenett and Venables (2002) also take into account the new markets as well as new products in decomposing the export growth of 23 developing countries between1970-1997. They evaluate the number of zeros in bilateral trade matrices and conclude that exports of traditional products to the new markets constitute one third of export growth of these countries.

Amurgo-Pacheco and Pierola (2007) also add a geographical dimension to the classical product-definitions of the margins. They define the intensive margin in terms of "Old products being exported to Old Destinations" and the extensive margin in terms of three possibilities: "Old Products being exported to New Destinations", "New Products to New Destinations" and "New Products to Old Destinations". They find that the intensive margin is much more important than the extensive margin in the growth of trade for all countries in their sample. However, they also find that the relative importance of the extensive margin is higher for poorer regions relative to richer ones. Finally, they conclude that, at the extensive margin, geographical diversification is more important than product diversification.

Kehoe and Ruhl (2013), as different from the previous studies, take into account the relative importance of a good in a country's trade, rather than declaring a good to be nontraded only if the reported value of trade is zero.They evaluate the share of least-exported goods as an indicator of extensive margin and they find a positive and significant relationship between the extensive margin and total trade growth for 1,913 bilateral country pairs over the period 1995-2005. They show that the magnitude of this relationship changes with respect to country pairs and time horizons.

Amiti and Freund (2008) decompose China's export growth into its extensive and intensive margins for the period 1992-2006. Using HS-6-digit data, they reach an interesting result: Almost the entire growth of China's exports to the world is due to the intensive margin. At HS-10-digit level, they find that the extensive margin is responsible for about 5-15% of this growth.

One of the studies on Turkey's extensive and intensive margins is Aldan and Çulha (2013). Following the methodologies by Hummels and Klenow (2005) and Kehoe and Ruhl (2013), Aldan and Çulha (2013) analyze Turkey's extensive margin in terms of new products and new markets for the period 1993 and 2011 based on 4-digit SITC data for the manufacturing industry.They compare their results with the U.S., China, India, the Czech Republic, Korea and Mexico and they conclude that

Turkey's extensive margin is relatively higher than the other countries and the source of this success is new markets rather than new products.

Even though the review of the related literature shows that the extensive and intensive margins have been defined in different ways by different studies, the main and general idea here is to determine the degree of the contribution of the new and old products to the export growth of a country in a given market in a given period of time. With this related literature in this paper, we have chosen to apply the Feenstra and Kee (2007) index, which may also be considered an improvement of Hummels and Klenow and then the Amiti and Freund (2008) index due to its dynamic nature. Hence, in what follows, we shall first introduce the data and then describe our methodology together with its empirical results. The last section will contain our conclusions.

III. The Data and Methodology

III.i. Data

Our data source in this study is "Eurostat" – the major statistical office of the European Union. Eurostat provides us with the necessary import figures of the EU-15 countries. We use import data of the EU-15 market, because it provides homogeneous customs values of imports from non-EU-15 countries. The Eurostat data-set was compiled in accordance with SITC Rev. 3 between 1996 and 2006; however, it was revised to Rev. 4 in 2007. Extensive-intensive margin methodologies are very sensitive to these classifications and to use conversion tables is not a solution for this reclassification problem.For example in SITC Rev.3 59841- Mixedalkylbenzenes, n.e.s. and 59845- Mixed alkylnaphthalenes, n.e.s. are converted into 5984- Mixed alkylbenzenes and mixed alkylnaphthalenes as a single product in SITC Rev.4. Therefore, product-5984 seems to be a new product even though it was exported in the previous period. Since our extensive and intensive margin computations would be severely affected by such re-classification, we were not able to use the data after 2006. Therefore, we had to confine our analysis to the period 1996-2006, using SITC-Rev.3 data consistently throughout the entirety of our calculations. The data-setwe use is at a quite disaggregate level, i.e. 5-digit, so as to take into account the potentially important effects of product heterogeneity in these types of analysis. More specifically, our analysis comprises 3049 products with 30

countries from Middle East and North Africa, Central and Eastern Europe, Asia, Latin America as well as some developed countries.[4]

III.ii. Methodology

We first count the number of export products along the period under consideration. Even though counting number of products is a practical and useful first step towards understanding the degree of export diversification, it alone is insufficient to see important details that cannot be overlooked. Therefore, we also analyze and evaluate the degree of export diversification in terms of shares, using some more technical methodologies. That is to say, secondly, we evaluate product varieties and extensive margins of the countries, based on the methodology of Feenstra and Kee (2007). This methodology is useful in measuring the importance of new products in terms of their share in the EU-15 marketand it also enables us to carry out cross-country comparisons.Finally, we measure the relative importance of extensive and intensive margins on the countries' own export growth in the EU-15 market from 1996 to 2006, based on the methodology of Amiti and Freund (2008).

The Number of the Types of Export-Products in the EU-15 market

Counting the number of product categories that the country exports is the most practical way of measuring the export-product variety of a country. We present the number of the types of products in 1996 and 2006 exportedto the EU-15 market.

Product Varieties and Extensive Margins (based on Feenstra and Kee, 2007)

As we have already mentioned in the literature survey, most of the studies on extensive and intensive margins are based on Hummels and Klenow (2005). Hummels and Klenow (2005) decompose the market share of a country into its extensive and intensive margins at a point in time. In their methodology, extensive margin of a country measures the ratio of "the value of world exports of the products produced by this country" to "the value of world exports of all products produced by all countries." However, there are some problems with this methodology. First, the value of the index depends on the set of products exported by the country-in-question, but not on its own value of exports. Hummels and Klenow (2005: 710)

[4]These countries are the main exporters to the EU-15. Although the share of these countries changes over time, overall, total exports of these countries constitute more than 70% of total EU-15 imports from outside of EU-15 in both 1996 and 2006. See the Appendix for the shares of individual countries.

summarize the disadvantage concerning this problem as follows: "a country may appear to have a large extensive margin because it exports a small amount in categories in which the world exports a lot." Secondly, as mentioned by Feenstra and Kee (2007), the application of this extensive-margin index in its original form leads to inconsistencies in cross-year comparisons. Feenstra and Kee (2007) overcome this problem by averaging the worldwide exports over the years. In this way, they obtain a consistent set of countries suitable for comparison. However, measuring the importance of intensive margin in the market share may be misleading, even after this modification. For this reason, we measure only the product varieties and extensive margin by the methodology of Feenstra and Kee (2007) and we utilize another index for the measurement of the intensive margin.

In the Feenstra and Kee (2007) approach, we first measure product variety by the ratio of "the value of worldwide exports in products that a given country exports to the EU-15 market" to "the value of worldwide exports from all non-EU-15 countries to the EU-15 market." Formally:

$$PV_t^a = \frac{\sum_{j \in I_t^a} X_j^w}{\sum_{j \in I_t^w} X_j^w} \tag{1}$$

where PV_t^a refers to the product variety of "country *a*" in year *t*; *j* refers to the product; *a* refers to the country-in-question (e.g. Turkey); *w* refers to the world (i.e., all non-EU-15 countries exporting to the EU-15 market in our case); I_t^a refers to the set of products exported to the EU-15 market by "country *a*" at time *t*; I^w refers to the total set of worldwide products exported to the EU-15 market in the overall period and X_j^w is the *average value* of worldwide exports for product *j*,summed over all non-EU-15 countries and averaged across years. By summing across countries and averaging across years, we obtain a consistent comparison set of products exported by the world that does not itself vary over time.

The numerator in this expression is the value of worldwide exports in products that "country *a*" exports to the EU-15 market, averaged over the years.The denominator is the worldwide exportsfrom all non-EU-15 countries to the EU-15 market, which are also averaged over the years. Therefore, PV_t^a can be understood

as world exports to the EU-15 market in I^a in year t relative to world exports to the EU-15 market in all I^w.

Then, the extensive margin of "country a" (EM^a) is defined as the growth rate of product variety from the year t_0 to the year t_1 and computed by the following formula:

$$EM^a = [\ln(PV_{t1}^a) - \ln(PV_{t0}^a)]x100 \quad (2)$$

Extensive and Intensive Margins of Export Growth (based on Amiti and Freund, 2008)

Extensive and intensive margins of a country depend only on the value of its own exports in the Amiti and Freund (2008) index, which construct extensive and intensive margins of a country's export growth. In other words, it does not take into account the shares in the import market. So, the decomposition by Amiti and Freund (2008) is useful for analyzing the export growth of a country over time, rather than cross-country comparisons. Hence, the Amiti and Freund (2008) approach should not be confused with the Feenstra and Kee (2007) methodology.

Amiti and Freund (2008) decompose export growth of a country from one year to another into three parts: i) the increase in the export growth due to the growth in products that were exported in both years (intensive margin), ii) the contraction in export growth due to products exported in the base year but no longer exported in the final year (disappearing goods) and iii) the increase in export growth due to the export of new products (new goods). They define the extensive margin as 'the new-goods component' minus 'the disappearing-goods component'. At this point, we should note that Amiti and Freund (2008) is the first study to introduce disappearing goods into the definition of the extensive margin.

Formally, Amiti and Freund (2008) decompose export growth of a country from one year to the next into its extensive and intensive margins as follows:

$$\underbrace{\frac{\sum_j X_{t,j} - \sum_j X_{t-1,j}}{\sum_j X_{t-1,j}}}_{\text{Export Growth}} = \underbrace{\frac{\sum_{j\in I} X_{t,j} - \sum_{j\in I} X_{t-1,j}}{\sum_j X_{t-1,j}}}_{\text{(i) Intensive Margin}} + \underbrace{\frac{\sum_{j\in I_t^N} X_{t,j}}{\sum_j X_{t-1,j}} - \frac{\sum_{j\in I_t^D} X_{t-1,j}}{\sum_j X_{t-1,j}}}_{\text{(ii) (iii) Extensive Margin}} \quad (3)$$

where I_t^N is the set of products exported by the country in the year *t* but not exported in the year *t-1* (new products); I_{t-1}^D is the set of products exported in the year *t-1* but not exported in the year *t* (disappearing products); *I* is the set of products exported in both the year *t* and the year *t-1*; $X_{t,j}$ and $X_{t-1,j}$ are values of the exports of "product *j*" in the year *t* and the year *t-1*, respectively.

Therefore, as in Amiti and Freund (2008), we decompose export growth of a country from 1996 to 2006 into three parts:

(i) the growth in products that were exported in both periods, which they call "the intensive margin";

(ii) the increase in export growth due to the new products

(iii) the decrease in export growth due to the disappearing goods. Extensive margin is defined as the component (ii) minus component (iii).

IV. Results

First we present the results in terms of the number of the types of export-products, the Feenstra and Kee (2007) index and the Amiti and Freund (2008) index in a cross-country comparison for overall (SITC 0-9), manufacturing (SITC 5-8) and primary (SITC 0-4) sectors. Then we focus on Turkeyseparately and evaluate the results of these three methodologies in terms of each technological category.

IV.i.Extensive and Intensive Margins: Comparison Among Countries

The Number of the Types of Export-Products in the EU-15 market

Table 1 below shows the number of the types of export-products in 1996 and 2006, in terms of (i) total number of products that each country exported to the EU-15 market and (ii) the percentage-ratio of these numbers in the total number of

products exported to the EU-15 market by all the 30 countries considered. The ranking is according to the number of products for the overall industries in 2006.

Table 1 shows that the number of the export-products is the highest for the US in both 1996 and 2006. China's prominent success in increasing the number of its export-products from 1996 to 2006 is also noteworthy. Switzerland, Norway, Japan, Poland, the Czech Republic and Canada had higher numbers of products than China in 1996; however, China's number of products is higher than all of these countries in 2006.

According to Table 1, for overall industries, Turkey was able to export 2205 and 2557 different products (at the 5-digit level) to the EU-15 market in 1996 and 2006, respectively. As of 2006, in terms of export diversification, Turkey's performance puts her at the 9th position among the 30 exporters in the EU-15 market. In general, this can be considered a good performance.

Table 1 also demonstrates that, for overall industries, in 1996 and 2006, respectively, Turkey was able to export 70.1 % and 79.7 % of all types of products exported to the EU-15 market from the rest of the world. For the manufacturing industry, Turkey's performance in product variety is given by 74 % in 1996 and 85 % in 2006, while, for primary products, it is 57.4 % and 62.2 % in 1996 and 2006, respectively. That is to say, in terms of diversifying its exports, Turkey is structurally more successful in the manufacturing industry than in primary products. This can also be regarded as a promising result to some extent, because diversification in manufacturing can be considered a better sign of development as compared to diversification in primary products. However, we should also note that product variety in manufacturing is higher than that in the overall and primary sectors for most of the countries.

Based on the table above, we can also determine countries' gains and losses (i.e., increases and decreases) in their number of exported products from 1996 to 2006. When we evaluate the gains and losses in the number of exported products from 1996 to 2006 for overall sectors, we see that developing countries – especially Lithuania, Latvia, Romania, China, and the Ukraine are the countries with the highest increases in the number of exported products from 1996 to 2006. In contrast, developed countries such as Switzerland, US, Japan, Canada and Norway are the ones with the lowest increases and, in some cases, with decreases in the number of the types of products exported to the EU-15 market. However, the magnitude of the losses for the developed countries is much lower than the magnitude of the gains for the developing countries, implying that the developing counties did not necessarily improve their product varieties at the expense of the developed countries. EU-15's

overall demand for imports should have sufficiently and effectively increased so as to create extra opportunities for the developing countries from 1996 to 2006.

Table 1: Number of product types and percentage-share of each number in the total number of product types exported to the EU-15 market

	OVERALL (SITC 0-9)				Manufacturing (SITC 5-8)				Primary (SITC 0-4)			
	1996		2006		1996		2006		1996		2006	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
U S	3082	97.6	3071	95.3	2380	98.8	2398	97.2	688	93.6	659	89.2
CHINA	2491	78.9	2925	90.8	2037	84.6	2349	95.2	444	60.4	563	76.2
SWITZERLAND	2957	93.6	2890	89.7	2360	98.0	2350	95.2	585	79.6	527	71.3
POLAND	2586	81.9	2790	86.6	2109	87.6	2179	88.3	467	63.5	601	81.3
CZECH R	2606	82.5	2727	84.6	2170	90.1	2205	89.3	426	58.0	512	69.3
NORWAY	2679	84.8	2721	84.5	2193	91.1	2185	88.5	475	64.6	524	70.9
JAPAN	2661	84.3	2666	82.7	2240	93.0	2250	91.2	409	55.6	403	54.5
INDIA	2237	70.8	2604	80.8	1854	77.0	2134	86.5	373	50.7	461	62.4
CANADA	2546	80.6	2569	79.7	2053	85.3	2078	84.2	483	65.7	478	64.7
TURKEY	**2205**	**70.1**	**2557**	**79.7**	**1783**	**74.0**	**2097**	**85.0**	**422**	**57.4**	**460**	**62.2**
HUNGARY	2456	77.8	2513	78.0	2014	83.6	2010	81.4	431	58.6	492	66.6
BRAZIL	2085	66.0	2403	74.6	1691	70.2	1928	78.1	384	52.2	468	63.3
KOREA	2076	65.7	2320	72.0	1814	75.3	2014	81.6	255	34.7	295	39.9
SLOVENIA	2122	67.2	2320	72.0	1805	75.0	1897	76.9	308	41.9	414	56.0
ROMANIA	1766	55.9	2226	69.1	1520	63.1	1877	76.1	237	32.2	339	45.9
SLOVAKIA	1971	62.4	2220	68.9	1688	70.1	1840	74.6	274	37.3	373	50.5
RUSSIA	2155	68.2	2207	68.5	1789	74.3	1823	73.9	356	48.4	376	50.9
THAILAND	1797	56.9	2171	67.4	1457	60.5	1760	71.3	329	44.8	401	54.3
ISRAEL	2107	66.7	2151	66.8	1780	73.9	1808	73.3	316	43.0	331	44.8
BULGARIA	1696	53.7	2030	63.0	1422	59.1	1693	68.6	266	36.2	330	44.7
ESTONIA	1681	53.2	1989	61.7	1444	60.0	1624	65.8	230	31.3	359	48.6
MEXICO	1707	54.1	1911	59.3	1443	59.9	1621	65.7	255	34.7	280	37.9
MALAYSIA	1619	51.3	1891	58.7	1386	57.6	1607	65.1	224	30.5	276	37.3
CROATIA	1564	49.5	1856	57.6	1322	54.9	1549	62.8	234	31.8	299	40.5
INDONESIA	1607	50.9	1809	56.1	1322	54.9	1493	60.5	276	37.6	308	41.7
LITHUANIA	1182	37.4	1762	54.7	1007	41.8	1393	56.4	167	22.7	361	48.8
UKRAINE	1228	38.9	1649	51.2	1019	42.3	1399	56.7	201	27.3	241	32.6
MOROCCO	1406	44.5	1586	49.2	1130	46.9	1295	52.5	268	36.5	286	38.7
TUNISIA	1333	42.2	1561	48.4	1141	47.4	1322	53.6	186	25.3	234	31.7
LATVIA	1028	32.6	1518	47.1	882	36.6	1271	51.5	138	18.8	240	32.5

Source: Authors' own calculations

Product Varieties and Extensive Margins (based on Feenstra and Kee, 2007)

Table 2 presents the product varieties and extensive margins of the countries from 1996 to 2006 for overall, manufacturing and primary sectors. The ranking is based on the extensive margins. Bold numbers indicate the countries, compared to

which Turkey is definitely more successful in the related sectors. Italic numbers show the countries with negative extensive margins.

Table 2 should be interpreted carefully. That is to say, product varieties and extensive margins should be considered together in making cross-country comparisons because considering only the extensive margin and taking it alone as a success indicator of exporting new products can be misleading. For example, in 1996, one country can have a very high product variety close to 100 percent and another country can have a very low product variety. In 2006, the first country can still have a very high product variety close to 100 percent and the second country might have increased its product variety remarkably. Given this pattern, let us suppose that the extensivemargin for the first country turns out to be lower than that of the second country. In such a case, it can be misleading to conclude that the first country is definitely unsuccessful in exporting new products as compared to the second country. More accurately, it could be safely concluded that acountry is definitely more successful than one of its competitors in exporting new products if that country's product variety in 1996 and its extensive margin are both higher.

According to Table 2, Turkey's extensive margin is the highest among other countries when we consider overall sectors. In 1996, Turkey exported 74.8 percent of all types of products that the EU-15 countries imported. That percentage increased to 88.96 in 2006, indicating a growth rate of 17.33 percent. Latvia, Slovakia and Poland are the countries that follow Turkey. On the other hand, Japan, Israel, Russia, China, Thailand, Indonesia, Estonia and Canada are the countries that have negative extensive margins in the overall sectors. The product variety of the US has remained almost unchanged from 1996 to 2006 and its extensive margin is also lower than that of the majority of the countries. However, the US is different from other countries because its product variety was already very high in 1996 (96.24 per cent), which, of course, limited its possibilities of growth in product variety and hence its extensive margin. Finally, Turkey's product variety in 1996 and also its extensive margin are both higher with respect to Tunisia, Slovenia, Slovakia, Lithuania, Romania, Malaysia, Bulgaria, Croatia, Latvia, Ukraine, Korea and Morocco. That is to say, in the case of overall sectors, Turkey is definitely more successful than these countries in exporting new products to the EU-15 market.

In the case of the manufacturing industry, Table 2 shows that all countries have increased their product variety from 1996 to 2006 except Switzerland, Hungary, Israel and Russia. Also, in 2006, product varieties are higher for China and developed countries like the U.S, Switzerland, Japan and Canada while extensive margins are higher for developing countries, especially for the small ones, such as Latvia, Ukraine, Lithuania and Romania. In manufacturing, Turkey's extensive

margin is 3.52 percent, which is higher than that of Slovenia, Slovakia, Mexico and Bulgaria. As compared to these countries, Turkey's product variety in 1996 is also higher. Therefore, we can conclude for the manufacturing industry that Turkey is definitely more successful than these countries in terms of the ability to export new products to the EU-15 market. It should also be noted that Turkey is very similar to India in terms of product variety and extensive margin in the manufacturing industry. Moreover, China is one of the most successful countries in manufacturing in terms of exporting new products. China's product variety in 1996 is higher (94.06 per cent) than that of most countries and its extensive margin is also higher than that of countries such as the Czech Republic, Poland, Brazil, Israel, Hungary, Turkey, India, etc.

Table 2: Product varieties and extensive margins, 1996 and 2006

	Overall				Manufacturing				Primary		
	PV-1996	PV-2006	EM		PV-1996	PV-2006	EM		PV-1996	PV-2006	EM
TURKEY	**74.8**	**89.0**	**17.3**	LATVIA	66.2	80.6	19.6	SLOVAKIA	29.7	71.6	87.9
LATVIA	**64.4**	**76.1**	**16.7**	UKRAINE	77.0	85.8	10.8	**TURKEY**	**31.7**	**75.8**	**87.3**
SLOVAKIA	**70.7**	**83.4**	**16.5**	LITHUANIA	73.5	79.2	7.5	POLAND	40.0	85.6	76.2
POLAND	78.7	91.8	15.5	ROMANIA	84.2	89.9	6.6	SWITZERLAND	51.1	87.1	53.3
SWITZERLAND	85.7	95.2	10.5	THAILAND	84.1	89.0	5.6	SLOVENIA	**25.2**	**37.1**	**38.6**
ROMANIA	**69.0**	**76.1**	**9.8**	MALAYSIA	83.5	87.7	4.9	ROMANIA	**27.0**	**38.5**	**35.7**
LITHUANIA	**69.0**	**75.9**	**9.5**	S KOREA	88.2	92.4	4.7	S KOREA	**25.0**	**31.8**	**23.9**
UKRAINE	**72.0**	**79.1**	**9.3**	CROATIA	80.0	83.7	4.6	MALAYSIA	**25.5**	**31.5**	**21.1**
S KOREA	**71.2**	**76.3**	**6.8**	CHINA	94.1	98.3	4.4	LITHUANIA	58.6	70.7	18.8
SLOVENIA	**70.7**	**75.5**	**6.5**	MOROCCO	76.2	79.5	4.2	HUNGARY	37.1	44.6	18.5
MALAYSIA	**68.1**	**72.3**	**6.0**	INDIA	90.4	93.8	3.7	INDIA	67.3	76.9	13.3
INDIA	84.0	88.9	5.7	ESTONIA	81.3	84.4	3.7	CZECH R	73.2	81.5	10.8
TUNISIA	**70.8**	**74.7**	**5.3**	INDONESIA	82.1	85.2	3.7	LATVIA	59.7	65.4	9.0
CZECH R	87.7	91.8	4.5	**TURKEY**	**90.7**	**94.0**	**3.5**	TUNISIA	58.1	62.8	7.7
MEXICO	78.3	81.3	3.7	TUNISIA	**77.0**	**79.7**	**3.5**	BRAZIL	77.0	83.1	7.6
BRAZIL	88.2	91.5	3.6	BULGARIA	**82.4**	**85.3**	**3.4**	MEXICO	60.7	64.2	5.7
BULGARIA	**67.3**	**69.5**	**3.2**	SLOVAKIA	**85.6**	**88.5**	**3.3**	UKRAINE	60.5	63.7	5.2
NORWAY	92.3	94.8	2.7	MEXICO	**84.9**	**87.6**	**3.2**	NORWAY	87.9	92.2	4.8
CROATIA	**65.7**	**67.1**	**2.1**	SLOVENIA	**87.3**	**90.1**	**3.2**	BULGARIA	**28.2**	**28.9**	**2.4**
HUNGARY	76.9	78.3	1.8	CZECH R	93.4	95.8	2.6	RUSSIA	81.0	82.6	2.0
MOROCCO	**62.8**	**63.9**	**1.7**	BRAZIL	92.7	95.1	2.5	ISRAEL	**30.2**	**30.5**	**1.1**
U.S.A	96.2	96.5	0.3	NORWAY	94.4	96.3	2.0	MOROCCO	**25.3**	**25.6**	**1.1**
JAPAN	80.4	80.0	*-0.5*	CANADA	95.1	96.6	1.6	U.S.A	90.5	89.8	*-0.8*
ISRAEL	75.8	75.3	*-0.7*	POLAND	93.0	94.4	1.5	JAPAN	40.6	36.5	*-10.5*
RUSSIA	90.4	89.1	*-1.5*	U.S.A	98.5	99.4	0.9	CROATIA	**26.1**	**23.2**	**-12.0**
CHINA	87.9	84.1	*-4.4*	JAPAN	95.3	96.0	0.7	CHINA	72.0	46.0	*-44.9*
THAILAND	79.5	74.8	*-6.0*	SWITZERLAND	98.7	98.5	*-0.2*	CANADA	82.1	46.2	*-57.4*
INDONESIA	78.0	71.2	*-9.1*	HUNGARY	91.1	90.6	*-0.6*	ESTONIA	68.0	38.0	*-58.3*
ESTONIA	77.7	70.8	*-9.3*	ISRAEL	92.6	91.6	*-1.1*	THAILAND	66.8	36.4	*-60.8*
CANADA	91.2	83.0	*-9.5*	RUSSIA	94.4	91.9	*-2.7*	INDONESIA	66.6	35.6	*-62.7*

Source: Authors' own calculations
Notes: *PV:* Product variety, *EM:* Extensive margin

Table 2 also shows that, for most of the countries, extensive margins in the primary sector are higher than those in the overall and manufacturing sectors. Most probably, this pattern is due to the fact that product varieties in the primary sector in 1996 were quite low for all countries, relative to those in overall and manufacturing sectors. This initial structural difference must have paved the way for higher growth in product variety in the primary sector from 1996 to 2006. In the primary sector, Slovakia has the highest extensive margin (87.9 percent). Turkey, Poland and Switzerland have also relatively higher extensive margins as compared to their competitors. On the other hand, Indonesia, Thailand, Estonia, Canada and China are the countries that have the lowest extensive margins in the primary sector.

Extensive and Intensive Margins of Export Growth (based on Amiti and Freund, 2008)

Table 3 presents the export growth of the countries from 1996 to 2006 and the share of export growth attributed to the intensive and extensive margins for the overall, manufacturing and primary sectors, respectively. The ranking is according to the export growth for the overall sectors.

According to the table, Turkey's export growth rate is 254% in the overall sectors and 290% in manufacturing. In all categories, such MENA countries as Morocco and Tunisia and such Asian countries as India and Indonesia have lower rates of export growth than Turkey. In general, China and the CEECs have higher rates of export growth than Turkey in overall and manufacturing sectors. Considering the extensive and intensive margins of export growth, the table shows that a large proportion of the export growth of all countries arises from their intensive margins.

Interestingly, in overall sectors, Canada's extensive margin is the highest (33%), whereas the previous index showed that Canada is the least successful country in exporting new products. The reason why Canada has the highest extensive margin, according to the Amiti and Freund (2008) index, can be explained as follows: Some new products for Canada constitute a high proportion of Canada's total exports, while the share of these products in total imports of the EU-15 is very small. Therefore, in the Amiti and Freund (2008) index, -which is based only on the own exports of the country- Canada's extensive margin turns out to be the highest, while it is the smallest according to the Feenstra and Kee (2007) index. Following Canada, Lithuania (23%), India (13%) and Morocco (12%) are the other countries with the highest extensive margins in overall sectors.

Table 3: Intensive and Extensive Margins (based on Amiti and Freund, 2008)

		Overall						Manufacturing						Primary					
		Share of export growth from						Share of export growth from						Share of export growth from					
	ΔX (%)	**Int.**	**Ext.**	*New*	*Disap.*		ΔX (%)	**Int.**	**Ext.**	*New*	*Disap.*		ΔX (%)	**Int.**	**Ext.**	*New*	*Disap.*	
CHINA	499	0.98	0.02	0.02	0.00	CHINA	524	0.98	0.02	0.02	0.00	RUSSIA	444	1.00	0.00	0.01	0.00	
SLOVAKIA	368	0.94	0.06	0.07	0.01	CZECH R.	379	1.00	0.00	0.00	0.00	KOREA	386	0.99	0.01	0.01	0.00	
CZECH R.	343	0.99	0.01	0.01	0.01	SLOVAKIA	376	0.95	0.05	0.05	0.00	ROMANIA	369	0.84	0.16	0.18	0.02	
ROMANIA	314	0.96	0.04	0.05	0.01	UKRAINE	353	0.92	0.08	0.12	0.04	SLOVAKIA	327	0.85	0.15	0.16	0.01	
POLAND	312	0.97	0.03	0.04	0.00	POLAND	327	0.99	0.01	0.01	0.00	SLOVENIA	300	0.63	0.37	0.38	0.01	
UKRAINE	294	0.94	0.06	0.10	0.04	HUNGARY	317	1.00	0.00	0.00	0.00	ESTONIA	281	0.92	0.08	0.09	0.01	
RUSSIA	294	1.03	-0.03	0.01	0.04	ROMANIA	310	0.97	0.03	0.04	0.00	POLAND	257	0.90	0.10	0.11	0.00	
ESTONIA	292	0.93	0.07	0.09	0.01	ESTONIA	300	0.93	0.07	0.08	0.01	BULGARIA	225	0.67	0.33	0.36	0.02	
HUNGARY	278	0.99	0.01	0.02	0.01	**TURKEY**	**290**	**0.98**	**0.02**	**0.02**	**0.00**	MEXICO	216	0.98	0.02	0.03	0.01	
TURKEY	**254**	**0.96**	**0.04**	**0.04**	**0.01**	BULGARIA	259	0.99	0.01	0.03	0.02	LITHUANIA	215	0.64	0.36	0.38	0.02	
BULGARIA	251	0.93	0.07	0.09	0.02	MEXICO	234	0.99	0.01	0.02	0.01	UKRAINE	211	0.97	0.03	0.05	0.02	
MEXICO	227	0.99	0.01	0.03	0.02	KOREA	224	0.99	0.01	0.01	0.00	NORWAY	203	1.00	0.00	0.00	0.00	
KOREA	222	0.99	0.01	0.02	0.01	LITHUANIA	216	0.85	0.15	0.16	0.01	CHINA	172	1.00	0.00	0.03	0.02	
LITHUANIA	212	0.77	0.23	0.24	0.01	BRAZIL	180	0.96	0.04	0.05	0.00	SWITZERLAND	168	0.98	0.02	0.02	0.00	
INDIA	152	0.87	0.13	0.14	0.01	RUSSIA	162	1.00	0.00	0.02	0.02	TUNISIA	146	1.00	0.00	0.02	0.02	
BRAZIL	145	0.94	0.06	0.06	0.01	INDIA	160	0.94	0.06	0.06	0.00	CZECH R.	139	0.88	0.12	0.12	0.00	
NORWAY	139	1.04	-0.04	0.00	0.05	THAILAND	101	0.97	0.03	0.03	0.00	BRAZIL	132	0.95	0.05	0.05	0.00	
TUNISIA	108	0.97	0.03	0.05	0.02	TUNISIA	100	0.96	0.04	0.05	0.01	INDIA	118	0.38	0.62	0.62	0.00	
SLOVENIA	104	0.90	0.10	0.11	0.01	SLOVENIA	96	0.93	0.07	0.08	0.01	**TURKEY**	**114**	**0.77**	**0.23**	**0.23**	**0.00**	
THAILAND	86	0.97	0.03	0.04	0.00	MALAYSIA	83	0.96	0.04	0.04	0.01	CROTIA	108	0.53	0.47	0.50	0.03	
CROTIA	83	0.89	0.11	0.16	0.05	CROTIA	79	0.97	0.03	0.06	0.03	HUNGARY	106	0.88	0.12	0.12	0.00	
MALAYSIA	82	0.96	0.04	0.06	0.01	CANADA	76	0.76	0.24	0.25	0.01	INDONESIA	89	1.01	-0.01	0.02	0.03	
ISRAEL	72	0.99	0.01	0.04	0.03	ISRAEL	74	0.98	0.02	0.03	0.01	MOROCCO	79	0.85	0.15	0.16	0.01	
MOROCCO	65	0.88	0.12	0.13	0.01	NORWAY	71	0.99	0.01	0.01	0.01	MALAYSIA	75	0.95	0.05	0.07	0.01	
CANADA	64	0.67	0.33	0.39	0.06	MOROCCO	59	0.90	0.10	0.11	0.01	ISRAEL	66	1.00	0.00	0.04	0.03	
INDONESIA	64	0.97	0.03	0.07	0.04	US	56	1.00	0.00	0.00	0.00	JAPAN	36	0.99	0.01	0.01	0.01	
SWITZERLAND	60	1.01	-0.01	0.02	0.04	SWITZERLAND	56	1.00	0.00	0.00	0.00	THAILAND	35	0.92	0.08	0.08	0.00	
US	51	1.07	-0.07	0.00	0.07	INDONESIA	51	0.93	0.07	0.10	0.03	CANADA	30	0.88	0.12	0.22	0.10	
JAPAN	37	1.01	-0.01	0.01	0.02	JAPAN	36	1.00	0.00	0.00	0.01	US	15	0.98	0.02	0.08	0.06	

Source: Authors' own calculations
Notes: *ΔX:*Export growth, *Int:* intensive margin, *Ext:* extensive margin, *New:* new products, *Disap:* disappearing products

Table 3 also shows that the U.S (-7%), Russia (-3%), Norway (-4%) and Switzerland (-1%) have negative extensive margins due to disappearing goods from 1996 to 2006.

Rather similar to the cases of Romania and Taiwan, Turkey's extensive margin is 4% in overall sectors. According to the Feenstra and Kee (2007) index, Turkey's extensive margin was the highest in overall sectors; however, according to

the Amiti and Freund (2008) index, Turkey is ranked 16th. The reason for this big difference is that, in 2006, Turkey exported a relatively small amount in categories in which the world exported a lot to the EU-15 market.

In the manufacturing sector, the effect of disappearing products on the extensive margin is generally much lower, as compared to the overall sectors. In manufacturing, only 2% of Turkey's export growth is due to the extensive margin, which results completely from new products. Canada (24%), Lithuania (15%) and Ukraine (8%) have the top-three extensive margins in manufacturing.

Relative to the overall and manufacturing sectors, the extensive margin in the primary sector is the highest for most of the countries (Table 3). 23% of Turkey's export growth in the primary sector is due to the extensive margin, which is completely due to new products. India (62%), Croatia (47%) and Slovenia (37%) are the leading countries in the primary-sector exports in terms of their extensive margins.

IV.ii. Extensive and Intensive Margins of Turkey for each Technological Category

Now, we focus on Turkey and calculate the extensive and intensive margins of Turkey for each technological category.

In the case of the number of the types of export-products,we present number of Turkey's export products with their share in all number of products exported to the EU by the world for each technological category in both 1996 and 2006. We also present Turkey's gains (i.e., increases) in its number of the types of export-products from 1996 to 2006 with the rank of Turkey out of the 30 countries in our sample.

For the Feenstra and Kee Index (F-K index), we present product varieties (PV) in 1996 and 2006 and extensive margin (EM) of Turkey with the rank of Turkey out of the 30 countries in our sample.

For the Amiti and Freund Index (A-F Index), we present the growth rate of total exports between 1996 and 2006 and intensive and extensive margins of this growth. We also present the share of new products (New) and disappearing products (Disapp.) in extensive margins.

Tables 4-8 present the results for RMIG, LIG, CIG, EIRG and DIRG.

RMIG – Raw-Material Intensive Goods

The table below shows the results of the number of exported products, the F-K index and the A-F index for the RMIG category.

Table 4: Extensive and Intensive Margins, Turkey, RMIG

RMIG	1996	2006	Extensive and Intensive Margins
Number of Exported Products	375 (55.6 %)	411 (61.2 %)	Gain: 36 (Rank: 21)
F-K Index	P.V = 30.4	P. V = 77.4	E.M = 93.6 (Rank= 2)
A-F Index	Export Growth Between 1996 and 2006: 123%		I.M = 0.75; E.M= 0.25 (New: 0.25, Disapp:0.00)

Source: Authors' own calculations.
Notes: *Gain*: Increases in the types of export-products from 1996 to 2006. *F-K Index*: Feenstra and Kee (2007) index, *A-F Index*: Amiti and Freund (2008) index. P.V: Product Variety. *I.M*: Intensive Margin, *E.M*: Extensive Margin. *New*: The share of new products, *Disapp*: The share of disappearing products.

According to Table 4, in the RMIG category, Turkey exported 375 products in 1996 and 411 products in 2006. In other words, Turkey exported 55.6 % of the number of all types of products exported to the EU by the world in 1996 and 61.2 % in 2006.36 new products were exported in the RMIG category in 2006.

The F-K index shows that in 1996, Turkey exported 30.4 percent of all types of products that the EU-15 countries imported. That percentage increased to 77.4 in 2006, indicating an extensive margin of 93.6. Due to a very low product variety in 1996 (30.4), Turkey's extensive margin in RMIG has turned out to be the second-highest among 30 major exporters in the EU-15 market.

According to the Amiti and Freund index, 25 per cent of Turkey's export growth from 1996 to 2006 is due to the extensive margin.

All in all, we can conclude that even though Turkey's number of exported products did not increase very much from 1996 to 2006, the share of world exports of these new products increased much from 30.4% to 77%. The share of these new products in Turkey's own export growth is also relatively higher compared to the other four technological categories (see Tables-5-8) In this connection, we can argue that Turkish exporters seem to have made a correct choice by determining a few new products whose share are high both in the EU-15 market and in Turkey's own exports. Also, since Turkey exports 61.2% of total number products in 2006, there are still opportunities for Turkey in the RMIG category to increase its competitiveness by producing and exporting new products.

LIG – Labor Intensive Goods

Table 5 below shows the results of the number of exported products, the F-K index and the A-F index for the LIG category.

Table 5: Extensive and Intensive Margins, Turkey, LIG

LIG	1996	2006	Extensive and Intensive Margins
Number of Exported Products	809 (86 %)	887 (91.7 %)	Gain: 78 (Rank: 11)
F-K Index	P.V = 92.7	P. V = 94.5	E.M =1.9 (Rank= 17)
A-F Index	Export Growth Between 1996 and 2006: 154%		I.M = 1 ; E.M = 0 (New: 0.00, Disapp:0.00)

Source: Authors' own calculations
Notes: *Gain*: Increases in the types of export-products from 1996 to 2006. *F-K Index*: Feenstra and Kee (2007) index, *A-F Index*: Amiti and Freund (2008) index. P.V: Product Variety. *I.M*: Intensive Margin, *E.M*: Extensive Margin. *New*: The share of new products, *Disapp*: The share of disappearing products.

According to Table5, in the LIG category, Turkey exported 86 % of the number of all types of products exported to the EU by the world in 1996 and 91.7 % in 2006. The increase in the number of types of export-products is 78 in the LIG category.

The F-K indexresults in Table 5 show that Turkey's product variety is 92.7 in 1996 and 94.5 in 2006. On the other hand, Turkey's extensive margin is only 1.9 in this category. This result occurred mainly due to the fact that Turkey's product variety in LIG in 1996 was already quite high (92.7); indeed, it was the highest product variety for Turkey among the five technological categories.(see Tables 4, 6-8)

The Amiti and Freund index also shows that the share of new products in Turkey's own export growth from 1996 to 2006 in LIG category is zero percent.

So, we can conclude that, since Turkey has already exported almost all the types of products in 2006, there seems to be no opportunity for Turkey to increase its competitiveness by producing and exporting new products in LIG category. Also, very high product variety in 2006 shows that, the chance for Turkey to increase its competitiveness via the intensive margin (by increasing the exports of old products) is also very limited.

CIG – Capital Intensive Goods

Table 6 below shows the results of number of exported products, F-K index and A-F index for CIG category.

Table 6: Extensive and Intensive Margins, Turkey, CIG

CIG	1996	2006	Extensive and Intensive Margins
Number of Exported Products	240 (63 %)	310 (79.9 %)	Gain: 70 (Rank: 5)
F-K Index	P.V = 84.5	P. V = 87.7	E.M = 3.7 (Rank= 17)
A-F Index	Export Growth Between 1996 and 2006: 940 %		I.M = 0.99 ; E.M = 0.01 (New: 0.01, Disapp:0.00)

Source: Authors' own calculations
Notes: *Gain*: Increases in the types of export-products from 1996 to 2006. *F-K Index*: Feenstra and Kee (2007) index, *A-F Index*: Amiti and Freund (2008) index. P.V: Product Variety. *I.M*: Intensive Margin, *E.M*: Extensive Margin. *New*: The share of new products, *Disapp*: The share of disappearing products.

According to Table 6, the increase in the number of types of export-products is 70 in CIG, which puts Turkey 5th among the 30 competitors. Even though Turkey is 5th in terms of increase in the number exporting products in CIG category, share of world exports of these new products did not increase much from 1996 to 2006 which resulted in an extensive margin of 3.7 for Turkey and puts Turkey 17th among its competitors.

The Amiti and Freund index also shows that Turkey's rate of export growth in the CIG category is 940%and only 1 % of this growth comes from the extensive margin. So, for CIG, while the export growth is very high, we observe that this growth has not been supported by new product varieties.

Therefore, even though Turkey is successful in increasing the number of exported products from 1996 to 2006, the contribution of these products to Turkey's competitiveness in terms of the increase in their share in the EU-15 market and in Turkey's own export growth is insufficient. Moreover, the improvement opportunities in post-2006 period are also relatively limited in the CIG category as Turkey already exports 80% of all types of products in this category.

EIRG – Easy-to-Imitate Research Intensive Goods

Table7 below shows the results of the number of exported products, the F-K index and the A-F index for the EIRG category.

Table 7: Extensive and Intensive Margins, Turkey, EIRG

EIRG	1996	2006	Extensive and Intensive Margins
Number of Exported Products	201 (48.2 %)	273 (64.8 %)	Gain: 72 (Rank: 1)
F-K Index	P.V = 89.1	P. V = 93.8	E.M = 5.2 (Rank= 7)
A-F Index	Export Growth Between 1996 and 2006: 702 %		I.M = 0.99 ; E.M = 0.01 (New: 0.02, Disapp:0.01)

Source: Authors' own calculations
Notes: *Gain*: Increases in the types of export-products from 1996 to 2006. *F-K Index*: Feenstra and Kee (2007) index, *A-F Index*: Amiti and Freund (2008) index. P.V: Product Variety. *I.M*: Intensive Margin, *E.M*: Extensive Margin. *New*: The share of new products, *Disapp*: The share of disappearing products.

Table 7 shows that Turkey is the top country in the EIRG category in terms of the increases in the number of exported products, with 72 new products being exported in 2006 as compared to 1996. That is to say, among the 30 exporters, Turkey is the most successful one in diversifying its exports from 1996 to 2006 in the EIRG category

Also, despite its high product variety in 1996 (89.1), Turkey's extensive margin in EIRG has turned out to be the seventh-highest among 30 major exporters in the EU-15 market. This relative success in the EIRG category of Turkey can be considered an encouraging result, as it is usually desirable for any developing country to diversify successfully its exports of research-intensive goods on the way to improving international competitiveness and expanding development possibilities.

On the other hand, export growth from 1996 to 2006 in this category is 702 % and only 1% of this growth comes from the extensive margin.

To sum up, in terms of the number of exported productsandthe F-K index, Turkey exhibited a successful performance from 1996 to 2006.However, in terms of the A-F index, the results are not satisfactory for Turkey. In other words, there are significantly high number of new products exported by Turkey to the EU-15 market and the share of world's exports of these products in EU-15's total imports increased remarkably. However, these new products lead to an infinitesimal increase in Turkey's own export growth.

Consequently, the new products produced and exported by Turkey from 1996 to 2006 seem to be correct choices for improving its competitiveness. However, it should also be noted that if Turkey continues to export these new products at the existing relatively low levels, its competitiveness will not improve at all. Turkey has opportunities to raise its export growth as well as its competitiveness in the EU-15 market by increasing the production and exports of these new products.

Moreover, in 2006, Turkey still exports only 64.8 % of the total number of products, despite its fine performance of export diversification in these categories from 1996 to 2006. In this respect, a relatively encouraging conclusion is also possible: In the post-2006 period, important opportunities seem to exist for Turkey, especially in the EIRG category.

DIRG - Difficult-to-Imitate Research Intensive Goods

Table 8 below shows the results of the number of exported products, the F-K index and the A-F index for the DIRG category.

Table 8: Extensive and Intensive Margins, Turkey, DIRG

DIRG	1996	2006	Extensive and Intensive Margins
Number of Exported Products	580 (79.5 %)	676 (89.1 %)	Gain: 96 (Rank: 4)
F-K Index	P.V = 91.1	P. V = 94.0	E.M = 3.1 (Rank= 15)
A-F Index	Export Growth Between 1996 and 2006: 253 %		I.M = 0.93 ; E.M = 0.07 (New: 0.10, Disapp:0.03)

Source: Authors' own calculations
Notes: *Gain*: Increases in the types of export-products from 1996 to 2006. *F-K Index*: Feenstra and Kee (2007) index, *A-F Index*: Amiti and Freund (2008) index. P.V: Product Variety. *I.M*: Intensive Margin, *E.M*: Extensive Margin. *New*: The share of new products, *Disapp*: The share of disappearing products.

Table 8 shows that in the DIRG category Turkey was ranked 4th among its 30 competitors, thanks to its inclusion of 96 types of new products between 1996 and 2006.If the DIRG category is considered to be the most important sector in terms of expanding development possibilities and improving export competitiveness in the long term, these results should be interpreted as a very positive outcome for Turkey's experience of export diversification in this period.

According to the F-K index, Turkey's extensive margin is 3.1. Turkey's success in this category should not be underestimated, because Turkey's product variety was also rather high in 1996 (91.1%).

According to the A-F index, in the DIRG category, Turkey's rate of export growth is 253% and 7% of this growth comes from the extensive margin. New products lead to a 10% increase, while disappearing goods cause a 3% decrease. Therefore, Turkey's position in DIRG is relatively better and more promising.

Therefore, we can conclude that Turkey performed much better than the overwhelming majority of its competitors in the EU-15 market in the 1996-2006 period, in terms of diversifying its exports of DIRG, which usually tend to create the highest value-added from exporting activity and the largest improvements in the terms-of-trade for the exporting country.However, in the post-2006 period, improvement in Turkey's performance via the extensive margin seems to be limited since nearly 90% of all types of products were exported by Turkey in 2006.

V. Conclusions

In this study, we evaluated Turkey's export diversification in terms of extensive and intensive margins and constructed a framework of analysis for comparing Turkey with its main competitors in the EU-15 market. We first calculated and assessed the number of products exported to this market by each country in 1996 and 2006, since changes in the number of exported products give a preliminary idea on the extensive margins of the countries. Then, we analyzed the extensive and intensive margins in terms of export shares by using more sophisticated methodologies. First, we examined the extensive margins of all countries over time, based on the methodologies developed by Hummels and Klenow (2005) and Feenstra and Kee (2007). In this regard, we evaluated the importance of new products in terms of their shares in the EU-15 market. Secondly, based on Amiti and Freund (2008), we measured the relative importance of extensive and intensive margins on Turkey's export growth in the EU-15 market from 1996 to 2006 and compared it with Turkey's main competitors in this market. In this way, we assessed the importance of new products in terms of their shares in countries' own exports.

One of our major results is that the much larger portions of export growth are generally due to the intensive margin (rather than to the extensive margin) for all countries. Also our computations demonstrated that product varieties are especially higher for China and such developed countries as the U.S, Switzerland, Japan and Canada, while the extensive margins are generally higher for the developing countries, especially for the small ones like Latvia, Ukraine, Lithuania and Romania.China's performance in export diversification in terms of adding new products to its export portfolio is also very impressive.

When we analyze the dynamics in the EU-15 market from a broader perspective that involves a comparison of developed countries vis-à-vis the developing countries, our results indicate that the latter's position has generally improved better than that of the former. That is to say, the relative importance of the

exports of the developing countries has been increasing regularly in the EU-15 market in our period of analysis. Indeed, this relative rise of the developing countries against the developed ones has been a general trend at the global level and the reflections of this trend in the EU-15 market are quite prominent. For example, there are decreases in the number of the product types exported from the developed countries to the EU-15 market, while the developing countries exhibited increases in this respect. However, the gains of the developing countries are much higher than the losses of the developed countries. That is to say, the improvement on the part of the developing countries has not been necessarily at the expense of the developed countries. The upshot is that demand for imports by the EU-15 countries has increased in a dynamic pace, generating further export possibilities for the developing countries, including Turkey, from 1996 to 2006.

From Turkey's point of view, according to the three types of extensive-intensive margins measurement (i.e., the number of exported products, Feenstra and Kee (2007) index, Amiti and Freund (2008) index), in the RMIG category, Turkey's ability to export new products seems quite successful due to Turkish exporters' correct choices of new products and the high share of these products both in the EU-15 market and in Turkey's own exports.In the LIG category, the number of products that are already being exported by Turkey as well as the world export share of these products in total world exports to the EU-15 are higher, as compared to other categories in 1996. This aspect of the LIG category has limited the increase in Turkey's extensive margin. In the CIG category, as evidenced by Table 6, the contribution of the new products to Turkey's export growth is very limited compared to their rather high numbers. In EIRG category, the new products produced and exported by Turkey from 1996 to 2006 seem to be correct choices for improving its competitiveness. Moreover, Turkey has opportunities to raise its export growth as well as its competitiveness in the EU-15 market by increasing the production and exports of these new products.Finally, in DIRG, Turkey is also quite successful in terms of its ability to export new products, based on all the three criteria.

All in all, Turkey is especially successful in diversifying its export-products in research-intensive categories for which the EU-15-demand for imports from the rest of the world has been in ascendancy. Therefore, focusing upon its exporting capability in the context of the EU-15 market, Turkey can be said to be successful in exporting new products. This is a desirable result for a developing country striving for enhancements in its international competitiveness. For the future, there seem to be further opportunities to enhance its ability to diversify its exports and hence its competitiveness.

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Appendix

Export shares of the countries in total EU-15 imports, 1996 and 2006*

	1996	2006
US	19.77	12.52
CHINA	4.76	12.47
RUSSIA	3.94	6.42
JAPAN	9.72	6.27
NORWAY	5.06	4.96
SWITZERLAND	7.25	4.31
POLAND	2.10	3.33
CZECH R	1.66	2.90
KOREA	1.96	2.51
TURKEY	1.68	2.46
HUNGARY	1.52	2.22
BRAZIL	1.81	1.75
INDIA	1.49	1.50
CANADA	1.92	1.26
MALAYSIA	1.68	1.14
SLOVAKIA	0.58	1.12
THAILAND	1.33	0.99
ROMANIA	0.62	0.98
INDONESIA	1.23	0.82
MEXICO	0.52	0.70
ISRAEL	0.91	0.62
SLOVENIA	0.74	0.56
TUNISIA	0.64	0.53
MOROCCO	0.73	0.48
BULGARIA	0.29	0.43
UKRAINE	0.23	0.38
ESTONIA	0.21	0.29
LATVIA	0.25	0.25
LITHUANIA	0.21	0.25
CROATIA	0.30	0.25
TOTAL	75.10	74.66

Source: Eurostat
*Ranking is based on 2006 values.