Politická ekonomie 2025

Volume 73, Issue 3
https://doi.org/10.18267/j.polek.1459
Open Access

PRAGUE UNIVERSITY OF ECONOMICS AND BUSINESS

A Policy Dilemma in the Context of Turkey's Sectoral Export Competitiveness: The Role of Exchange Rates and Labour Costs

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Abstract

Production in Turkey has a high dependence on imported inputs. Therefore, the policy aiming at increasing exports through the depreciated national currency leads to different results depending on the degree of dependence on imported inputs. In this context, this study econometrically analyses increases in exports of manufacturing and service industries which have different levels of imported input dependence. The analysis findings indicate that national currency depreciation leads to competitive effects in the manufacturing industry, but not in the service sector. The effect of labour costs, on the other hand, is much lower in the manufacturing industry than in services. In addition, we found that the unit value index of crude material imports has a significant negative impact on the sectoral competitiveness of the manufacturing industry. In contrast, changes in import prices seem to have no significant impact on service exports.

Keywords: Exports, competitiveness, imported inputs, sectoral input differences, exchange rate policy, lower-valued domestic currency

JEL Classification: F14, L60, L80

Citation: Yılmazand, M. S. and Acar, M.: A Policy Dilemma in the Context of Turkey's Sectoral Export Competitiveness: The Role of Exchange Rates and Labour Costs. *Politická ekonomie*, 2025, 73 (3), 447–470, https://doi.org/10.18267/j.polek.1459

1. Introduction

Establishing price competitiveness in exports by devaluing the national currency is an important foreign trade and economic growth strategy. This argument is based on the Mundell-Fleming model. According to the model, in a small and open economy, national currency depreciation changes the relative prices on international goods and service markets in favour of the small country, leading to export increases and import decreases (Fleming, 1962; Mundell, 1960). Thus, economic growth is achieved through foreign trade surpluses. As indicated by Trošt and Bojnec (2016), exports may contribute to higher growth in developing economies. Accordingly, policymakers may pursue a policy of undervaluing the domestic currency as a solution to the trade deficit problem or to stimulate their economies. However, in addition to one-sided policies, such changes in exchange rates can also lead to currency war between countries, as in the aftermath of the Great Depression of 1929. The Bretton Woods system was created to eliminate the destructive effects of these competitive devaluations of national currencies. As will be recalled, in the Bretton Woods system, all currencies were pegged to the dollar and the dollar to gold (Eichengreen, 2021, p. 554).

It is argued that the gains from foreign trade through price competitiveness occur with a certain lag. After the depreciation of the national currency, the value of imports in the foreign currency increases while the value of exports in the national currency decreases due to ongoing contracts, resulting in a significant foreign trade deficit in the short run. Gains from foreign trade emerge over time through renewed contracts and price adjustments. Since this process, which shows the relationship between the exchange rate and the balance of trade, takes place graphically in a J-shape, this phenomenon is known as the J curve in the literature (Magee, 1973, p. 308). These gains from foreign trade are based on an elasticity approach to exports and imports. If the sum of the elasticities of demand for exports and imports, also known as the Marshall-Lerner condition, is above 1, national currency depreciation will lead to a foreign trade surplus (Wilson, 2001). Otherwise, increases in exports and decreases in imports would not generate a foreign trade surplus. The elasticity coefficients of tradable goods and services are mainly associated with the level of technology of the goods. High-tech products have a high elasticity, while low-tech products have a low elasticity. In Turkey, manufacturing industry production is concentrated at low and low-medium technology levels (Avci *et al*., 2016).

In addition to the elasticity approach, foreign trade dynamics are determined by many other factors. In particular, research into the determinants of exports has generated a large body of literature on competitiveness. Competitiveness is mainly associated with cost and productivity advantages in production (Paul and Dhiman, 2021). While higher productivity in production corresponds to higher output per unit of input, a relative increase in production costs eliminates the advantage of price competitiveness of goods and services on international markets. Therefore,

rising costs are one of the obstacles to export increases. Although production involves various cost elements, crude materials and intermediate inputs are important cost elements, especially for the manufacturing industry. Disruptions in the supply of these resources or high dependence on imported inputs may lead to anti-competitiveness effects.

In economies with high dependence on imported inputs, imported goods and services may be an important source of local production and exports. In other words, one of the cost sources of production and exports is the exchange rate (Campa and Goldberg, 2008). In case the exports depend on imports, the effectiveness of the exchange rate policy will become uncertain. This uncertainty is not only a consequence of exchange rate policy. At the same time, any strategy targeting economic expansion may result in import increases and trade deficits. Thus, the most important result of imported input dependence is that it leads to a policy dilemma. In addition to the problem of trade deficits, this tight relationship between exports and imports also damages price competitiveness in exports. A monetary policy aimed at price competitiveness in exports by depreciating the national currency may become ineffective due to the high imported inputs. While export prices become more competitive on international markets, this competitiveness is suppressed by the increase in input prices.

Labour costs is another important source of price competitiveness in exports (Paul and Dhiman, 2021). An increase in relative labour costs may lead to higher costs in the production of the same unit of the product and thus to anti-competitive prices in exports. However, the competitive price effects of both imported inputs and labour costs are not uniform across sectors. While labour is the most important cost source for the service sector, crude materials or intermediate input goods are the most important cost source for manufacturing industries (Abeysinghe and Yeok, 1998, p. 51). Therefore, in case the domestic currency is undervalued, if there is a high imported input dependence, the gains from foreign trade in the manufacturing industry sector are expected to decrease. Moreover, in case the domestic currency is overvalued, the manufacturing industry may not experience significant export decreases thanks to cheap imported inputs (Greenaway *et al*., 2010; M. A. Yülek, 2014). In the service sector, high labour costs may lead to decreases in service exports by eliminating the competitive advantage. Therefore, differences in the cost sources of sectors cause differences in the effects of the policies pursued.

The manufacturing industry and the service sector are two important sectors of the Turkish economy. While the service sector has the highest share in domestic production, the manufacturing industry sector has the highest share of total exports. The main cost source of the manufacturing industry is crude materials and intermediate inputs, while it is labour in the service sector. The Turkish manufacturing industry has a high imported input dependence and changes in the production structure over time lead to increases in the use of imported inputs (Ersungur and Kiziltan, 2010; Yalçin *et al*., 2012). Therefore, the sensitivity of the manufacturing industry

to changes in the exchange rate through the cost channel increases over time. In addition, the imported input dependence is relatively higher in sub-sectors with high technology and capital levels (Erduman *et al*., 2019). In this case, it can be said that sectors with the potential to generate high export earnings have high import input-based vulnerabilities in the case of national currency depreciation.

Differences in the cost sources of sectors differentiate the sectoral effects of exchange rates and monetary policies. In Turkey, the strategy of keeping the national currency undervalued in line with the objective of competitive export prices ignores this differentiation. On the other hand, according to Akçay (2023), these sudden changes in the monetary policy strategy of policymakers in Turkey are not independent of their interaction with capital groups. Therefore, in addition to the cost-driven sectoral effects of the undervalued domestic currency preference, there is also a distributional or income transfer background between capital groups. In this context, this study investigates the exchange rate and labour-induced competitive effects in the manufacturing and service sectors in Turkey.

There are significant differences in terms of cost sources between the manufacturing and service sectors. Therefore, policies aimed at increasing exports by keeping the value of the national currency lower create a distribution problem from a sectoral perspective. These different cost structures between sectors reveal different political expectations in terms of price competitiveness. On the other hand, this situation also limits the effects of export-oriented policies pursued by political decisionmakers. In this context, the study offers a different perspective on the exchange rate and export relationship for the Turkish economy, which aims to increase exports by keeping the value of the national currency low. The Turkish economy represents an important case study because, in Turkey, a policy of keeping the value of the national currency at a lower level is deliberately implemented from time to time to promote exports. This is done in an economy where input dependence of imports is high and wage regulations regarding the labour market are made frequently. In the context of these characteristics, investigating export competitiveness in the Turkish economy through the manufacturing and service sectors, which have different input sources, constitutes an important motivation. In this context, the study aims to show that differences in input structures in Turkey are important elements in making sectors more competitive in exports. Moreover, the study fills an important gap in the literature in that it considers a period in which the Turkish lira was significantly depreciated and considers a wide scale of relevant sectors as well as sectoral differences. The rest of the paper consists of sectoral trends in Turkey followed by a literature review, data, model and methodology. The paper concludes with a discussion of the findings.

2. Sectoral Trends in Turkey

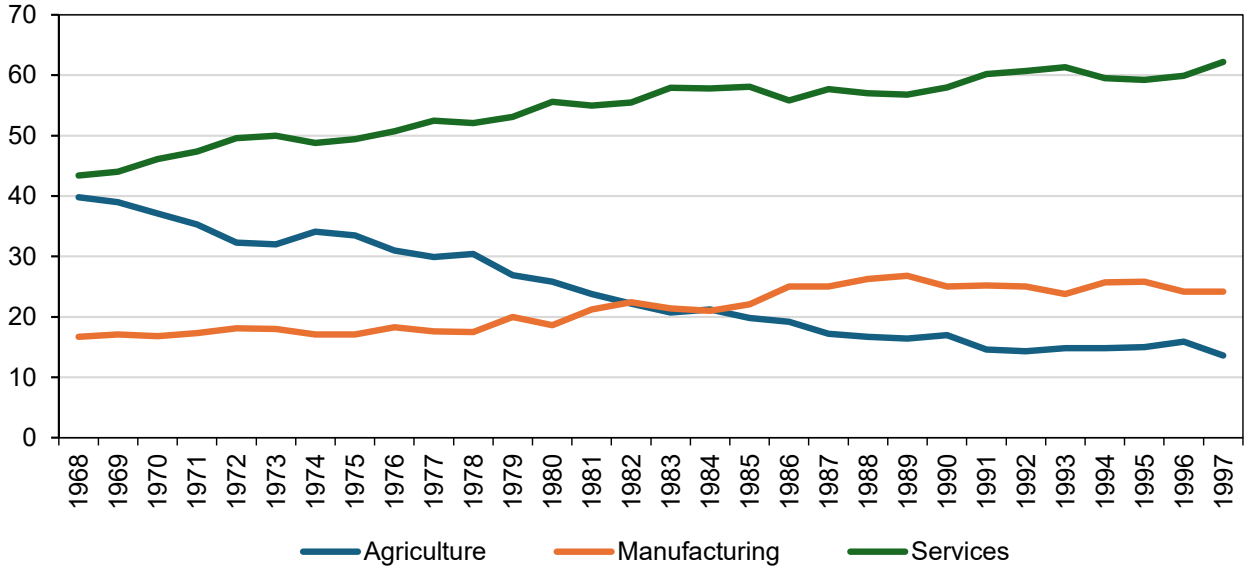
Sectoral trends are mainly evaluated through the main sectoral groups of industry, services and agriculture. In addition, the sectors have different internal dynamics. They are also interpreted as an indicator of development based on their share in the economy. This is because, while the agricultural sector, which is the primary sector, is the dominant sector of economies in the early stages of economic development, the manufacturing industry (secondary) and the service sector (tertiary) may take over this dominance in more advanced stages. The primary and secondary sectors appear similar because both produce tangible goods, but they differ in their dependence on natural resources. While the agricultural sector is highly dependent on natural resources, the industrial sector is not directly dependent on and constrained by natural resources. Natural resource scarcity causes the primary sector to suffer from diminishing returns despite considerable technical progress. In the industrial sector, on the other hand, there are increasing efficiencies in production due to high levels of capital investment and organization (Clark, 1960, pp. 490–491). These similar sectoral trends across countries are known in the literature as Clark's three-sector theory. Although Clark's three-sector theory is the most well-known theory of economic development stages, sectoral trends and sectoral classification, there are many other theories (Wolfe, 1955).

Like the trends predicted by the three-sector theory, the dynamics within sectors also follow a certain path. In the manufacturing industry, while low-technology production is intensively carried out in the early stages of sectoral development, technology intensity increases in the later stages of development and production is realized mainly at medium and high-technology levels (Polat, 2011, p. 25).This situation also affects the export composition of countries. Rich countries export more complex goods while relatively poor countries export more simple goods (Hausmann *et al*., 2007, p. 2).

In the context of main sector groups, the increase in the share of the industrial sector in the economy is known as industrialization, while further stages of development where the service sector replaces industry are defined as deindustrialization. However, these dynamics in sectors do not always emerge at specific stages of development. In some countries, the service sector may develop significantly before the industrialization stage reaches a certain maturity (M. Yülek, 2019, p. 179). This is called premature deindustrialization and is argued to cause long-term losses in economic development. This is because the manufacturing industry sector acts as an engine of growth in economies due to its important forward and backward linkages (Thirlwall, 1983, pp. 345–346). On the other hand, some approaches associate industrialization and deindustrialization phenomena with sectoral productivity increases rather than value added. According to this approach, the reason for the increase in the share of the service sector in output is the sector's low productivity growth. Low productivity growth increases prices and gives the impression that a higher value added is created in nominal terms (Rowthorn and Ramaswamy, 1997, p. 9).

Figure 1 shows the shares of agriculture, industry and service sectors in Turkey's GDP for the period 1968–1997. During the period, the share of the agricultural sector in the economy decreased while the shares of industry and the service sector increased. The general trend is in line with the prediction of the three-sector theory and the Turkish economy exhibits a service-dominated structure instead of industrialization in the early stages of its development. On the other hand, contrary to deindustrialization in nominal terms, the share of the industrial sector increased in GDP during the period.

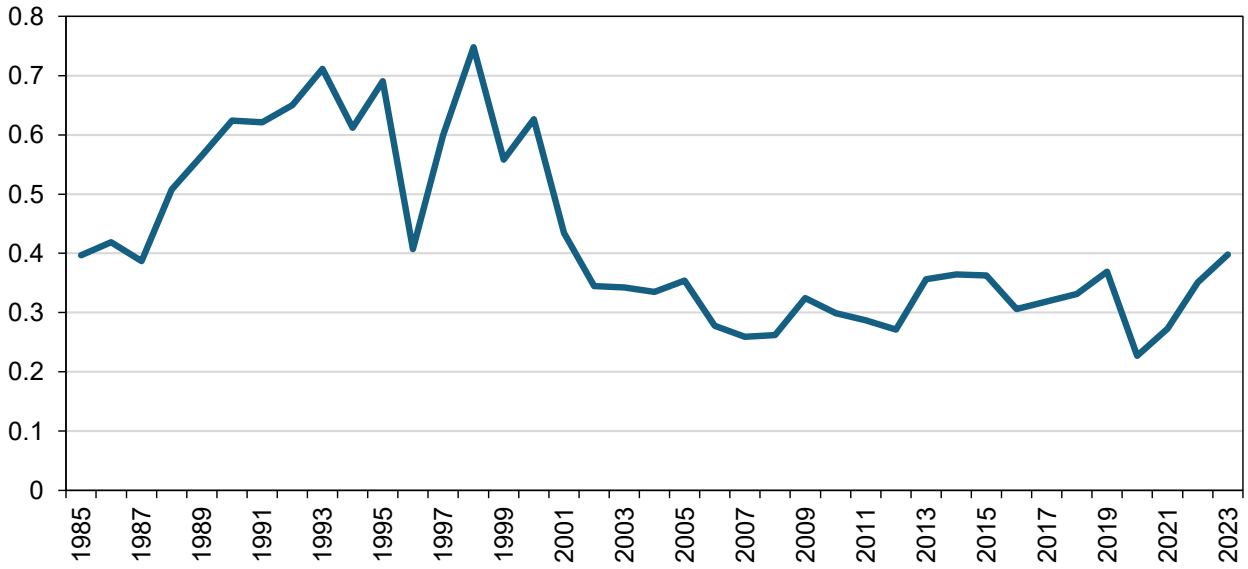
Figure 1: Shares of main sectors in Turkey's GDP (1968–1997)



Source: Data compiled from TURKSTAT (Turkish Statistical Institute, 2024)

Figure 2 shows the ratios of service exports and goods exports obtained from the balance of payments of the Turkish economy. According to the graph, service exports in Turkey have been approximately 35% of goods exports in the last 20 years of the period under consideration. Although there is a relatively stable export distribution in the last 20 years of the relevant period, exports of services were more adversely affected than exports of goods during the COVID-19 pandemic crisis.

Figure 2: Ratio of service exports to goods exports



Source: Data compiled from Central Bank of the Republic of Türkiye, CBRT EDS (CBRT, 2024)

3. Literature Review

There are various studies investigating the relationship between the exchange rate and foreign trade for Turkey. Studies on the effects of changes in the exchange rate, which is the main determinant of foreign trade, on exports and imports are widely available in the literature. The effect of exchange rate changes on foreign trade components is realized through competitive or anti-competitive effects that affect the relative prices of exported and imported goods. A competitive exchange rate policy aims to affect the relative prices of goods and services, in other words, the terms of trade. Price dynamics are an important factor in establishing export competitiveness (Manavgat and Kaya, 2016).

In this context, empirical studies on Turkey have reached various findings. Some studies show that there is no long-run relationship between exchange rate changes and foreign trade balance or foreign trade variables (Alper, 2023; Doğan and Karagöz, 2005; Erkekoğlu and Gül, 2020; Yamak and Korkmaz, 2011). Although some studies found a long-term relationship between exchange rates and foreign trade variables, they concluded that there is no causality between the variables (Bozdan *et al*., 2018; Yurtoğlu, 2017). Gül and Ekinci (2006) found both a long-term relationship and causality between variables. However, the direction of causality is from foreign trade variables to the exchange rate. Tapşın and Karabulut (2013) found that the exchange rate changes affect imports but not exports. For this reason, they argued that the exchange rate policy is inef-

fective. It is also among the findings that the increase in the real effective exchange rate decreases the foreign trade volume (Değer and Demir, 2015). On the other hand, there are also studies that support the traditional relationship. According to these studies, there is a negative relationship between the value of the national currency and the balance of trade (Çelik, 2018; Kaplan and Dayıoğlu, 2016; Okay *et al*., 2011). Contrary to theoretical expectations, the positive relationship between the value of the national currency and exports is also among the findings of the studies. Balcilar *et al*. (2014) found a positive relationship between the real effective exchange rate and exports in the short run and a negative relationship in the long run. The study found that wages, productivity and foreign demand explain exports better than the real effective exchange rate. The positive effect of foreign income on exports is also supported by many empirical studies (Ayhan, 2019; Çelik, 2018; Kaplan and Dayıoğlu, 2016; Kizildere *et al*., 2015).

The effects of the national currency depreciation on the foreign trade balance are different across periods. This effect is expected to be negative in the short run and positive in the long run. This is mainly explained by the "ongoing contracts" argument, and the trade balance follows a J-shaped process graphically. Empirical studies on Turkey have reached different findings regarding the existence of the J curve. The findings of most analyses based on general foreign trade indicators suggest that a J curve does not exist (Akbostanci, 2004; Karamelikli, 2016a; Sezer, 2017). On the other hand, studies on the J curve have also investigated Turkey's bilateral trade with its trading partners or sectoral J curves. Gözen and Bostanci (2021) argued that the J curve is not observed in Turkey's bilateral trade with its main trading partners. In studies investigating symmetric and asymmetric dynamics, the results differ depending on trading partners and whether asymmetries exist. According to Karamelikli (2016b), while Turkey has a symmetric J curve relationship with its trading partner Germany, it has an asymmetric J curve relationship with the United Kingdom. Moreover, just like methodological and country-based studies, sectoral studies also have different results. For example, Durmaz (2015) showed the existence of a J curve effect for 13 out of 58 sectors in his study. In other sectors, there is no J curve effect. On the other hand, Yazici and Ahmad Klasra (2010) did not find any J curve effect in their sectoral study and found that the J curve effect deteriorated as imported input dependence increased.

In addition to exchange rate changes, the foreign trade effects of exchange rate uncertainty have also been among the main topics of study (Fang *et al*., 2006; Hooper and Kohlhagen, 1978; Zia and Mahmood, 2013). In contrast to exchange rate changes, there is an important consensus on the relationship between exchange rate uncertainty and foreign trade components. Empirical results show that exchange rate uncertainty has negative effects on the balance of trade (Acaravcı and Öztürk, 2002; Ayhan, 2019; Çelik, 2018; Köse *et al*., 2008; Tari and Yildirim, 2009; Türkyilmaz *et al*., 2007). However, some studies find that exchange rate uncertainty does not have significant effects on exports (Sevim and Dogan, 2016).

A competitive exchange rate policy aims to affect the terms of trade in favour of the country. However, the relationship between the terms of trade and the exchange rate can take place either from the exchange rate to the terms of trade or from the terms of trade to the exchange rate (Azgün, 2013, p. 96). The effect of exchange rate changes on prices is based on a large body of literature, also known as a pass-through effect. According to this approach, the exchange rate changes can affect prices through various channels (Kara and Öğünç, 2012, p. 2). One of these channels is high imported input dependence (Campa and Goldberg, 2008, p. 139). According to Zengin (2001), while there is a direct pass-through from the real exchange rate to import prices, export prices are affected indirectly through import prices. According to the other approach, changes in the terms of trade lead to an income transfer between countries through foreign trade. In the case of an increase in exports and a decrease in imports, an income transfer from abroad to the domestic economy is the source of increases in domestic prices (Zengin, 2001, p. 27). These increases in domestic prices are expected to lead to anti-competitive effects on the real exchange rate. This causality from foreign trade prices to the real exchange rate is supported by empirical evidence (Çalışkan Çavdar, 2011; Zengin, 2001).

4. Data

This study attempts to investigate the exports of the manufacturing industry and the service sector, which are likely to be affected differently by exchange rate policies due to differences in cost sources, using two different sets of models. There are 86 sub-sectors for the manufacturing industry and 121 sub-sectors for the service sector. For the service sector, all main sector groups other than agriculture, forestry and fishing, mining and quarrying, and manufacturing sectors from the CBRT (2024) sector balance sheets are considered. For both sets of models, the period is 2009–2022 and the time dimension is 14. Various other variables are included to explain sectoral exports and detailed definitions, data periods and data sources for these variables are given in Table 1.

In addition to the variables in Table 1, year dummies covering the 2020–2022 period were created. Controlling the relevant period in the analysis is critical because global problems such as the COVID-19 pandemic crisis and the subsequent disruptions in the global supply chain would have significant negative effects on the export performance of countries. The contraction in production due to the deterioration in economic expectations and restrictions due to the COVID-19 pandemic is likely to have significant negative effects on exports. Likewise, an important reason for the contraction in production and exports in the relevant period is the disruptions that have been observed in the global supply chain.

Table 1: Variables, definitions, data periods and sources

Variable	Definition	Abbreviation	Data period	Data source
Export	Foreign sales/net sales	*X*	2009–2022	CBRT (2024)
Labour wages	Real effective exchange rate based on unit labour costs	*WREER*	2009–2022	CBRT (2024)
Exchange rate	Real effective exchange rate based on CPI	*PREER*	2009–2022	CBRT (2024)
Fixed investments	Tangible assets/total assets	*FI*	2009–2022	CBRT (2024)
Gross domestic product	Gross domestic product (at purchaser's prices)	*GDP*	2009–2022	Turkish Statistical Institute (2024)
Crude material imported value	Crude materials (excluding fuel) import unit value index	*CMIV*	2013–2022	CBRT (2024)

Source: Authors' own elaboration

Table 2: Econometric models hypotheses

No.	Hypothesis
H_1	The real effective exchange rate based on labour wages has no significant effect on manufacturing industry exports. It has a negative effect on service sector exports.
H_2	The real effective exchange rate based on consumer prices has a negative effect on manufacturing industry exports. However, it has no significant effect on service sector exports.
H_3	Fixed investments have positive effects on both the manufacturing industry and service sector exports. Their effects on the manufacturing industry are relatively more dominant.
H_4	Gross domestic product has positive effects on both the manufacturing industry and service sector exports.
H_5	Crude material import input value has negative effects on manufacturing industry exports. It has no effect on service sector exports.
H_6	Year dummies for the period 2020–2022 have negative effects on both the manufacturing industry and service sector exports.

Source: Authors' own elaboration

In the study, the exports of the manufacturing and service sectors are analysed based on two different real effective exchange rates calculated based on consumer prices and labour wages. Depending on the literature, it is assumed that the exchange rate based on consumer prices is

more important for the manufacturing industry and the exchange rate based on labour wages is more important for the service sector. Various control variables are also included in the models to explain sectoral exports. In this direction – apart from the exchange rates – fixed investments as a sector-specific indicator, gross domestic product (GDP) as a macro indicator and the value of crude material imported inputs are included in the models to determine the effect of changes in imported input prices on sectoral competitiveness. In addition, there are also year dummies in the model for the period 2020–2022 to represent global turmoil, the COVID-19 pandemic and the subsequent disruptions in the global supply chain. Hypotheses regarding the analysis results of the econometric models are given in Table 2.

5. Model and Methodology

Two models are built to explain the manufacturing industry and service sector exports. The models have the same set of variables for both sectors. Therefore, the models are represented in a single equation structure as follows:

$$X_{i,t} = \beta_0 + \beta_1 WREER_t + \beta_2 PREER_t + FI_{i,t} + GDP_t + CMIV_t + D_{2020} + D_{2021} + D_{2022} + \varepsilon_{i,t} \quad (1)$$

The variable names in the equation are given following the abbreviations in Table 1. The subscripts i and t for the variables in the equation correspond to the unit and time dimensions of the dataset, respectively. In addition, year dummies for the 2020–2022 period are expressed as D in the model and their subscripts indicate which year the dummy belongs to.

The models built to explain manufacturing industry and service sector exports are analysed using the panel data method, including unit (i) and time (t) dimensions. Short panel methods are preferred when the unit size is larger than the time dimension ($T < N$) and the time dimension is not large enough ($T = 14$). In these methods, it is assumed that the time dimension of the series is not large enough to contain a unit root. Whether the created models are suitable for the fixed-effect or random-effect estimators is tested using the Hausman (1978) test (Greene, 2003, p. 301). For the Hausman test, the null hypothesis refers to the random-effect estimator, while the alternative hypothesis refers to fixed effects. Hausman test statistics and probability values are given in Tables 3 and 4. According to the test results, the null hypothesis is rejected in all the models to explain manufacturing industry exports. Since the alternative hypothesis indicating fixed effects cannot be rejected, all the models built to explain manufacturing industry exports should be estimated with the fixed-effect estimator. On the other hand, since the null hypothesis cannot be rejected in any of the export models built for the service sector, the random-effect estimator should be preferred to explain service sector exports.

Table 3: Tests of fixed-effect and random-effect estimators

Diagnostic test	Objective
(Born and Breitung, 2016)	Testing the existence of autocorrelation in the panel fixed-effect model
(Pesaran, 2004)	Testing the existence of cross-sectional dependence in the panel data model
Modified Wald statistics (Greene, 2003, p. 324)	Testing the existence of heteroscedasticity in the panel fixed-effect model
(Wooldridge, 2010)	Testing the existence of autocorrelation in the panel data model
(Levene, 1960)	Testing heteroscedasticity in the panel data model

Source: Authors' own elaboration

The objectives for the diagnostic tests are given in Table 2 and the test results for the models are reported in Tables 3 and 4. According to the diagnostic test results, the models built to explain the exports of both sectors suffer from heteroscedasticity, autocorrelation and cross-sectional dependence problems. There is no autocorrelation problem only in the manufacturing industry export models. For this reason, the estimation coefficients obtained from the fixed-effect estimator for the manufacturing industry sector and the estimation coefficients obtained from the random-effect estimator for the service sector are not consistent and unbiased. In this regard, Driscoll–Kraay (1998) standard error estimators were used to obtain consistent and unbiased estimation results and the findings are reported in Tables 5 and 6. Driscoll–Kraay (1998) standard errors are robust to heteroscedasticity, autocorrelation and cross-sectional dependence problems.

Table 4: Diagnostic tests for manufacturing industry sector export models

Diagnostic test	(1)	(2)	(3)	(4)
(Born and Breitung, 2016)	1.71 [0.087]	1.76 [0.079]	1.90 [0.057]	1.73 [0.084]
(Pesaran, 2004)	20.257 [0.000]	20.268 [0.000]	19.615 [0.000]	11.168 [0.000]
Modified Wald statistics (Greene, 2003, p. 324)	43,831.02 [0.000]	41,393.14 [0.000]	64,746.61 [0.000]	43,980.46 [0.000]
(Hausman, 1978)	11.32 [0.010]	11.11 [0.025]	11.04 [0.026]	13.45 [0.036]

Note: The values given in square brackets are the probability values of the relevant test statistic.
Source: Author's own calculations

Table 5: Diagnostic tests for service sector export models

Diagnostic Tests	(1)	(2)	(3)	(4)
(Wooldridge, 2010)	37.783 [0.000]	38.653 [0.000]	27.451 [0.000]	38.436 [0.000]
(Pesaran, 2004)	21.495 [0.000]	23.208 [0.000]	16.530 [0.000]	25.191 [0.000]
(Levene, 1960)	21.862 [0.000]	21.837 [0.000]	10.871 [0.000]	21.745 [0.000]
(Hausman, 1978)	4.47 [0.215]	4.46 [0.346]	5.44 [0.244]	4.44 [0.617]

Note: The values given in square brackets are the probability values of the relevant test statistic. W0 variances are reported for Levene's (1960) heteroscedasticity test statistics.

Source: Author's own calculations

6. Findings and Discussion

Export models for the manufacturing industry and service sector, which have different import input dependence ratios and different cost structures, were analysed with fixed-effect and random-effect methods, respectively, using the PCSE (panel-corrected standard error estimator) method and the DK (Driscoll–Kraay) standard error estimator. Analysis results for the manufacturing industry and service sector are given in Tables 5 and 6, respectively. When both tables are examined together, it can be said that the difference in cost sources manifests itself in competitive effects. The higher labour costs in the service sector compared to the manufacturing industry lead to differences regarding the determinants of the export level. According to the findings, while the real effective exchange rate based on labour wages is an important factor in explaining service exports, its explanatory level is not enough for the manufacturing industry exports. On the other hand, while the real effective exchange rate based on consumer prices has significant effects on manufacturing industry exports, a significant result was found in only one model in the service sector. The coefficient sign of all the significant estimation coefficients of exchange rate variables is negative. The negative sign of the coefficient is due to the calculation method of the real effective exchange rate. According to the method, an increase in the nominal exchange rate means a decrease in the real effective exchange rate. In other words, the decrease in both exchange rate variables creates competitive effects.

The level of fixed investments, which is added to the models as a sector-specific variable at the sub-sector level, also has significant differences in the context of the manufacturing

industry and services. Investments affect exports significantly and positively in all fixed-effect estimates calculated according to Driscoll–Kraay standard errors for the manufacturing industry. On the other hand, according to the PCSE method, no significant effect of fixed investments on manufacturing industry exports was found. It is thought that this difference in the results regarding fixed investments arises from the long-time structure of the estimators obtained according to Driscoll–Kraay's standard errors. In the service sector, no significant effect of fixed investments on exports was found. While the gross domestic product variable added to the model as a control variable does not have any effect in explaining manufacturing industry exports, it has positive and significant effects on service exports.

In addition to labour-related cost differences between sectors, differences in imported input dependence ratios also create a significant inter-sectoral competitive gap. The high and increasing imported input dependence in the Turkish manufacturing industry makes the exchange rate an important cost source for the sector. Not only do national currency depreciations create competitive advantages for the sector, but they also increase costs. It means that competitive advantages are negatively suppressed. The findings obtained from Model 3 support this argument in Table 5. The increase in crude material imported input value affects manufacturing industry exports significantly and negatively, according to Driscoll–Kraay standard errors. According to the PCSE method, it does not have a significant effect. Since there is no use of crude materials in the service sector, the general import unit value was included in the analysis instead of the crude material import unit value. However, according to both methods, no significant effect of the increase in imported unit value on service sector exports was found.

Dummy variables in the period 2020–2022 were included in the analysis to examine the effects of the change in Turkey's monetary policy stance, the COVID-19 pandemic crisis and the global supply chain disruptions on sectoral exports. The 2020 year dummy does not have any effect on manufacturing industry exports, and its effect on service sector exports is significant and negative according to both analysis methods. While the negative effects in the service sector continue in 2021 and 2022 according to the Driscoll–Kraay estimations, the findings obtained from the PCSE method are not significant. For the manufacturing industry, the dummy variables for 2021 and 2022 are significant at the 10% and 5% significance levels, respectively and no significant estimation could be obtained from the PCSE method.

Table 6: Models to explain manufacturing industry exports

Variables	(1)		(2)		(3)		(4)	
Method	**DK**	**PCSE**	**DK**	**PCSE**	**DK**	**PCSE**	**DK**	**PCSE**
WREER	−0.011	−0.018	−0.020	−0.027	−0.046*	−0.031	−0.0544**	−0.032
PREER	−0.0851***	−0.045**	−0.091***	−0.045**	−0.057**	−0.034	−0.075***	−0.060
FI	0.272***	0.048	0.268***	0.043	0.240**	−0.113	0.319***	0.061
GDP	–	–	−0.006	−0.004	–	–	–	–
CMIV	–	–	–	–	−0.035*	−0.013	–	–
D2020	–	–	–	–	–	–	−0.001	−0.008
D2021	–	–	–	–	–	–	−0.020*	−0.020
D2022	–	–	–	–	–	–	−0.035**	−0.025
Constant	0.614***	0.523***	0.817***	0.664**	0.819***	0.626***	0.754***	0.652***
F/Wald test	110.49 [0.000]	10.19 [0.017]	149.86 [0.000]	11.16 [0.024]	66.59 [0.000]	12.69 [0.012]	389.85 [0.000]	13.57 [0.034]
Number of observations	1,204	1,204	1,204	1,204	860	860	1,204	1,204

Note: The symbols *, ** and *** given with the estimation coefficients correspond to the 10%, 5% and 1% significance levels, respectively. The values given in square brackets are the probability values of the relevant test statistics. The fixed-effect estimator results are reported according to the Hausman test.

Source: Authors' own calculations

The analyses conducted to explain sectoral exports provide important findings. Firstly, the findings of the study indicate that differences in sectoral input structures are important sources of export competitiveness in Turkey. In addition, the high degree of imported input usage makes the Turkish manufacturing industry an integral part of the global value chain. This follows from increasing globalization. According to this argument, countries in the global value chain cannot increase exports by reducing the value of the national currency. Also, the ability of countries in the global value chain to conduct independent monetary policy is restricted (Albu *et al*., 2022, p. 3; Frohm, 2021, pp. 21–22; Fišera and Horváth, 2022, pp. 1–2). However, the same is not true for the service sector, which uses labour-intensive inputs. Therefore, it can be stated that service exports are relatively more independent of the global value chain than manufacturing sector ex-

ports. Moreover, for the service sector, the most important source of competitiveness is not the exchange rates, but wages. Therefore, because of increasing globalization and hence expansion in the global value chain, keeping the value of the national currency low is gradually losing its importance among the policies aimed at export increases (Fišera and Horváth, 2022, p. 1).

Table 7: Models to explain service exports

Variables	(1)		(2)		(3)		(4)	
Method	**DK**	**PCSE**	**DK**	**PCSE**	**DK**	**PCSE**	**DK**	**PCSE**
WREER	−0.026***	−0.025***	−0.017***	−0.014*	−0.035***	−0.018**	−0.021***	−0.020**
PREER	−0.009	0.003	−0.002	−0.002	0.002	−0.002	−0.026***	−0.009
FI	0.043	0.008	0.043	0.008	0.024	−0.023	0.043	0.006
GDP	–	–	0.006***	0.006*	–	–	–	–
CMIV	–	–	–	–	−0.005	−0.010	–	–
D2020	–	–	–	–	–	–	−0.008***	−0.007***
D2021	–	–	–	–	–	–	−0.012***	−0.007
D2022	–	–	–	–	–	–	−0.005***	−0.002
Constant	0.234***	0.187***	0.024	0.009	0.254***	0.125**	0.289***	0.226***
F/Wald test	1343.55 [0.000]	16.29 [0.001]	511.76 [0.000]	19.99 [0.000]	1022.05 [0.000]	20.43 [0.000]	5040.96 [0.000]	39.94 [0.000]
Number of observations	1,694	1,694	1,694	1,694	1,210	1,210	1,694	1,694

Note: The symbols *, ** and *** given with the estimation coefficients correspond to the 10%, 5% and 1% significance levels, respectively. The values given in square brackets are the probability values of the relevant test statistics. The random-effect estimator results are reported according to the Hausman test.

Source: Authors' own calculations

The findings confirm the basic hypotheses of the study. However, there are differences in the sectoral effects of GDP and year dummies. While GDP does not affect manufacturing industry exports, it affects service sector exports positively. Regarding year dummies, the negative effects are concentrated in the service sector exports. This situation arises from the difference in the trade structures of the services and manufacturing industries and it is plausible that the service sector is more negatively affected due to the restrictions in the COVID-19 pandemic crisis. On the other hand,

it can be argued that disruptions in the global supply chain will have a significant negative effect on manufactured goods that are heavily included in the global value chain. In this sense, being included in the global value chain both limits the export effect of independent exchange rate policy and makes domestic production and exports more sensitive to global dynamics.

In the service sector, a lower-valued national currency based on wages, and in the manufacturing sector, a lower-valued national currency based on prices makes exports more competitive. These findings show what kind of distributional effects the policies of political decisionmakers have on sectors through the exchange rate and wage channels. On the other hand, depending on the lobbying power of certain sectors on the political decision making mechanism, it is likely that the export-driven policy framework will be affected. For example, firms operating in the service sector may press for lower wages as well as a lower-valued national currency to promote service exports. In this context, this study offers a different perspective on the relationship between exchange rates and exports.

7. Conclusion

With the 2001 Transition to the Strong Economy Programme, the Turkish economy began to follow a strong Turkish lira policy to encourage capital inflow from abroad into the country to provide the capital that was not sufficient at home. The export-discouraging and import-increasing effects caused by the strong national currency have caused significant foreign trade deficits. The main consequence of this negative pressure of foreign trade deficits on the balance of payments is the vulnerability to sudden stops. Therefore, when it was understood that the policies of attracting international capital into the country were not sustainable due to political turmoil and global problems, more competitive (lower-valued national currency) Turkish lira policies were adopted instead of strong national currency and policies oriented to international markets. However, when the exchange rate shocks began, which first appeared with the Pastor Brunson crisis in 2018, various problems occurred. The high foreign currency indebtedness structure of real sector balance sheets and high import input dependence are among these problems. While the deterioration in real sector balance sheets eliminated the advantages arising from competitiveness, the import input dependence caused high inflation, affected the decisions of all economic agents and reduced competitive advantage in exports.

A significant part of total exports from Turkey are carried out by the manufacturing industry sector. That is why price competitiveness is important in the manufacturing industry. In Turkey and similar developing countries, the manufacturing industry and service sector have a high share of the GDP, and the share of the service sector in the GDP increases over time. This situation causes the service sector to stand out not only due to its position within the production structure but

also because of its gains from foreign trade. However, differences in the cost structures of these two main sectors lead to different results in policies aimed at price competitiveness. The main cost source in the service sector is labour costs due to its labour-intensive structure, while in the industrial sector, it is intermediate inputs and crude materials. In this case, naturally, the expectations of the sectors will be different for the emergence of price competitiveness in exports. While low wages create a significant competitive advantage for the service sector, national currency depreciations in the manufacturing industry may cause export-enhancing effects. However, the manufacturing industry's high levels of import input dependence can reduce the competitive effects of national currency depreciation. Accordingly, in this study, the effects of changes in exchange rates and labour costs in the manufacturing industry and service sector exports were analysed econometrically.

The findings of the analyses in the study, in line with expectations, were found to be affected negatively and significantly by changes in the real effective exchange rate based on consumer prices. The effects of the real effective exchange rate, which is based on labour costs, on manufacturing industry exports are limited. On the other hand, while the real effective exchange rate based on labour costs in the service sector is a negative and significant determinant of exports, a significant effect of the real effective exchange rate based on consumer prices was found in only one model. Significant and negative results were found in the manufacturing industry export model, in which the crude material import value was included due to the high import input dependence. The findings provide support for the view that national currency depreciations create competitive effects in the manufacturing industry, but cost increases in imported input materials suppress these competitive effects. The general imported input value, which is included in the model to explain service sector export, does not have a significant effect on exports.

Dummy variables considering the period 2020–2022 were included in the models to investigate the effects of the sudden change in Turkey's monetary policy stance and problems such as the pandemic-related supply chain disruptions and closures on the sectoral export level in 2020 and beyond. Although the findings partially differ depending on the analysis methods, it is seen that the service sector exports were negatively affected in 2020 (the COVID-19 pandemic crisis year), but the pandemic did not have any significant impact on the manufacturing industry sector. On the other hand, the analysis findings based on Driscoll–Kraay standard errors show that both sectors were negatively and significantly affected in 2021 and 2022, while the findings of the PCSE method are not statistically significant. Therefore, as can be seen from the impact of the COVID-19 pandemic crisis, the sectoral effects of global problems also vary significantly. The effects of fixed investment levels on exports were investigated to include sector-specific effects in the model. While it is supported by the Driscoll–Kraay fixed-effect analysis findings that fixed investments in the manufacturing industry are a positive and significant determinant of ex-

ports, the results of the PCSE method did not have any significant effect. In the service sector, according to both the Driscoll–Kraay random-effect analysis results and the PCSE method results, fixed investments do not affect exports. Finally, it is seen that the gross domestic product affects significantly and positively the service sector exports but does not have any effect on the manufacturing industry sector exports.

The study presents empirical findings on how price competitiveness in exports in the Turkish economy differs regarding various sectors. While the competitive export indicator for the service sector is lower labour wages, it is the lower-valued Turkish lira for the manufacturing industry. In addition, our findings also indicate that the competitive exchange rate policy for the manufacturing industry is limited due to the high dependence on imported inputs. Therefore, sectoral expectations regarding the competitive exchange rate policy (lower-valued Turkish lira) in Turkey are different. In this sense, the study makes an important contribution to the existing literature by revealing the significant effects of sectoral differences and differences in cost sources of the relevant sectors on export dynamics. Moreover, the findings of the study imply that an exchange rate policy targeting a lower-valued domestic currency is not a sustainable policy aiming at increasing exports. It seems that the service sector can only export more at the expense of impoverishing workers through lower wages. On the other hand, the manufacturing industry can only benefit from the lower-valued domestic currency exchange rate policy in the short term due to the high dependence on imported inputs. Therefore, a continuous increase in exports for the Turkish manufacturing industry can only be possible with a continuous depreciation of the Turkish lira.

We should also mention that there are some limitations to our study. The first of these limitations is related to the dataset. Since it includes aggregated sectoral data, the dataset used in this study does not enable an evaluation of firm-specific behaviour. Another limitation is that these findings and evaluations of the study are only valid for the time being for the Turkish economy. However, these findings may offer important implications for countries with similar production dynamics and cost structures to the Turkish economy, which leaves room for further empirical work.

Acknowledgement

Funding: There was no funding, either externally or internally, towards this study.

Conflicts of interest: The authors hereby declare that this article was not submitted no published elsewhere.

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