Is there room for manoeuvre? Impact of exchange rate on Turkish exports[*]

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ABSTRACT

Turkey's external trade has increased remarkably in recent years giving a significant amount of current account deficit. This period is coincided mainly with an appreciation of the domestic currency under a flexible exchange rate regime. Exports of the county have also gone up unexpectedly. This situation brings about a question whether export demand and export supply are influenced from the changes in the real exchange rate differently. While appreciation of the currency encourages imports by making the foreign goods relatively cheaper, it might also increase the export potential of the sectors which heavily use imported inputs. This study aims to analyse the effects of the real exchange rate on the export performance of the country using panel data econometrics for 13 manufacturing sectors over the period of 1994-2011. Rather than estimating an aggregate export function, we estimate export demand and export supply separately controlling for changes in export unit prices, average wages, domestic demand, foreign income, capacity utilisation and quality measures in time and across sectors. We construct an industry-specific real exchange rate series. The preliminary results indicate that export demand is responsive to the price-related variables such as real exchange rate and export prices, while export supply is influenced by rather production-related variables such as capacity utilisation rate, domestic demand and real wages.

INTRODUCTION

Turkey has been dealing with trade deficit for many years now. The export subsidies of 1980s and 1990s have increased exports relative to the pre-1980 reforms however, the growth in Turkish exports augmented imports as well. Following the Customs Union agreement with the EU in 1996, Turkey expected its exports to European countries to increase and so they did. Dependence of Turkish production to imported energy and intermediate goods have

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increased imports and thus causing a large trade deficit being accumulated over the years. Moreover, appreciation of the Turkish Lira, following the single-party government of AKP (Justice and Development Party) after many years of unstable coalitions and economic policies that have led to economic crises in 2001, imposed more pressure on the trade deficit the country has to deal with.

Traditionally expenditure reduction and switching policies have been considered as measures to deal with trade deficits and current account imbalances. Misalignment in real exchange rate is generally accounted for these imbalances in trade. In this respect, stabilisation policies, involving adjustments of main prices (namely goods prices, interest rate and exchange rate) are occasionally urged to be implemented in the short run. However, the revenue side of trade balance is largely ignored. This is mainly because actions to stimulate export earnings require structural changes whose impacts can be seen only in the long run. Before taking any action, it is particularly crucial to examine how exports earnings can be promoted. In order to do so, the detrimental factors on both demand and supply sides of exports must be examined, and the role of real exchange rate has to be investigated in the supply and demand sides of exportation.

This study aims to analyse the effects of the real exchange rate and other factors on the export performance of the country using panel data econometrics for 13 manufacturing sectors over the period of 1994-2011. Rather than estimating an aggregate export function as in many studies in the literature, we estimate export demand and export supply separately controlling for changes in export unit prices, average wages, domestic demand, foreign income, capacity utilisation and quality measures in time and across sectors. We construct and an industry-specific real exchange rate using the main trade partners.This approach will enable us to see whether the real exchange rate influences export demand and export sully differently.

THEORETICAL BACKGROUND

The relationship between real exchange rate and trade balance has extensively been analysed in both theory and empirics. Earlier studies require the sum of the price elasticities of import demand and export supply of a country to be unity for a devaluation to affect trade balance positively (Marshall, 1923; Lerner, 1944). Most studies that examine price elasticities of trade have taken export supply to be infinitely elastic for any single country (Goldstein and Khan, 1978). Some others mention about a lag, stating that changes in the real exchange rate influence trade balance initially negatively but then positively after a certain time period, a

theory called as J-curve (Bahmani-Oskooee and Artatrana, 2004). Akbostancı (2002) finds in her study covering the period 1987-2000 that depreciation of the currency improves the Turkish trade balance both in the short and long run.

The traditional approach to imports and exports is that they are imperfect substitutes for domestic goods. Although this approach is valid for imports of most developing countries, the case for exports is quite different. Lall (2000) points out that export structure is path-dependent. The usual view for international trade is that quantity of exports is determined by the demand for exportable goods by the rest of the world, thus assuming infinite price elasticity.

Following Goldstein and Khan (1978), in a paper on the determinants of export supply and demand in Greece, Balassa et al. (1989) estimate a simultaneous equation model to assess the responsiveness of export supply and demand to price changes. They perceive the preference between exporting and supplying the domestic market as a movement along the production possibility frontier caused by incentives. In most models of export supply, domestic (consumers') price index is used to reflect this preference between markets (see Goldstein and Khan, 1978; Khan and Knight, 1988; Carre and Saxena, 2003). In a relatively recent paper on the factors determining India's export performance Sharma (2003) explicitly includes domestic demand as a determinant of export supply to reflect the market preference of producers and mention that a raise in domestic demand would decrease export supply.

In a paper on the expansion of export supply and demand in developing countries, Donges and Riedel (1977) employ industrial production index, capacity utilization and various definitions of real exchange rate to explain export supply and find a positive relationship between the real exchange rate and supply of exports for a number of countries including Egypt, Israel, South Korea, Spain, Taiwan in the period from 1950s to 1970s.

Holly and Wade (1991) estimate export supply and demand relations for the UK using Goldstein and Khan type of export demand function and an export supply that depends on the attractiveness of export markets relative to domestic for producers and the "capacity of the domestic economy to supply tradables" reflected by differences in export and domestic prices.

Using a gravity type framework to model export performance with market access and supply capacity variables similar to Redding and Venables (2004), Fugazza (2004) finds that the low growth in supply capacity is a limiting factor for export performance in African and Middle Eastern countries.

Faini (1988) examines the impact of domestic demand pressure on export supply through changes in wages and thus find that Turkey's relatively elastic labour supply dampens the effect of domestic demand. In terms of the significant impact of relative prices on export supply, they suggest to use "an adequate measure" of real effective exchange rate to identify this impact clearly.

Turkish Economy in the 2000s

Turkey has achieved to have an astonishing economic performance after the large scale economic crisis in 2001. Many international observers agree that radical reform efforts providing a sound fiscal stand and disinflation policies undertaken under the guidance of *International Monetary Fund* (IMF) and a sound macroeconomic management have been accounted for this success. It is also considered that political stability which has been brought about by a strong single party government with *Justice and Development Party* (AKP) improved the business climate in Turkey and strengthened the positive perception of international investors towards the Turkish economy and contributed positively to the economic success. Consequently, this success on the economic ground brought another success on the political stand, and AKP has shown another distinguished performance by winning three successive parliamentary elections. Accordingly, improved confidence in the Turkish economy has led international investors to direct their short-run and long-run financial investments into Turkey. Although this excessive amount of capital inflow allows the economy to close the resource gaps caused by high economic growth rates, it can also be held accountable for the increased domestic absorption and overvaluation of the domestic currency[1] which has inevitably lead the economy to encounter large current account deficits. This increases the fragility of the economy and constitutes a major concern among policy makers and economists in Turkey. Following a surplus of 2.3% of GNP in 2001, the economy begun to experience huge current account deficits rising to 5.2% in 2004, and 6.3% in 2005, and finally 8.3% in 2006. Imbalances of this amount are traditionally alarming for a country like Turkey, and immediately drive policy makers to implement some contractionary policy measures.

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[1] Another important reason for improvement in confidence is the determination of the government regarding its disinflation programme. This is extremely important because Turkey suffered from high and very persistent inflation for almost 30 years. After a number of unsuccessful attempts to curb it, the Central Bank has finally opted to adopt the inflation-targeting policy as a new monetary policy.

This trend in the current account balance continued in the period 2007-2011. Unlike the first period, the economic growth rate, on average, remained at around 3.6% in this period, showing high volatility year by year. The financial resource requirement of the Turkish economy remained very high and the current account deficit reached almost 10% of GDP in 2011. This high dependency of the economy on foreign savings increased the vulnerability of the Turkish economy to changes in the economic environment, and aroused the concern of national and international observers.

Table 1: Main Economic Indicators

(%)	1995-2000	2001	2002-2007	2008	2009-2010
GDP Growth	4.7	-5.7	6.8	0.7	2.1
Inflation Rate	69.5	68.5	12.8	10.1	6.5
Interest Rate	74.4	62.5	26.0	25.7	14.3
Real Effective Exchange Rate	119.4	116.3	155.2	168.8	179.8
Nominal Exchange Rate	0.264	1.225	1.416	1.293	1.524
as a share of GDP					
PSBR	7.3	12.1	3.2	1.6	3.7
CAB	-1.1	1.9	-3.9	-5.7	-4.4
Total Debt	42.0	57.7	43.0	37.8	41.5
Short-term	9.4	8.3	7.5	7.3	9.4
Long-term	32.2	42.0	30.4	30.5	31.7
FDI inflows	0.4	1.7	1.8	2.7	1.3
Private capital inflows	0.3	-0.9	2.8	1.6	2.2
percentage change					
Real Effective Exchange Rate	7.6	-21.2	9.0	-11.3	6.0
Nominal Exchange Rate	66.6	96.5	1.5	-0.7	8.3
Nominal Wage Index	77.3	31.9	17.8	7.7	---

Sources: State Planning Organization, *Economic and Social Indicators*. Various issues; Central Bank of the Republic of Turkey, *Electronic Data Delivery System.* http://evds.tcmb.gov.tr/cbt.html; World Bank, *World Development Indicators.*

Turkey has occasionally encountered problems of current account imbalances, most of which ended up with balance of payment crises and consequently prompted governments to implement macroeconomic stabilisation and adjustment policies. Controlling imports has appeared to be the crucial component of conventional stabilisation policies. Foreign exchange rate adjustment (expenditure switching) and reductions in domestic absorption (expenditure reduction) with appropriate fiscal and monetary measures are, in turn, two inevitable policy instruments that have mostly been used in curbing import bills.

In order to assess the performance of the successive AKP governments correctly, the full period between 2001 and 2010 can be divided into two distinctive sub-periods depending on the autonomy of the ruling government in implementing a macroeconomic policy. The first period between 2002 and 2007 covered the first AKP period, and the government had a full commitment to the conditions of the stand-by agreement with IMF with a little freedom to implement independent macroeconomic policies. However the continuation of the stand-by policies helped the AKP period. First, a sound macroeconomic management provided by the right conduct of policies improved the confidence of international institution and investors and encouraged capital inflows to Turkey, which was desperately in need of finance for reforming the economy together with having positive economic growth. As seen in Table 1, the economic growth rate, on average, reached the level of 7 per cent, historically highest rate for the time being. The long standing economic problem of inflation appeared to be resolved with astonishing amount of decline from almost 70 per cent in 2001 to 12.8 per cent for the period of 2002-2007. As the willingness to invest by international investors improved, privatisation income rose with gradually increased foreign direct investment (*see* Günçavdı and Küçük, 2012). As a consequent of a drastic reduction in public sector borrowing requirement and improve risk perception of the Turkish economy abroad, interest rate declined to the level of 26 per cent in the first AKP period from almost 63 per cent in 2001.

The favourable conditions in international markets eased the access of the Turkish economy to international liquidity, which was necessary to finance economic growth, and were exposed Turkey to large entry of international capital into Turkey. This can evidently be seen in Table 1. Private capital inflows to Turkey, as a share of GDP, seem to have increased to almost 3 per cent in the period of 2002-2007 from -0.9 per cent in 2001. Together with a solid structure of the banking sector provided by the reforms undertaken in the earlier period, Turkish households and firms became able to access finance easily. These developments in macroeconomic indicators together with distinguished economic growth performance were perceived as positive, and were rewarded with another victory of general election on the 22nd of July, 2007.

The stand-by agreement was ended in 2007, and the ruling government gained, to some extent, some freedom to conduct an independent macroeconomic policy. However the second AKP government opted to sustain the general direction of the earlier policies, and continued economic reforms but in a looser sense in some fields. The proper conduct of macroeconomic policies in a favourable international condition helped Turkey build up strong

confidence, and she was eventually begun to be seen as a success story again.[2] However the *sub-prime mortgage crisis* erupted in the USA in 2008 and it influenced the world economy badly. Although international investors became much reluctant to invest in emerging market economies, Turkey, somehow, remained as an exception from this, and she continued to attract investors. Even though financial resources available was limited and flew into emerging markets relatively less than in the earlier period, the Turkish economy grew substantially in some year. As seen in Table 1, inflation rates, on average, remained very low; interest rates surged around 26 per cent; nominal exchange rate declined substantially by appreciating domestic currency. The need of foreign savings of the economy remained as high as before and current account deficit reached the 5.7 per cent of GDP in 2008. However there was no serious problem to access international funds in the forms of both FDI and private capital inflows. This easy accessibility, together with low interest and inflation rates and appreciated domestic currency, led to a *consumed boom* and also allowed the Turkish banking sectors to expand the volume of credit to finance this increase in expenditure. Therefore the second AKP government was able to compensate the deteriorating effects on economic growth of the crisis in the world economy with increasing the share of domestic economic activities through higher non-tradable expenditure. Although goods prices seem to have increased more than nominal wages, the real income loss of wage earner groups still remained very limited (see Table 1).

The economic conditions began to return normal after 2008. Economic growth revived, but never reached the levels in the first period. Inflation substantially declined further and reached about 7 per cent; interest rates continued to decline, but remained as high as high before in a real sense. As seen in Table 1, there is a visible deterioration in some macroeconomic indicators in the second period, but the variability in main prices remained low, and hence the Turkey still kept attracting international funds. In this regard, capital inflows continued to have surged in the second period as well. One common feature of both periods of AKP governments has been the imbalances of external account and deficits in

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[2] Turkey undertook the first wide-scale structural adjustment programme in the early 1980s, and had been regarded by international experts as the most successful reforming country for the earlier stage of the reform package (*see* Saraçoğlu, 1991). It was a gradual reform programme and trade regime shift took place at the earlier stage, and fiscal reforms had not been undertaken until the economic crisis in 2001. The implementation of a new reform programme after the economic crisis in 2001 and the good conduct of these policies and reforms generated an astonishing economic performance, and once again, Turkey has begun to be considered as a new success story by the international community. This economic success has been named as so-called *Turkish Silent Revolution* (*see* Casanova, 2004).

current account balances. Despite this dependence of foreign savings, the country managed to grow.

EMPIRICAL ANALYSES

After a brief summary of the literature and the recent developments in the Turkish economy, main determinants of exports will be explored in this section.

The Model and the Data

In order to differentiate the demand-side and supply-side factors, we estimate two export functions. The literature states the potential determinants of **export demand** as :

$$Q_x = f\,(\,P_X,\,Y^*,\,Quality,\,P_M^*,\,RER,\,2003dummy,\,Z*2003dummy) \tag{1}$$

where

Q_x denotes export demand for each sector[3], measured by export volume index;

P_X denotes export price for each sector, measured by export unit value index;

Y^* denotes foreign income, measured by the export-weighted average of GDP per capita of Turkey's main export partners (25 countries)[4] which is computed as:

$$Y_j^* = \sum_{i=1}^{25} \alpha_{ij}\,Y_i^* \qquad i = 1,\,\dots.,\,25; \quad j = 1,\,\dots,\,13. \tag{2}$$

where $\alpha_{ij} = X_{ij}/(\sum_{i=1}^{25} X_{ij})$, i represents the country, j represents the sector and X is the exports.

Quality denotes the quality of Turkish products, measured as the ratio of export prices to import prices of each sector;

P_M^* denotes import prices of the trading partners, weighted by their respective export shares, calculated as:

$$Pm_j^* = \sum_{i=1}^{25} \alpha_{ij}\,Pm_i^* \qquad i = 1,\,\dots.,\,25; \quad j = 1,\,\dots,\,13. \tag{3}$$

2003dummy denotes a step dummy to capture the effects of both exchange rate regime shift and single party government.

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[3] The manufacturing sectors covered (ISIS Rev 3) are food and beveridges, textiles, wearing apparel, basic metals, machinery and equipment, motor vehicles and trailers, furnitures, chemicals, fabricated metals, rubber and plastics, other non-metalic minerals, paper products and wood.

[4] Countries whose export shares are above 1 % in total Turkish exports are taken: Germany, UK, Italy, France, USA, Russian Federation, Irak, Spain, UAE, Nederlands, Romania, Israel, Iran, Belgium, Greece, Saudi Arabia, Switzerland, Bulgaria, Eygpt, Algeria, China, Poland, Ukraine, Azerbaijan and Syrian Arab Republic.

Several interaction dummies are added to the model in order to find out if the effect of the variable in question on export demand has significantly changed after 2003. The *vector Z* covers the interaction dummies with *P_X, Y^*, Quality, P_M^* and RER.*

RER denotes industry-specific real exchange rate, measured as

$$RER_j = P_j^{-1}(\sum_{i=1}^{25} \alpha_{ij} E_i P_i^*) \qquad i = 1, \ldots, 25; \quad j = 1, \ldots, 13. \qquad (4)$$

where, P_j is the domestic price of sector j, P_i^* is the GDP deflator of country i, E is the nominal exchange rate and α_{ij} is the weights calculated as explained before.

Aggregate indexes of real exchange rates can be less effective than industry-specific indexes in capturing changes in industry competitive conditions (Goldberg, 2004). We use two different real exchange rate series: National bilateral currencies are used for E in the first one and euro, US dollars and British pound are used instead of national currencies in the second index. Goldberg ve Tille (2008) states that most of the payments are done by highly convertible currencies, particularly US dollars and euro in world trade. Bleaney (1997) also argues that although Japan constitutes a significant place in world trade, US dolar is used in pricing Japanese goods. Table 2 indicates the Turkish foreign trade by payments. As can be seen, most of the trade are paid by US dollars and euro.

Table 2: Foreign Trade by Currencies Paid (Thousands $).

Currency	Exports	Imports	Total
US dollars	51,651,955	114,033,526	165,685,481
Euro	54,847,505	62,375,229	117,222,734
Turkish Lira	2,640,260	5,824,986	8,465,245
British pound	3,711,682	905,722	4,617,404

For that reason, an alternative real exchange rate series are constructed by replacing bilateral national currencies of the European countries by euro and of the other countries by US dollars, keeping the pound for the UK.

Exchange regime has been changed to the flexible exchange rate from managed floating on February 2001. A political regime shift has been occurred on November 2002, from coalition governments of more than 10 years to single party government. The effects of these two events have been observed in real exchange rates. Graph 1 to 3 present the industry-specific real exchange rates (dollar/euro denominated). The common trend in almost all series is a depreciation until 2002 and an appreciation afterwards. The real exchange rates continued to depreciate throughout the period, however, for some sectors including paper, chemicals and food products.

Graph 1: Industry-specific Real Exchange Rates I
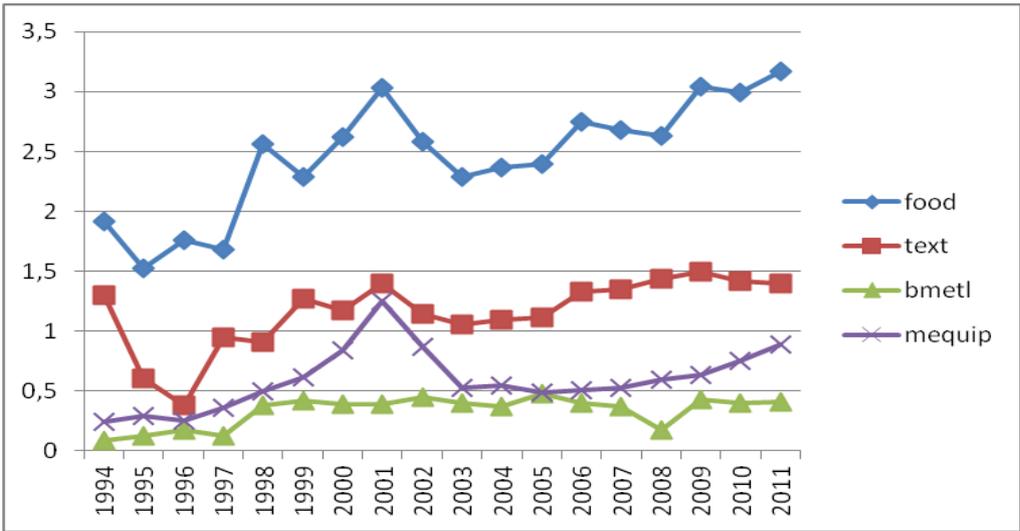
Source: Own calculations

Graph 2: Industry-specific Real Exchange Rates II
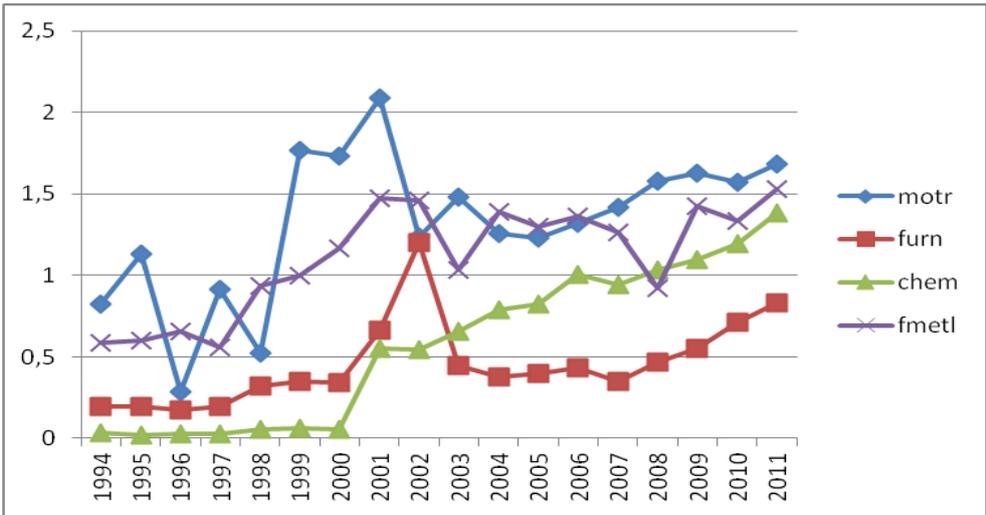
Source: Own calculations

Graph 4 depicts the movements of US dollars and euro against Turkish Lira from 1994 to 2011 (measured as TL per 1 unit of foreign currency). There is a continuous depreciation of the local currency until 2001 where managed floating regime has been changed to flexible exchange rate regime. Euro has contiued to rise while the Turkish Lira has started to appreciate after that date particularly due to extensive inflow of portfolio and foreign direct investment.

Graph 3: Industry-specific Real Exchange Rates III
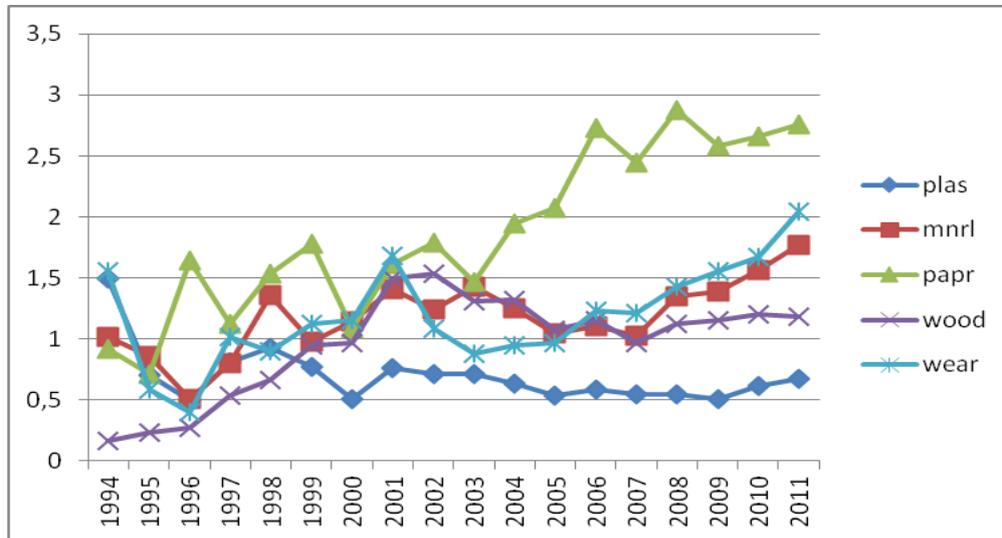
Source: Own calculations

Graph 4. Nominal Exchange Rates
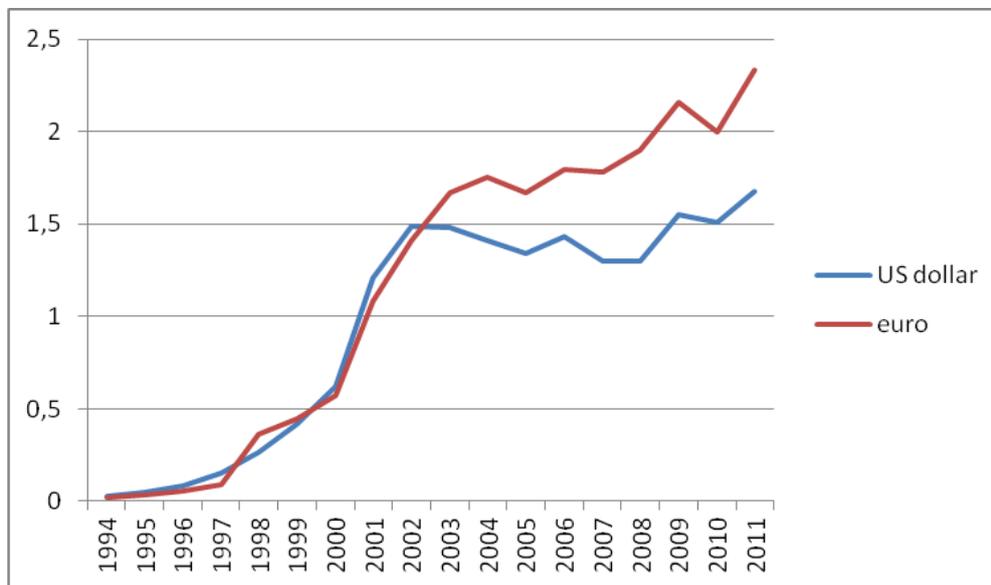
Source: www.tcmb.gov.tr

Economic theory suggests a negative sign for export prices as higher prices will reduce demand for exports. An increase in the incomes of buyer countries and quality of Turkish products are expected to rise demand for exports. Imported products of the buyers are considered as substitutes, therefore if their prices rise, demand will shift to the Turkish

exports. Finally, an increase (depreciation) in real exchange rate is expected to make the Turkish products cheaper and thus to increase exports.

The theoretical discussions and empirical studies suggest main determinants of **export supply** as follows (References):

$$Q_x = f\,(P_X,\ RER,\ Q_D,\ Rwages,\ Capacity,\ 2003dummy,\ Z*2003dummy) \qquad (5)$$

where

Q_X is the export supply by 13 manufacturing sectors, measured by export volume index;

P_X is the export prices, measured by export unit value index;

RER is the industry-specific real exchange rates as explained before;

Q_D is the domestic demand, measured as total production plus imports minus exports by each manufacturing sector;

$Rwage$ is the average real wage for each sector; and finally

$Capacity$ is the capacity utilisation rate of each sector.

The *vector Z* again covers the interaction dummies with P_X, RER, Q_D, *Rwages, Capacity* in order to identify if exchange rate regime and the government change have affected the variables.

The economic theory suggest positive signs for export prices and capacity utilisation rate while a negative sign for average wages. An increase in domestic demand is expected to reduce export supply if export is considered as a residual. Finally the effect of the changes in real exchange rate on export supply depends on various factors and might even influence each sector separately. The sectors which heavily use imported inputs might be affected from depreciation negatively, while the other sectors might be affected positively. The final impact on total export supply will be determined by the dominance of each factor. Main descriptive characteristics of the data can be seen in Table 3.

Table 3. Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Qx	234	98.5	63.2	9.0	266.5
Px	234	125. 2	38.0	76.4	397.1
Pm	234	66.4	55.1	1.6	344. 4
Y	234	7637.7	5103.2	128.5	29469. 9
Quality	234	107.3	0.2	66.2	200.2
Qd	234	119.7	61.6	-38.9	394.9
RER	234	110	0.6	23	317.2
Capacity	234	76.2	7.9	43.6	90.0
Rwage	234	103.1	15.0	65.7	146.6

The annual data from 1994 to 2011 are collected from Central Bank of Republic of Turkey, Turkish Institute of Statistics, the World Bank, United Nations Commodity Trade Statistics Database and www.oanda.com.

Estimation Technique

Examining the determinants of export demand and supply using sectoral real exchange rate defined and calculated as mentioned above requires the use of panel data estimation techniques. In doing so, the data that covers 18 years and 14 sectors have been tested for unit root to avoid the problem of spurious regressions among non-stationary variables as stated by Granger and Newbold (1974) using the Levin, Lin and Chu (2002) test, which may be viewed as an ADF test when lags are included[5]. All variables are I(1) therefore become stationary after taking first differences. Therefore all models are estimated by first differences of the variables.

The export supply and demand models are separately estimated using panel fixed effects technique[6]. The results are reported as Model 1.1 in respective tables of export supply and demand. Following the sector-fixed effects[7] estimations, we perform a number of tests to check for any problems that the data might have and thus cause the estimates be unreliable. The first test Pesaran (2004)'s test for cross section dependence (CD)[8] which is used to assess the presence of sectoral dependence in the data. There the test results reveal that the sectors are correlated. Secondly, we test for heteroskedasticity[9] and autocorrelation[10]. These errors have been corrected for using the Feasible Generalized Least Squares (FGLS) technique with heteroskedastic and correlated panels and no autocorrelation. The results are shown as Model 1.2 in the tables (export supply and demand). The same process has been repeated for the models which incorporate 2003 dummy and interaction variables used to investigate the impact of post-2003 policies on export behaviour. Model 2.1 in both results tables shows the estimation coefficents of the fixed-effects model and Model 2.2 gives the results of FGLS estimations.

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[5] This test assumes all series are stationary under the alternative hypothesis.
[6] Fixed effects and random effects models have been compared using the Hausman specification test.
[7] Two-way fixed effects model has been estimated as well to find that there exists no time-fixed effects. In that respect, Wald test of joint significance has been applied to time dummies.
[8] This test has a null of cross sectional independence and this hypothesis is rejected at 1%.
[9] Tested using the likelihood ratio test.
[10] Wooldridge test applied to the data reveals no first order autocorrelation in the series.

Empirical Results

The equations (1) and (5) are estimated and the results are discussed in this section.

Export Supply

Export supply seems to be determined mainly by real variables rather than monetary variables. Namely, changes in domestic demand and capacity utilisation influence export supply significantly in the initial models (1.1 and 1.2.), while the changes in the export prices and the real exchange rate have no significant impact (Table 4)[11]. The negative coefficient estimates for export prices in the supply equations remind the Jones and Berglas (1977) explanation on the issue. Jones and Berglas argue, in a theoretical framework, that "even if the net supply curve for every commodity exported is positively sloped, a raise in all export prices could easily *reduce* the quantities exported".

Table 4. Export Supply Estimation Results

ΔQx	Model 1.1	Model 1.2[a]	Model 2.1	Model 2.2[a]
ΔPx	ns	ns	ns	---
ΔQd	---	---	-	---
ΔRER	ns	ns	ns	---
$\Delta Capacity$	+++	+++	ns	ns
$\Delta Rwage$	---	---	---	---
Constant	+++	+++	+++	+++
Impact of post-2003 policies				
2003dummy			+++	+++
2003dummy * ΔPx			+	+++
2003dummy * ΔQd			-	---
2003dummy * ΔRER			--	---
2003dummy * $\Delta Capacity$			+++	+++
2003dummy * $\Delta Rwage$			ns	ns
R2	0.168		0.426	
Wald chi2		209.02		710.08

Note: [a] Estimated as heteroskedastic and cross-correlated panels
ns. shows insignificant, - and + signs indicate that the coefficients are significant at 10%, 5% and 1% levels.

They attribute this unconventional argument to the size of income and substitution effects mainly. However, even if the assumptions[12] their explanation is based on are not valid

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[11] Estimation results are presented in the Appendix.
[12] There is direct income effects of price changes and exportables are also consumed domestically.

even in that case "the price of nontradables could rise sufficiently to draw resources away from production of exportables (and therefore lower exports)".

The domestic demand seems to be main competitor of the Turkish exports as an increase in domestic demand will reduce export supply, a result which supports the argument about exports being a residual. The pressure of domestic demand on exports appears to be more dominant after 2003 as the interaction dummy is significantly negative (Models 2.1 and 2.2).

An increaase in capacity utilisation will rise exports, indicating the importance of another supply-side constraint on the Turkish exports. Its effect become greater particularly after 2003, producing a positive and highly significant coefficient for the interaction dummy. As one of main component of any cost function, a rise in the real sectoral wages will reduce the profitability and export supply in turn, however with no specific predominant effect after 2003.

Monetary determinants appear to influence export supply after 2003. Export prices have a negative impact on export supply, a finding contrary to the theoretical expectations but consistent with the above results as the domestic market constrains the external market reducing the residual for exports despite the rising prices. For the last decade, the Turkish exportable sectors have heavily used imported inputs, thus an appreciation of the currency will make those inputs cheaper and easily avaliable, increase production and exports in turn.[13]

Table 5. Export Supply Parameters
(calculated from Model 2.2)

Variables	pre-2003	post-2003
Px	-0.195	-0.009
Qd	-0.059	-0.205
RER	-0.025	-0.177
Capacity	0	1.855
Rwage	-0.303	-0.303

In fact the last decade has witnessed an appreciation of almost all sectoral real exchange rates, due to mainly the fall in inflation rates from almost 70 % to 10 %. This period is accompanied by an accelerating exports (together with imports) with the help of both a

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[13] The table presents the results with the real exchange rate with Euro and US dollars. The results in which the real exchange rate series with national currencies are used did not differ too much.

stable internal environment owing to the single party government and a promising external enviroment with a remarkable inflow of funds.

The dummy variable which intends to capture the effects of single party government and flexible exchange rate regime seems to influence export supply favorably as expected.

Table 5 exhibits the elasticities calcuted from the estimates from the model 2.2. All variables seem to be inelastic. The sizes of the effects of domestic demand and real exchnage rate appear to be greater after 2003.

Export Demand

Unlike the export supply model, export prices and industry-specific real exchange rate are the main determinants of export demand. Before deciding to purchase, it is obvious that foreigners will look at the prices of the products, see if it makes a difference when converted into their own currencies and then compare with the prices of the alternative goods. That is why, export price, real exchange rate and import price of the partner country are all statistically significant.

Table 6. Export Demand Estimation Results

ΔQx	Model 1.1	Model 1.2 [a]	Model 2.1	Model 2.2 [a]
ΔPx	ns	- - -	ns	- - -
ΔPm^*	+ + +	+ + +	ns	+
ΔRER	- - -	- - -	ns	- -
ΔY^*	- -	- - -	ns	ns
$\Delta Quality$	ns	ns	ns	ns
constant	+ + +	+ + +	+ + +	+ + +
Impact of post-2003 policies				
2003dummy			+ +	+ + +
2003dummy * ΔPx			ns	ns
2003dummy * ΔPm^*			ns	ns
2003dummy * ΔRER			- - -	- - -
2003dummy * ΔY^*			ns	-
2003dummy * $\Delta Quality$			ns	+
R^2	0.170		0.229	
Wald Chi2		507.72		476.08

Note: [a] Estimated as heteroskedastic and cross-correlated panels
ns. shows insignificant, - and + signs indicate that the coefficients are significant at 10%, 5% and 1% levels.

Like any other demand models, export prices are negatively related to export demand in all modelsthroughout the estimation period with no specific impact after 2003 (Table 6).[14] Appreciation of the real exchange rate seems to increase demand for exports, a finding contrary to the expectations. The import prices of the trading partners are used as prices of the substitute goods. Thus, a fall in the price of the substitute goods will shift the demand away from the Turkish goods towards alternatives.

Quality of the products as measured as the ratio of export unit prices to import unit prices of each sector, appears to have no significant impact on export demand (in models 1.1 and 1.2). However, quality becomes important after 2003, producing a positive sign for interaction dummy. There is a negative relationship between the income of the trading partner (measured as GDP per capita) and export demand. For normal goods, an increase in purchasing power is expected to rise demand for exports, however for inferior goods a rise in income is expected to reduce demand. The empirical results support the latter case. Dummy variable for the changes in 2003 still has a positive impact on export demand as in export supply.

Table 7. Export Demand Parameters
(calculated from Model 2.2)

Variables	pre-2003	post-2003
Px	- 0.159	-0.213
Pm*	0.220	0.389
RER	-0.037	-0.264
Y*	0	-0.001
Quality	0	0.105

Table 7 shows the elasticities calculated from the model 2.2. Price elasticity of demand is calculated as -0.159, while income elasticity is -0.001. Cross-price elasticity of demand is 0.220 while real exchange rate elasticity is calculated as -0.037. The size of the coefficients of RER and the export and foreign imports prices increased after 2003, indicating their rising influences on export demand.

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[14] Details of the estimation results can be found in the Appendix.

CONCLUDING REMARKS

In sum, the empirical results indicate that price effects are less important for the Turkish exports than supply-side effects. Capacity utilisation and real wages are found to be significant determinants of the export supply, while export prices and real exchange rate become significant after 2003. An appreciation of the local currency seems to affect exports positively, contrary to the theoretical expectations, supporting the argument that Turkish exportable sectors heavily use imported inputs which become relatively cheaper when the local currency is appreciated. Industrial production seems to go to firstly to domestic markets and then external markets and thus an increase in domestic demand reduces export supply.

Concerning to export demand, it is influenced from the changes in export prices and real exchange rate significantly. Therefore economic policies related to prices and exchange rates are expected to encourage demand for exports, however policy-makers are recommended to concentrate on the measures to increase the capacity and production of the industrial sectors such as investment in technology and total factor productivity in order to have a sustainable exports growth.

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APPENDIX

Table A1. Estimation Results (Export Demand)

ΔQx	Model 1.1	Model 1.2	Model 2.1	Model 2.2 [a]
ΔPx	-0.099	-0.137	-0.130	-0.159
	(-1.46)	(-6.11)***	(-0.86)	(-3.07)**
ΔPm	0.411	0.392	0.325	0.220
	(5.96)***	(20.4)***	(1.01)	(1.84)*
$\Delta Quality$	-1.200	0.012	-7.489	-4.733
	(-0.12)	(0.44)	(-0.59)	(-1.20)
ΔRER	-0.107	-0.090	-0.034	-0.037
	(-2.97)**	(-7.46)***	(-0.74)	(-1.97)**
ΔY	-0.001	-0.001	-0.001	-0.001
	(-2.02)*	(-10.9)***	(-0.78)	(-1.45)
2003dummy			4.052	4.066
			(2.04)**	(3.72)***
2003dummy * ΔPx			-0.042	-0.0539
			(-0.25)	(-0.89)
2003dummy * ΔPm			0.108	0.169
			(0.32)	(1.38)
2003dummy * $\Delta Quality$			8.643	10.574
			(0.40)	(1.70)*
2003dummy * ΔRER			-24.202	-22.743
			(-2.95)**	(-7.81)***
2003dummy * ΔY			-0.002	-0.001
			(-0.91)	(-1.92)*
Constant	7.772	7.426	5.741	6.499
	(8.03)***	(18.8)***	(4.35)***	(8.59)***
R2	0.170		0.229	
Wald Chi2		507.72		476.08

NOTES: (a) indicates the estimations with heteroskedastic and cross-correlated panels.
Figures in brackets are t values in fixed effect models and z-values in corrected GLS models, *, **,
*** indicate that the variable is statistically significant at 10%, 5% and 1% levels, respectively.

Table A2. Estimation Results (Export Supply)

ΔQx	Model 1.1	Model 1.2[a]	Model 2.1	Model 2.2[a]
ΔPx	0.091	0.014	-0.205	-0.195
	(1.54)	(0.40)	(-1.64)*	(-3.81)***
ΔQd	-0.123	-0.128	-0.103	-0.058
	(-3.31)**	(-11.34)***	(-1.78)*	(-3.34)***
ΔRER	-0.022	-0.019	-0.028	-0.024
	(-0.70)	(-1.61)	(-0.89)	(-2.62)**
ΔCapacity	0.723	0.499	0.080	-0.095
	(4.43)***	(6.24)***	(0.40)	(-1.22)
ΔRwage	-0.247	-0.232	-0.246	-0.302
	(-2.70)**	(-5.70)***	(-2.81)**	(-7.47)***
Constant	10.305	8.567	6.278	5.284
	(10.97)***	(12.53)***	(5.64)***	(7.19)***
2003dummy			9.477	10.647
			(5.72)***	(10.89)***
2003dummy * ΔPx			0.235	0.186
			(1.72)*	(3.25)***
2003dummy * ΔQd			-0.120	-0.151
			(-1.72)*	(-7.06)***
2003dummy * ΔRER			-0.125	-0.146
			(-1.98)**	(-6.33)***
2003dummy * ΔCapacity			1.803	-0.095
			(6.08)***	(-1.22)
2003dummy * ΔRwage			0.028	-0.025
			(0.13)	(-0.28)
R2	0.168		0.426	
Wald chi2		209.02		710.08

NOTES: (a) indicates the estimations with heteroskedastic and cross-correlated panels.
Figures in brackets are t values in fixed effect models and z-values in corrected GLS models, *, **,
*** indicate that the variable is statistically significant at 10%, 5% and 1% levels, respectively.