# Box 3.2

## An Analysis of Turkish Firms' Cost Structure

In addition to demand-side factors, cost-related factors also play an important role in inflation developments. Cost elements of companies include a variety of items from raw materials, energy, personnel payments, rent payments, R&D and marketing & sales expenses to expenses arising from loans used for financing. The high depreciation in TRY over the recent years has caused intense price increases, particularly in sectors with high exchange rate sensitivity. This has raised interest in the impact of exchange rate developments on firms' costs. Moreover, the impact of the increases in financing costs on firms' activities and pricing behavior became a major topic of discussion. One of the main purposes of this box is to examine the extent of cost increases caused by exchange rates and financing expenses in cost structures of companies by using income statements of companies operating in various sectors in Turkey between 2009-2018.

### Data

While examining the cost structures of companies, the administrative records of the companies kept by the Revenue Administration have been used. Routine checks and data cleaning have been performed before the analysis.[1] After data cleaning, 6.2 million companies' data have been covered in the microdata set for the period between 2009 and 2018.[2]

Firms' income statements have been used for calculating the share of cost items in total expenses. As will be explained in the next section, detailed information about cost items have not been included in the income statements, but many cost items have been aggregated under the general administrative expenses item. For example, electricity, fuel, rent expenses and wages are not shown as separate items on the income statement, but are aggregated in the cost of sales or operating expenses.

### Methodology

Cost shares have been calculated as the ratio of each cost item to total cost. In the analysis, firstly, cost shares have been calculated by using a balanced panel consisting of firms operating every year during the period between 2009 and2018. In this way, it is possible to observe the change in the cost structure over the years within a balanced panel (301,557 companies). Table 1 presents the ratios calculated in this way. As another method, cost shares have been calculated based on main sectors by using all available firm data for each year. In this method, the number of companies may vary each year. In other words, the companies that entered in, remained in and exited from the data set during the 2009-2018 period have not been addressed separately. The second method has been applied for analyses based on the firm scale (based on the number of employees) and economic activity classification.

[1] Data cleaning steps were as follows: consistency between the of the sum of sub-items and the main items in the income statement; total assets not to be negative; main items not to be negative; data start and end dates to be correct except for special accounting period; the increases and decreases in the income statement items of a company to be consistent over the years.

[2] Number of firms by years is as follows: 519,987 firms for 2009; 555,952 firms for 2010; 583,037 firms for 2011; 590,447 firms for 2012; 602,345 firms for 2013; 619,169 firms for 2014; 646,509 firms for 2015; 673,667 firms for 2016; 696,891 firms for2017 and 750,256 firms for 2018.

## Results

Table 1 shows the ratios calculated by using the balanced panel data (companies operating in every year between 2009 and 2018). The cost of sales covering raw materials and commercial goods sold has the highest share among the cost items. Although this ratio is around 80%percent, it displays a downtrend from 2015 to 2018. The second highest share among the cost items belongs to the operating expenses item, which includes R&D, marketing, sales, distribution and general administrative expenses. This ratio also decreased in the 2017-2018 period.

Table 1: Developments of Firms' Cost Structure in the 2009-2018 Period (%)

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|
| Cost of Goods Sold | 82.0 | 83.6 | 81.4 | 85.3 | 82.3 | 82.8 | 79.3 | 78.7 | 76.4 | 70.8 |
| *Finished goods sold* | *25.7* | *26.8* | *26.5* | *27.6* | *26.3* | *26.3* | *25.1* | *25.3* | *25.5* | *24.2* |
| *Merchandise sold* | *42.3* | *43.0* | *41.7* | *43.7* | *41.3* | *41.3* | *40.5* | *39.9* | *38.6* | *34.7* |
| *Services sold* | *13.0* | *12.9* | *12.2* | *12.9* | *13.7* | *13.9* | *12.6* | *13.0* | *11.8* | *11.3* |
| *Other* | *1.0* | *0.9* | *0.9* | *1.1* | *1.0* | *1.2* | *1.0* | *0.5* | *0.5* | *0.5* |
| Operating Expenses | 10.3 | 9.9 | 9.0 | 9.3 | 9.2 | 9.1 | 9.1 | 9.4 | 8.3 | 7.4 |
| *R&D* | *0.2* | *0.1* | *0.1* | *0.1* | *0.1* | *0.1* | *0.1* | *0.1* | *0.1* | *0.1* |
| *Marketing, sell., dist.* | *4.7* | *4.6* | *4.2* | *4.4* | *4.3* | *4.3* | *4.3* | *4.5* | *4.1* | *3.7* |
| *General administration* | *5.5* | *5.2* | *4.7* | *4.8* | *4.7* | *4.6* | *4.6* | *4.7* | *4.1* | *3.6* |
| Foreign Exchange Losses | 2.8 | 2.4 | 3.3 | 1.7 | 3.6 | 3.5 | 6.1 | 5.7 | 10.0 | 13.9 |
| Expenses from Other Oper. | 1.1 | 1.0 | 0.9 | 0.9 | 1.0 | 0.9 | 1.1 | 1.0 | 0.9 | 1.4 |
| Financing Expenses | 2.4 | 1.9 | 2.7 | 1.8 | 2.8 | 2.4 | 3.5 | 3.7 | 3.5 | 5.4 |
| *Short-term* | *1.8* | *1.4* | *1.8* | *1.5* | *1.9* | *1.8* | *2.5* | *2.6* | *2.6* | *3.8* |
| *Long-term* | *0.6* | *0.5* | *0.9* | *0.4* | *0.9* | *0.6* | *1.1* | *1.1* | *0.9* | *1.6* |
| Extraordinary Expen.&Loss. | 1.3 | 1.2 | 2.7 | 0.9 | 1.2 | 1.2 | 0.8 | 1.5 | 0.8 | 1.0 |
| USD (Annual % Change) | 19.7 | -3.0 | 11.3 | 7.3 | 6.1 | 15.1 | 24.3 | 11.1 | 20.7 | 31.9 |
| Commercial Loans (Annual Average) | 12.5 | 8.9 | 11.6 | 13.2 | 10.1 | 12.5 | 14.1 | 15.1 | 16.5 | 26.1 |
| Financial Debts/Net Sales | 22.3 | 22.2 | 22.6 | 22.4 | 26.8 | 27.7 | 31.3 | 35.0 | 33.1 | 32.0 |
| Domestic PPI (Annual % Change) | 1.2 | 8.5 | 11.1 | 6.1 | 4.5 | 10.2 | 5.3 | 4.3 | 15.8 | 27.0 |

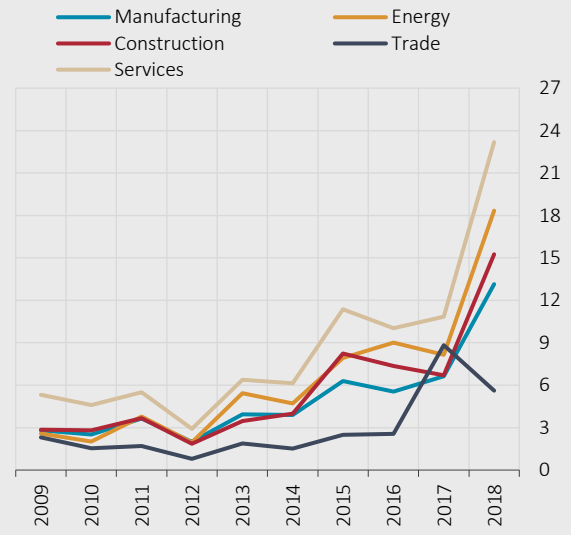
Source: CBRT, Revenue Administration (RA), TurkStat.

Table 1 illustrates that the other two important cost items are foreign exchange losses and financing expenses. In the foreign exchange losses item, expenses such as foreign exchange differences and sales losses in foreign currency are recorded. Financing expenses cover interest, exchange rate differences, loan commissions and other similar expenses incurred in relation to the amounts owed by the enterprise and not added to the cost of the assets. In short, it can be asserted that the foreign exchange losses item reflects exchange rate effects and the financing expenses item reflects interest rate effects. Except for 2012, the share of foreign exchange losses is higher than the share of financing expenses. It is noteworthy that the foreign exchange losses ratio has been increasing since 2015 and increased significantly in 2017 and 2018. The increase in financing expenses was lower in the period analyzed. An analysis of the structure of financing expenses reveals that the rise in the share of short-term debts among total financing expenses is more pronounced.

In the second stage of the analysis, the ratios of foreign exchange losses and financing expenses have been analyzed on a sectoral basis, taking into account all firms operating in that year (allowing the number of firms to change from year to year). Charts 1 and 2 show that the ratio of foreign exchange losses is higher than the that of financing expenses across all sectors, and the difference between the two ratios increased significantly in 2018. The increase in the share of foreign exchange losses shows that the cost increase arising from exchange rate losses is well above the credit costs.

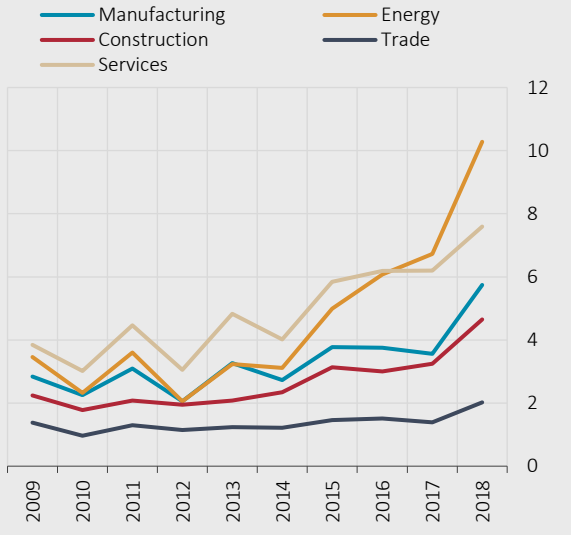
The sectors with the highest foreign exchange losses ratios are the services, energy and construction sectors, respectively. These sectors played an active role in many projects such as renewable electricity generation, electricity distribution, highway / bridge, city hospitals and airport projects in which both domestic and international foreign currency (FX) loans are used extensively. In addition, the intensive use of imported inputs in some sectors such as the energy sector is believed to have been effective in the rise of exchange rate losses. On the other hand, the foreign exchange losses ratio in the manufacturing industry, which has an FX income through the export channel, is lower compared to other sectors. Besides, it is noteworthy that the foreign exchange losses ratio in the trade sector decreased in 2018 (Chart 1). Similar to foreign exchange losses, the energy and services sectors, which use loans intensely, have a high ratio of financing expenses (Chart 2).[3]

Chart 1: Foreign Exchange Losses Ratio by Sectors (%)




Source: CBRT, RA, TurkStat.

Chart 2: Financing Costs Ratio by Sectors (%)

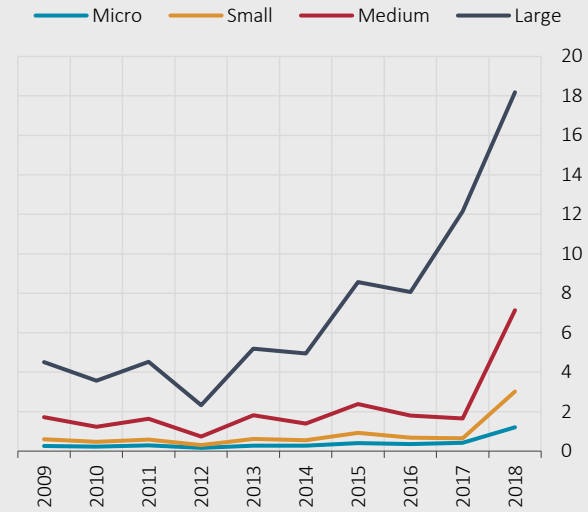



Source: CBRT, RA, TurkStat.

In addition to the sectoral segregation, cost shares have been calculated also by firm size classification based on the number of employees. When the foreign exchange losses and financing expenses rates are analyzed based on firm size, it is observed that both rates increase as the firm size increases (Chart 3 and Chart 4). Moreover, these ratios are close in all firm sizes except for large firms; whereas in large firms, the foreign exchange losses ratio is significantly higher than the financing expenses ratio. Both foreign exchange losses and financial expenses ratios remained relatively flat until 2018 and increased significantly in 2018. The highest increase for both ratios was observed in large-scale companies. In fact, 12.4 points of the foreign exchange losses ratio of the total 13.9% for 2018 (Table 1) belongs to large firms.

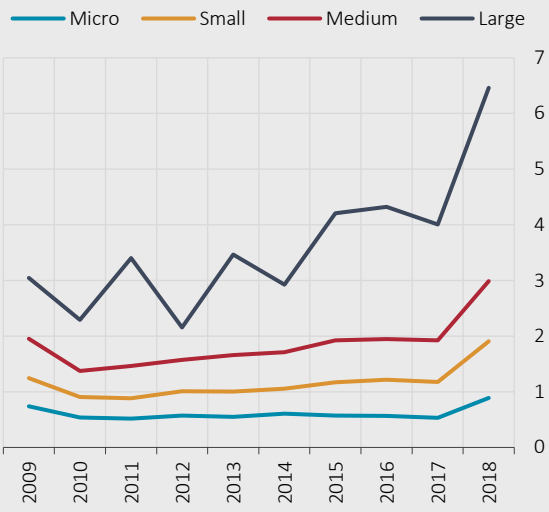
[3] Sectoral details of total financial debts / net sales ratio for 2018 is as follows: Manufacturing 28.5%; Energy 85.3%; Construction55.4 %; Trade 11.9% and Services 71.1%.

Chart 3: Foreign Exchange Losses Ratio by Firm Size (%)




Source: CBRT, RA, TurkStat.

Chart 4: Financing Costs Ratio by Firm Size (%)




Source: CBRT, RA, TurkStat.

As a result, an analysis of the cost structures of firms reveals that the cost of sales and operating expenses have the highest shares. Moreover, the share of foreign exchange losses in total costs increased rapidly in the 2017-2018 period and extended operating expenses. By sectors: services, energy and construction sectors have the highest share of foreign exchange losses respectively. The fact that these sectors are less open to foreign trade compared to the manufacturing industry sectors and therefore have a lower share of foreign currency revenues in their total revenues, make them more fragile. An analysis by firm size reveals that foreign exchange losses in large firms increased rapidly in 2018. The ratio of the number of firms by size to the total number of firms shows that the share of small, medium and large firms tended to increase until 2018. But then, the share of all these three groups decreased and the share of firms of micro scale increased in 2018. This finding indicates that the depreciation in the Turkish lira and the increase in financing costs adversely affected the company balance sheets and limited the investment and employment opportunities.