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External income shocks and Turkish exports: A sectoral analysis ☆

M. Hakan Berument [a,1], N. Nergiz Dincer [b,*], Zafer Mustafaoglu [c,2]

[a] Department of Economics, Bilkent University, 06800 Ankara, Turkey
[b] Department of Economics, TED University, 06420 Ankara, Turkey
[c] The World Bank, 1818H Street, NW, Washington, DC 20433, United States

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ABSTRACT

This study assesses how the growth rates of Turkish trading partners affected Turkish exports in various sectors for the period 1996:01 to 2009:12. To determine this, we modeled the destination countries and the export demand for each sector separately. Each model is estimated as a system of equations, where each equation represents a country using a seemingly unrelated regression method. The empirical evidence suggests that Motor Vehicles, Basic Metals, and Radio–Television are the sectors with the highest income elasticities for most of the analyzed countries, whereas the Food Products and Beverages sector has the lowest income elasticity. We also performed simulations for the effect of a 1% increase in the growth rate of each country on Turkish exports.

1. Introduction

Exports greatly contributed to Turkey's high growth rates between 2002 and 2007, with favorable foreign demand the driving factor. This study analyzes the dynamics of export dependence for Turkey, as a middle-income country, on foreign markets, and assesses the impact of its main trading partners' growth performances on its sectoral exports. With the 2008 global financial crisis, Turkish exports (and those of other developing countries) began to decrease. The impact of the crisis was larger in countries with a high level of openness. The export channel affected almost every country, even those with relatively strong economic fundamentals, such as Turkey. The Turkish economy contracted 4.8% in 2009 and exports declined by 5% in real terms. Change in exports varied considerably across sectors: while Food Products and Beverages exports increased by 11%, Motor Vehicle, Trailer, and Semi-Trailer exports recorded the highest decline, with 31% in real terms.

For the period that we consider, the import growth rate was 5.8% on average in real terms. Imports increased mostly in Textiles and Basic Metals sectors, while exports were mostly driven by Motor Vehicles and Home Appliances. Fig. 1 plots the trade openness, measured as the sum of exports and imports divided by GDP. The figure clearly suggests the important role of international trade for the Turkish economy. Especially after the 2001 financial crisis, economic openness increased significantly, and hit 45% in 2008. However, following the 2008 crisis, the Turkish economy's international trade volume decreased due to shrinking global demand.

The objective of this paper is to understand how the shock was distributed across Turkey's export sectors and to determine the level of heterogeneity (or homogeneity) in the ongoing recovery. The speed and sector inclusiveness of the recovery will likely be dependent on which countries recover faster and on the extent of their recovery, for three reasons: (1) for any given exports sector in Turkey, foreign income elasticity may change across countries; (2) the traded basket of goods can change across countries; and (3) the diversity of markets may be very limited for certain goods. A standard total export demand model does not distinguish between these factors. In this paper, rather than assessing the role of how world income or regional income affects domestic export performance, we look at the effect of each country's income from domestic exports. Moreover, income and price elasticities of Turkish export products are not the same. Thus, higher foreign income and real exchange rates affect domestic export demand for different products differently; this is the second disaggregation that we will incorporate. To capture country- and sector-specific differences, we will analyze how countries' incomes, real exchange rate, and alternative export market performance affect Turkish export demand at sectoral levels. In this way, we will try to determine how differences in foreign income recovery affect the recovery speed of various Turkish export sectors.

Our results suggest that income elasticities are generally greater than 1, consistent with the literature. This study adds to the literature by highlighting the variation across sectors and countries. To be specific,

☆ The views presented here are those of the authors; they do not necessarily reflect the official position of the World Bank.

* Corresponding author. Tel.: +90 312 585 0038; fax: +90 312 418 4148.
E-mail addresses: berument@bilkent.edu.tr (M.H. Berument), nergiz.dincer@tedu.edu.tr (N.N. Dincer), zmustafaoglu@worldbank.org (Z. Mustafaoglu).
URL: http://www.bilkent.edu.tr/~berument (M.H. Berument).
[1] Tel.: +90 312 290 2342; fax: +90 312 266 5140.
[2] Tel.: +1 202 458 5431; fax: +1 202 522 2119.

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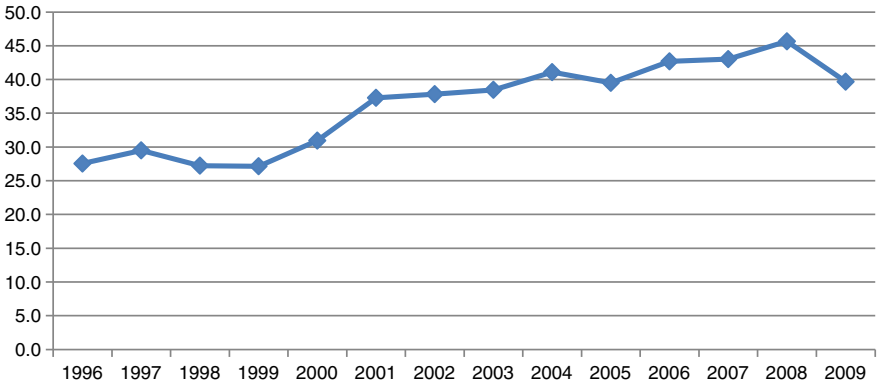

Fig. 1. Openness: export plus import to GDP ratio for Turkey.

the Basic Metals, Radio and TV, Motor Vehicles, Plastic and Rubber Products, Fabricated Metals, and Electrical Machinery (for most of the destination countries) sectors are highly dependent on foreign income, and for the Machinery sector, the income elasticities of developing countries are significantly higher than those of developed countries.

The paper is organized as follows: Section 2 reviews the literature and Sections 3 and 4 present the data and methodology, respectively. Section 5 discusses the results, Section 6 presents the simulations, and Section 7 discusses caveats. Section 8 concludes.

2. Literature review

In the early 1980s, Turkey changed its import-substitution economic and political policies to those of openness and liberalization. It lifted quantitative restrictions on trade and adopted an export-oriented growth strategy. Since then, export contribution to Turkey's economic growth has significantly increased.

A wide range of studies estimates export demand and supply functions for the purpose of analyzing export income elasticity for various countries. The foreign income variable used in these studies is generally world income demand. The influential Senhadji and Montenegro (1999) paper estimates the income and price elasticities of exports for a large group of developed and developing countries, including Turkey. Their results find that income elasticity is approximately 1.5, whereas price elasticity is approximately −1. Fullerton, Sawyer, and Sprinkle (1999) present a summary of studies on the export functions of different countries in Latin America and the associated income elasticities. Using different methods and over different periods, they find that income elasticities vary significantly. Funke and Ruhwedel (2001) find income elasticity for a group of East Asian countries to be more than 3, whereas Funke and Ruhwedel (2002) estimate income elasticity for OECD countries to be between 2 and 2.5. Akal (2010) finds the income elasticity of Turkish exports for OECD countries to be 1.99 by employing the Parks method for the 1993 to 2007 period.

Another set of studies analyzes other export determinants. Sahinbeyoglu and Ulasan (1999) estimate export supply and demand functions for 1987Q1 to 1998Q3 and conclude that traditional export functions were not sufficient to forecast the post-1994 period in Turkey. They note that uncertainty indicators and investments play crucial roles in explaining exports. Aydın et al. (2004) estimate the export supply function for Turkey for 1987 to 2004, and find export determinants to be real unit labor costs, export prices, and national income. Another group of studies is based on structural changes in exports. Neyaptı et al. (2007) analyze Turkish exports for 1980 to 2001 and find that exports improved with the 1996 EU Customs Union agreement. Aydın et al. (2007) focus on 1987 to 2006 but do not identify possible break events, such as that 1996 Customs agreement, nor the financial crises that Turkey experienced in 1994, 1999, and 2001.

Various other studies focus on sectoral exports. Nowak-Lehmann et al. (2007) investigate Turkey's sectoral trade flows to the EU based on panel data for 1988 to 2002. They use an extended version of the gravity model and analyze the role of price competition, EU protection, and transport costs. They find that increasing integration with the EU in terms of the Customs Union agreement increased exports. Dincer and Kandil (2010) estimate sectoral export functions in Turkey to investigate the asymmetric effects of real exchange rate shocks on each sector. They suggest that random fluctuations in exchange rate away from the equilibrium had a negative net effect on export growth post-2002. Also for Turkey, Saygili (2010) analyzes the role of unit labor costs and individual cost components in determining sectoral export dynamics and the change in impact of these costs after the above-mentioned structural reforms in 2001 for 1995Q1 to 2006Q2. The study suggests that average elasticity changes not only between time periods but also across sectors. Finally, Cosar (2002) calculates price and income elasticities using sectoral and country-specific export demand functions for 1994 to 2000. She calculates the elasticity of aggregate exports with the panel data technique. She also estimates two different sets of functions, one for six export partners and the other for export sectors. Her results suggest that real exchange rate elasticity of the total export demand is less than 1 and that income elasticity is greater than 1.

None of the above studies considers that Turkey's sectoral export demand from various countries might be different and could change over time simultaneously. This paper attempts to fill this gap; it analyzes the impact of economic growth in individual trading partner countries on sectoral exports under the assumption that the traded goods basket and sectoral export elasticities differ across countries.

3. Data

The data on exports in dollars and export price indices are from TURKSTAT's foreign trade database. We use exports in the ISIC-3 sectors in two digits. For each sub-sector, the volume, US dollar, and Turkish lira (TL) value of exports to each destination country are available (for 257 countries, including the free-trade zones) for 1996 to 2009 on a monthly basis. We provide the share of each sector's export of total export averages for 1996 to 2009 in Table 1. In Fig. 2, we provide the plot of the sectoral shares of some important sectors for the sample period that we consider. We include sectors whose average share of total exports is equal or greater than 3%. We exclude the smaller sectors from our analysis because we believe they do not significantly affect Turkey's overall export performance. Several observations for Sector 23 (Coke, Refined Petroleum Products, and Nuclear Fuels) are missing, and therefore, we also do not report the analysis for that sector. In the analyses, we use real exports, calculated as each sector's export (in dollars) to a country divided by that sector's export price (in dollars).

We calculate real exchange rate data for each country using its exchange rate relative to the TL, its consumer price indices, and Turkey.