

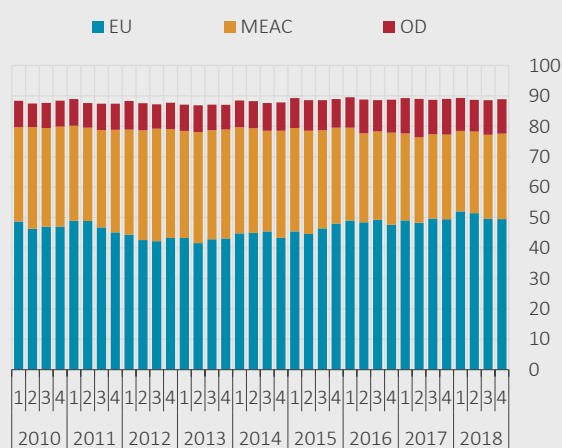
Box 4.4

A Regional Breakdown of the Determinants of Exports

Understanding export dynamics is vital for projecting economic growth and the current account deficit. Export demand is basically determined by the income of trading partners and developments in the real exchange rate (as a measure of competitiveness). In this context, estimating demand and exchange rate elasticities and determining the drivers of exports emerge as a fundamental requirement for evaluating the current state of the economy and producing forecasts. Studies on Turkish exports are mostly focused on estimating aggregate exports while only a few studies offer a regional breakdown. However, Turkey's export partners vary widely in terms of level of development and geographical location, and hence, the dynamics of exports to different sub-groups can also differ significantly. Considering this, the elasticities mentioned above are likely to differ as well when a regional breakdown is made, and therefore, elasticities estimated at the macro level by using aggregate data may include aggregation bias.

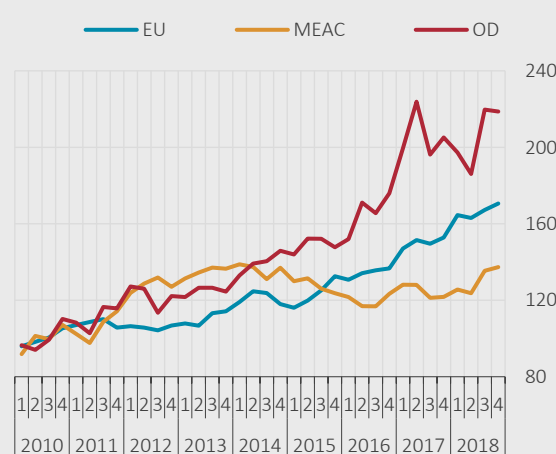
In this box¹, export dynamics are examined in three regions: the European Union (EU), Other Developed Countries (OD) and Middle East, Africa and the Commonwealth of Independent States (MEAC). For this purpose, regional export quantity indices are obtained by using sectoral nominal export data and unit value indices published by TURKSTAT.² Non-monetary gold exports are excluded when the quantity indices are being constructed. To capture regional demand changes, regional export-weighted income indices, which are based on real gross domestic product and export shares of the countries in each region, are used. Relative price changes are derived using the regional real exchange rate indices, which are obtained by using the CBRT's country set and methodology and take third-country effects into account. The analysis covers the period from the first quarter of 2003 (2003Q1) to the last quarter of 2018 (2018Q4).³

Chart 1: Regional Shares in Exports (Excluding Gold, % Share)



Sources: TURKSTAT and authors' own calculations.

Chart 2: Regional Export Quantity Indices (Seasonally and Calendar Adjusted, 2010=100)



Sources: TURKSTAT and authors' own calculations.

¹ This box presents the preliminary findings of the ongoing study by Eren, Kalafatçılar, and Yavuz (2019).

² TURKSTAT does not publish export quantity and unit value indices by country of destination but only nominal export figures in US dollars. Regional export quantity indices, excluding unprocessed gold are constructed by employing unit value indices for a total of 32 sectors according to SITC, Rev. 3, at either one digit or two-digit levels. In the first stage, for each region, sectoral real export figures are approximated by using both the sectoral nominal export figures for that region and the sectoral unit value indices in US dollars for total exports. These sectoral real export figures are then combined to estimate regional quantity indices.

³ The analysis for MEAC countries covers the period of 2005Q1-2018Q4.

The share of MEAC countries in Turkey's exports excluding gold fell by around 3 percentage points while the share of OD countries rose by 3 percentage points from 2010Q1 to 2018Q4 (Chart 1). On the other hand, the share of the EU remained around 49 percent despite its ups and downs during this period. Exports displayed a remarkable upward trend in all three regions until the end of 2014 but later followed notably different paths across the regions (Chart 2). Exports to the EU showed an uninterrupted upward trend in the post-2014 period, while exports to OD countries increased rapidly until the second half of 2017, but did not change significantly in the following periods and almost formed a plateau. Exports to MEAC decreased slightly in the period of 2015Q1-2016Q2, remained around the same level until the second half of 2018, and increased only marginally afterwards.

By employing the quantity indices obtained, we estimate export demand equations for each region through three different methods and observe to what extent income and relative price elasticities differ. All variables are introduced into the models in logarithmic terms. We present income and relative price elasticity estimates in Table 1 and Table 2. The alternative models used in the estimation are: (i) Vector Autoregressive Models (VAR), (ii) Error Correction Model, and (iii) Ordinary Least Squares (OLS). VAR and OLS estimations are computed with quarterly differenced data. Before the OLS estimation, the dependent variable is smoothed with a filter, and regional quantity indices are de-noised.⁴ Furthermore, the findings from the regional estimations are compared with those of total exports.

Table 1: Income Elasticity

	VAR ¹		Error Correction		OLS ²	
	Short	Long	Short	Long	Short	Long
EU	5.13**	3.80**	5.76***	3.31***	4.53***	3.61***
OD	2.60*	3.36*	3.89*	1.39***	2.70***	3.06***
MEAC	1.94*	3.64*	2.17***	1.69***	1.59***	2.09***
Total	3.87**	3.33**	2.58***	2.16***	4.23***	3.03***

***, ** and * correspond to 1, 5 and 10 per-cent significance levels, respectively.

¹ Elasticities are computed from the accumulated impulse-response functions. Short-run elasticity is calculated from the average of the first four quarters, while long-run elasticity is calculated from the values at the end of four years (16 quarters)

² Long-run elasticities are computed by adjusting short-run elasticities with the coefficients of lagged values of dependent variables used as explanatory variables.

⁴ De-noising is achieved by decomposing series into separate frequency components using discrete wavelet transform and then removing the highest frequency level (2 to 4 quarters).

Table 2: Relative Price Elasticity

	VAR ¹		Error Correction		OLS ²	
	Short	Long	Short	Long	Short	Long
EU	-0.18	-0.18	-0.15**	-0.18***	-0.17***	-0.13***
OD	-0.37*	-0.48*	-0.36**	-0.97***	-0.22***	-0.25***
MEAC	-0.42*	-0.48*	-0.21*	-0.02	-0.45**	-0.59**
Total	-0.15	-0.12	-0.07	0.06	-0.15***	-0.11***

***, ** and * correspond to 1, 5 and 10 per cent significance levels, respectively.

¹ Elasticities are computed from the accumulated impulse-response functions. Short-run elasticity is calculated from the average of the first four quarters, while long-run elasticity is calculated from the values at the end of four years (16 quarters)

² Long-run elasticities are computed by adjusting short-run elasticities with the coefficients of lagged values of dependent variables used as explanatory variables.

To sum up the findings from the three different methods executed for three regions and the total, the first point to be emphasized is that income elasticity is higher than that of relative price. Another important fact is that income elasticity is found to be higher for advanced countries, particularly for the EU. This finding is valid both in the long and short run. An equally important point is that the real exchange rate elasticity, for the statistical significance of which only limited evidence is obtained when aggregate data are used, displays a different outlook when regional data are employed. Findings from the models estimated for the EU, which constitutes almost half of Turkish exports, reveal that coefficients of the real exchange rate are either low or statistically insignificant. However, estimations for the remaining regions suggest statistically significant and larger coefficients. In other words, it is observed that when the focus is on aggregate exports with a macro view instead of regional details, the effect of the real exchange rate on exports cannot be gauged adequately due to the aggregation bias.

References

Eren, O., Kalafatçılar, M.K., and Yavuz, D. (2019). A Regional Breakdown of the Determinants of Exports. CBRT, ongoing study.

